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Citation: Toor, A. (2020). Enabling young individuals to make an informed about higher education: using persuasive technology. (Unpublished Doctoral thesis, City, University of London)

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Enabling Young Individuals to make an Informed Decision about Higher Education: Using Persuasive Technology

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Submitted in fulfilment of the requirement for the degree of Doctor of Philosophy

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Abbreviations

Abbreviation	Full Form
FBM	Fogg Behaviour Model
HE	Higher Education
HEFCE	Higher Education Funding Council for England
HESA	Higher Education Statistics Agency
LPN	Low Participating Neighbourhood
PSD	Persuasive Systems Design
PT	Persuasive Technology
WP	Widening Participation

Dedication

I would like to dedicate this research to my parents. I am really indebted to you both, for everything you have taught me.

This one is for you mom and dad!

Acknowledgements

Pursuing this PhD has truly been a life-changing experience for me. My PhD journey came with lots of wonderful experiences and adventures, as well as challenges, and it would not have been possible to do without the support I received from many people.

Firstly, this work owes to my dear dad, without whom I would not have been able to pursue my PhD. I would like to thank him for all his prayers, encouragements, emotional and financial support. You were the one who encouraged me to start this PhD. Thank you for always believing in me and never letting me doubt my abilities. I am ever so grateful for everything you have done for me. Thank you Dad!

Next, I would like to express my deep gratitude and appreciation to my supervisors - Professor Stephanie Wilson and Dr Simone Stumpf – for their patient guidance, useful critiques, and willingness to always be there for support and advice when I needed them. I find myself very fortunate and could not have asked for better supervisors!

I am also extremely grateful to the Centre for HCID members for their on-going encouragement and support. Special thanks go to Dr. Reem Al-Ashaikh for being such a great friend, who not only guided, but also inspired me throughout the 4 years. I would also like to thank all the participants who took part in my studies.

I would also like to extend my deepest gratitude to my loving family members. Although they live far, in a different country, they never failed to help and support me. Most importantly, I would like to thank my parents for their continuous prayers, love, encouragement and patience. You both have taught me to work hard and to never give up. Also, special thanks to my siblings, Sumbal, Nadir, Saadia and Baber, who have always been a phone call away whenever I needed support and motivation.

Lastly, another person who played a significant role in helping me complete my PhD was my best friend, Neelam. This journey would have been a tough one if you had not been a part of it.

Publications Related to this Thesis

Toor, A. (2016). Persuasive Technology in Education: Motivating Individuals to Enter Higher Education. *In Proceedings of the 30th International BCS Human Computer Interaction Conference (HCI 2016)*. eWIC BCS.

Toor, A. (2016). Persuasive Technology in Education: Motivating Individuals to Enter Higher Education. *In Proceedings of the 11th International Conference on Persuasive Technology (p. 120)*. ACM.

Abstract

Higher Education (HE) is the continuation of study after the age of 18. It occurs after the completion of secondary education, and normally includes undergraduate and postgraduate qualifications. One of the factors which play a vital role in influencing a young individual's decision to enter higher education is *peer pressure* from friends. Studies have already proven that young individuals are highly responsive to their peers and what the prevailing norm is when making decisions, hence, the same trait is seen in this context. For some individuals, friends play the role of a *barrier*, influencing them to not enter HE, whereas for others, friends play the role of a *motivator*, influencing them to enter HE. In both cases, these individuals are unable to make an informed decision about their future when considering HE. To feel socially accepted, they end up following their friends and making the same decision as them.

Existing studies and literature have paid limited attention to overcome friends' influence when making a decision about HE. The work that exists focuses primarily on minimising *family influence* only (particularly parents), where extra guidance and information is given to parents so that they encourage their children to enter HE. In addition, technologies are used in a limited way to help individuals make an informed decision about their future. E-portfolios and creation of timelines are being incorporated to encourage students to think about their future, however, they do not target overcoming friends' influence in particular.

To fill this gap, this PhD thesis aims to answer the overall research question: Investigating how technology can be used to facilitate young individuals in making an informed decision about HE. Answering this research question was approached in two parts. In the first part, the problem was unpacked, investigating the factors which impact a young individual's decision to enter HE, and in the second part, the technology to address the problem was developed. Three studies were conducted for the first part, which helped identify the problem, i.e., peer pressure from friends was playing a vital role for some individuals, impacting their ability to make an informed decision about HE. To address this problem, a persuasive technology, in the form of a persuasive interactive storytelling game was then developed and tested for the second part of this research. The game was developed on an existing smartphone app – Episode – with specific persuasive design models and principles applied. The final study involved testing whether the persuasive game was effective in changing the behaviours of individuals so that they are able to mitigate peer pressure from friends when making the decision about HE. Results from this study hypothesised that the game was effective, as the susceptibility to peer pressure from friends after playing the game had decreased in the participants overall. In total, four studies were conducted to answer the overall research question.

By undertaking the work done in this research, four contributions to the field of HCI are made. The main contribution is offering a novel approach to facilitate individuals in making an informed decision about HE by mitigating peer pressure from friends. A persuasive interactive storytelling game was developed to achieve this. The second contribution is the design of the persuasive game. A combination of two existing models were used to inform the design; the Behaviour Wizard and the PSD Model. The third contribution is the proposal of a new persuasive design principle – *Reverse Psychology*. This design principle is not covered in any existing persuasion strategies or frameworks, and the final study conducted indicated that the concept of *Reverse Psychology* is effective in persuading young individuals to change their behaviour. The final contribution is an empirical understanding of the barriers and motivators encountered by individuals from a Low Participating Neighbourhood, and the role technology plays in their decision making. This research contributed to existing work on the barriers and motivators to enter HE by addressing the limitations found in the previous studies, hence adding to existing knowledge.

Chapter 1: Introduction

This chapter gives a brief introduction of this work. It starts with the motivation to conduct this research, followed by an overview of the background and problem statement. Next, the research questions identified to answer the overall aim, the main contributions made of the work undertaken, and the methods used in this PhD research are presented. In the end, the structure of this thesis is outlined.

1.1 Motivation

"Aamna I really want to go to university but I don't know where to start, please can you help me?" was what one of my friends' younger sister, Rebecca, asked me one day. I helped her with the application and she got accepted into a university of her choice. The day she was offered a place, she rang me, and I was the first person she gave the news to. She was jumping with joy and could not stop saying how she is indebted to me, how I have helped build her future etc. I cannot explain how excited and overwhelmed with pleasure I felt at that moment (I literally felt like I had fulfilled my life's purpose!). Speaking to Rebecca and spending time with her when making the application made me realise that there were many young individuals, like her, who made a decision about going or not going to university in sixth form and were now regretting it, or were not necessarily content with their decision. Seeing Rebecca being able to do what she had always wanted, gave me the motivation to find a way to help other individuals too, so that they are able to make better decisions about university (and their future). I decided to research this topic deeper, and develop/propose a technology based solution which could help young individuals overcome the factors which influence their decision making.

1.2 Higher Education in UK

'Higher Education' (HE) is a level of education that is usually completed after the age of 18. Higher education courses lead to qualifications which are above the standard of A-levels or other Level 3 qualifications. They include undergraduate degree courses and postgraduate courses (HEFCE, 2018). The Higher Education Statistics Agency (HESA) reports that certain groups in the UK are under-represented in Higher Education (HE) relative to the HE population as a whole. The under-represented groups are disproportionately lower in number relative to the general population. These groups are: (i) Students from state schools or colleges, and (ii) Students from Low Participating Neighbourhoods (LPN). Prior to 2017, students from specified socio-economic classes 4, 5, 6 & 7 were also classified as an under-represented group. However, this classification as a measure was discontinued following concerns about the quality of the data collected for this classification.

In enrolment year 2016/17, the percentage of England domiciled young entrants (those who are below the age of 21) who entered higher education for a full-time undergraduate degree was 41% (HESA, 2018). From these, 90% came from state schools or colleges, and only 11.4% of the young entrants came from a low participating neighbourhood. When the HE statistics are looked at as a time series analysis (HESA, 2018), a trend can be seen – the number of students entering from a LPN is consistently the lowest throughout the years. On average over the past 5 years, only 11% of young students from this underrepresented group entered HE compared to the HE population as a whole (see section 2.1 for details).

To encourage students from underrepresented groups to enter higher education, a number of on-going Widening Participation (WP) and Outreach projects are being carried out, ranging from university activities such as taster weeks and Open Days, to specific mentoring and scholarship programmes. One could question that despite running numerous projects to widen participation, the participation rate of students from Low Participating Neighbourhoods (LPN) is still extremely low and not increasing significantly over the years. Perhaps the approach to widen participation needs to be adapted in order to see an increase in the participation rates of students from LPN. Moreover it was identified (Section 2.1.3) that the projects run by the WP teams only focus on encouraging individuals to enter higher education. These projects should be refined in a way which enable individuals to make better and informed decisions about their future - whether they should enter higher education or not.

In addition, prior studies have identified various barriers and motivators encountered by individuals which influence their decision to enter higher education. Lack of funds/finance, fear of debt, not being able to secure a job, and influence from parents, family or teachers were reported as some of the barriers to enter higher education ((Forsyth & Furlong, 2003), (Mullen, 2010), (Adams, 2013) and (Connor, et al., 2001)), whereas building a career, having better job prospects and influence from parents, friends and teachers ((NUS, 2008), (Round, 2005) and (Leeds, 2017)) were reported to be motivators to enter higher education. These studies showed that a variety of factors impacted an individual's decision about higher education.

1.3 Persuasive Technology

Persuasive technology can be defined as “any interactive computing system designed to change people's attitudes or behaviour through persuasion, not through coercion” (Fogg, B.J., 2002). While coercion may change behaviour by implying force, it is not the same as persuasion - which implies a voluntary change. The nature of this technology, in motivating users to change their behaviour, has allowed it to be applied within numerous domains, such as in marketing, healthcare, environment and education. For example, Amazon uses a persuasive ‘one-click buy’ button on their website to influence the buying behaviour of their customers. As this button is aimed to make their online buying simple, the customers are likely to buy more often.

Within the area of education, persuasive technology has been designed to aid the teaching process and encourage learning. Examples of such technologies include the development of an educational software to motivate children to read and write (Lucero, Zuloaga, Mota & Muñoz, 2006). The software designed by Eindhoven University of Technology and Universidad Tecnológica Metropolitana (Lucero, Zuloaga, Mota

& Muñoz, 2006)) persuaded children to read and write. It used a persuasive strategy of 'similarity', where a well-known literary character 'Papelucho' (who was familiar to the children) was included within the software so that children could relate to the character and follow the tasks he was doing, encouraging behaviour change. In addition, the HANDS Project (Mintz & Aagaard, 2012) developed a mobile application for a special school, to help teenagers diagnosed with autism handle daily situations and improve their social skills.

Although persuasive technology has been used within the educational sector, it is applied within classrooms and learning environments, to aid teaching and to encourage students' skills development and learning. The technologies used are primarily targeted towards students who are already in education, making their learning process simpler, *within* their classroom. Such as, 'digital storytelling' (Mayes, Morrison, Mellar, Bullen & Oliver, 2009), where the authors concluded for it to be a powerful tool for supporting teaching, learning and assessment in education. In another study, the use of digital technologies to enhance learning and creativity were addressed (Laurillard, Oliver, Wasson & Hoppe, 2009). However, limited attention has been paid to technologies which enable students to make their future decision (in terms of entering higher education or not); a decision which will usually be made *outside* their classroom.

There is little work in HCI that focuses on using technology to persuade young individuals to make informed decisions about their future. Not much research has been done to understand how technology can be persuasive and facilitate individuals to change their behaviours and attitudes so that they are able to make informed decisions about their future. The scope of this research is therefore to explore an opportunity, where a link must be made between individuals who are unable to make an informed decision about higher education and using persuasive technology to change their behaviour so that they are able to make an informed decision.

1.4 Research Questions

The overall aim of this research was to investigate how persuasive technology can be used to facilitate young individuals in making an informed decision about their future when considering higher education. To answer this aim, the research was approached in two parts. The first part investigated what the problem was; what factors influenced a young individual's decision about higher education. In the second part, a technology was developed to address the factor, which enabled individuals to overcome the problem and supported them in making an informed decision about higher education.

To address the first part of the research, three research questions were developed:

RQ-1: What factors influence individuals to not enter higher education? (Study One: Chapter 3)

RQ-2: What motivates individuals to enter higher education? (Study Two: Chapter 4)

RQ-3: Does a wider population across England also encounter the same barriers and motivators to enter higher education? (Study Three: Chapter 5)

Answering the three research questions (outlined above) revealed that peer pressure from friends can play a vital role for some individuals when making the decision about higher education. Whilst friends' influence

acted as a barrier for some individuals, influencing them to not enter higher education, it acted as a motivator for others, influencing them to enter higher education. In both cases, the individuals were unable to make an informed decision about HE; they ended up following their friends and making the same decision as them. In addition, it was also established from the literature review conducted (section 5.5), that there was a lack of work done which addressed this topic. The work that exists focuses primarily on minimising *parental* influence. Therefore, a potential for an emerging opportunity was identified here, where the need to design and build a technology which facilitates in overcoming peer pressure from friends was recognised. Hence, it was decided to focus on this factor/problem, *peer pressure from friends*, for the second part of the research. The two research questions developed for the second part of the research were:

RQ-4: How can a persuasive technology be designed to mitigate peer pressure from friends when making the decision to enter higher education? (Chapter 6)

RQ-5: Can an interactive storytelling game be used as a persuasive technology to facilitate in making an informed decision about the future? (Study Four: Chapter 7)

1.5 Contributions

The work undertaken in this research makes four contributions to the field of HCI. These contributions were achieved by answering the five research questions. These are:

1. An interactive storytelling game to mitigate peer pressure (Chapter 5 and 6)

This research presents a novel approach to facilitate individuals in mitigating peer pressure from friends when making a decision about higher education. An interactive story, called 'My Next Step' has been developed on an existing app –Episodes- which can be played on a smartphone or tablet. The game play involves players to make higher education related decisions for their avatar and see how friends influence can affect their avatars' future. The concept arises from the Choose Your Adventure storybooks, where the users' character ends up in different situations depending on the choices they make. In My Next Step, the players are also presented with a true story at the end, raising awareness about how friends influence has impacted other students' futures. The narrative of the game and true stories were inspired by the incidents reported by some of the participants recruited for Study 1 and 2 for this research. Answering RQ-4 and RQ-5 allowed me to make this contribution. This game could also be used to widen participation, as currently overcoming friends' influence is not factored into the projects run by the widening participation and outreach teams.

2. Design of the persuasive game using a combination of two models; the Behaviour Wizard and PSD Model (Chapter 6)

This research gives insight into designing a persuasive interactive storytelling game by incorporating the Behaviour Wizard and PSD model. This artefact type of contribution was associated with RQ-5. In addition, the persuasive design principles reported by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013) and Cialdini (Cialdini & Goldstein, 2002) were also looked at to be incorporated within the design of the game.

3. Proposal of a new persuasive design principle - *Reverse Psychology* (Chapter 7)
Evaluation of the effectiveness of the persuasive game identified the need for a new persuasive design which could support behaviour change. This was achieved by answering RQ-5.
4. An empirical understanding of the barriers and motivators encountered by individuals from a LPN, and the role technology played in their decision making (Chapter 3, 4 and 5)
This research contributed to existing work on the barriers and motivators to enter higher education. Answering RQ-1, RQ-2 and RQ-3 allowed me to add to existing knowledge by addressing the limitations found in the previous studies conducted.

1.6 Target Beneficiaries

The direction of work in this research is targeted towards benefitting two research disciplines: education and HCI. The people from both these disciplines will benefit from the contributions in this research. Within the education discipline, the Widening Participation and Outreach teams, career teams at university and schools will benefit from the persuasive game itself. These beneficiaries within the education discipline can use the game to help young individuals make an informed decision about higher education by being less susceptible to peer pressure from friends. At the same time, researchers within the HCI community and persuasive design teams will also benefit from the work undertaken. The design and implementation of the persuasive game developed for this research revealed a valuable contribution; although the persuasive design principles were carefully implemented within the game, the results were not as expected and failed to predict the experiences that were documented in previous literature. It might be the case that the design principles reported in the previous literature are not effective on this target group (mid-adolescents). This is explained in detail in the final chapter - Discussion and Conclusion (Chapter 8). In addition, this research will be valuable to both these disciplines as more up to date findings and limitations of the previous literature have been addressed.

1.7 Approaches and Methods Used in this PhD Research

This research incorporated a mixture of exploratory, empirical and persuasive technologies research. The exploratory research included the first two interview based studies. These studies explored the factors which influence an individual's decision about higher education; the barriers and motivators to enter higher education were investigated in these studies. The third and fourth studies were an empirical research. For both the third and fourth study, a null hypothesis was formed, validated and linked to existing knowledge from the first two studies. In addition, research on persuasive technology, the persuasive Behaviour Model (Fogg, B.J., 2009 (Behaviour Model)), Behaviour Grid (Fogg, B.J., 2009 (Behaviour Grid)) and persuasive design principles suggested by BJ Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013), Cialdini (Cialdini & Goldstein, 2002), and Oinas (Oinas-Kukkonen & Harjumaa, 2009) were explored in order to design a persuasive technology which meets the aim of this research. All the studies are explained in more detail later in this section.

Commented [WS1]: Have you found other work that identifies shortcomings in the persuasive principles?

Commented [A2R1]: I haven't found any literature that identifies the shortcomings in the design principles. I have however found other criticism of Persuasive Technology in general.

Commented [WS3]: effective

Commented [A4R3]: changed affective to effective

The first step was to establish the barriers and constraints that individuals face and what role technology played in their decision making. For this a literature review was conducted to learn about the higher education statistics, the barriers/motivators to enter higher education, the role technology plays within the education sector which affect an individual's decision, how persuasive technology is applied within the educational context and the different behavioural models which are used to persuade an individual to perform a target behaviour.

After the literature review, two interview based exploratory studies were carried out to ascertain what factors act as a barrier (Study 1: Chapter 3) and motivator (Study 2: Chapter 4) to enter higher education. Most importantly, what role technology plays in individuals' decision making was also addressed in these studies. Although a number of studies have been carried out previously to find out the barriers and constraints individuals face in entering HE, for this research, primary data needed to be gathered to see whether any new factors emerged. In addition, no previous studies include the role technology played in the decision making. Therefore, two studies were conducted to gather this information. Both these studies involved qualitative analysis of the results. The interviews were transcribed, and thematic analysis was used to analyse the data.

Thematic analysis is a qualitative research method which is widely used. It is a method for identifying, analysing, organizing, describing, and reporting themes found within a data set (Braun & Clarke, 2006). This method worked best to analyse the data because it gave me the flexibility to look for new and emerging patterns and trends in the barriers and motivators reported by the participants. In addition, it also allowed a deductive and inductive approach to analyse the data. By doing so, I was able to start analysing the code with specific pre-defined codes (deductive coding), and also develop new codes for any new patterns or themes which emerged while reading the transcripts (inductive coding).

A third study (online survey) was then conducted to validate the findings from the first two studies (Study 3: Chapter 5). This study was an empirical research and addressed the barriers and motivators reported in the first two studies. As it was an online survey, the aim was to recruit more participants (more than 300), so that I could validate my findings. A hypothesis was formed and it was tested whether there is a statistically significant difference in the barriers and motivators reported by three groups; who are in university, not in university, and still deciding. This allowed me to establish which of the barriers and motivators reported by the participants from the first two studies are important, and/or play a vital role in the decision making process of entering higher education.

After the analysis, it was evident that 'Friends' influence' plays an important role for some individuals when it comes to deciding about entering HE. On the other hand, there were also some individuals who reported that they ended up going into HE because their friends were going, and they did not want to feel left out. Those who were in university and not in university rated that their friends' decisions play an important role in their decision to enter HE, which is why this factor had a statistically significant difference when analysed. Individuals followed their friends and did not make an informed decision about their future. There was also not much work is done in the area of HCI to help overcome this barrier.

The next step was to design the persuasive technology to help overcome *friends' influence* (Chapter 6). This involved using Fogg's Behaviour Grid (Fogg, BJ., 2009 (Behaviour Grid)) to ascertain which target behaviour and attitude we are hoping to change, and the Fogg's Behaviour Model (Fogg, BJ., 2009 (Behaviour Model)) in order to establish which elements of motivation are required to be built within the persuasive technology which will help motivate these individuals to be able to make informed decisions about their future and not be influenced by friends decisions. To help build the motivation elements within the technology, the persuasive design principles suggested by BJ Fogg and Cheng (Cheng, 2013) and the Persuasive System Design (PSD) Model by Oinas (Oinas-Kukkonen & Harjumaa, 2009) was implemented. 'Design Thinking' is a well-known technique used to structure the design of a persuasive technology, hence the same approach was used as it seemed to be the most well-suited in structuring the design process of this persuasive technology.

Design Thinking or Service Design Thinking is a human-centered design methodology that uses intuitive problem-solving techniques to match people's needs with what is technologically feasible and organizationally viable (Brown & Wyatt, 2010). The framework has five stages of overlapping and inter-related activities: Empathise, Define, Ideate, Prototype and Test. With this model the target behaviour and attitudes were finalised, and each prototype was designed with a different persuasive design principle and motivational element. A number of design principles were used to design the prototypes for the persuasive technology. Each design principle has its own functionality and persuasive feature which helps to change the behaviour and attitudes of young individuals so that they are not influenced by friends and are able to make an informed decision about their future. In the end, only one of the persuasive technology prototype was selected to test whether it helps individuals make an informed decision about their future.

A novel approach was used help individuals overcome friends' influence when it comes to deciding about entering HE by raising awareness about peer pressure through the persuasive technology (Chapter 6). An interactive storytelling game was designed and developed by incorporating certain design principles, enabling young individuals to be able to make an informed decision about their future. Finally, an empirical study was conducted to test this interactive game (Study 4: Chapter 7). This study included qualitative (interviews) and quantitative data (questionnaires). A statistical test was used to measure change in behaviours/attitudes and determine whether there is any change after playing the persuasive game. The interviews were transcribed and analysed. A deductive approach was used to test whether playing the persuasive game helps overcome friends' influence when deciding about higher education so that they are able to make an informed decision about their future.

1.8 Thesis Structure

This chapter has provided an introduction to the motivation to design and develop a persuasive technology to help young individuals be able to overcome friends' influence and be able to make an informed decision about their future. It also touched upon the HE statistics in UK and persuasive technology. Both these concepts are expanded further in the next chapter. The research questions and main contributions in the field of HCI were also covered. The remainder of this thesis structure is as follows:

Chapter 2: Background and Related Work

This chapter provides a background on the HE statistics in UK. It gives a clearer idea of the student participation rate, demographic information, underrepresented groups in HE, and finally the barriers and motivators to enter HE that have been reported in previous studies. An overview of the various Widening Participation activities being run to motivate students to enter higher education is also included.

In addition, this chapter presents an overview of the literature on Persuasive Technology. It describes the Persuasive Models and Persuasive Design Principles, which will be later used as a basis for analysing the research studies, as well as scoping and designing the persuasive technology.

Chapter 3: Study I: Factors Influencing the Decision to Not Enter Higher Education

Chapter 3 presents the first study conducted for this research; 10 semi-structured interviews with 18-21 year olds who chose not to go to university and were from a LPN. As the participation rate of individuals from these neighbourhoods (LPN's) are significantly low, it was decided to recruit participants from this neighbourhood, to explore the barriers to enter higher education. This chapter includes the motivation and research questions for conducting this study, participant recruitment, the methods used to collect and analyse the data, and finally a discussion of the results. This study helped answer RQ-1.

Chapter 4: Study II: Factors Influencing the Decision to Enter Higher Education

This chapter presents the second study conducted for this research; 10 semi-structured interviews with undergraduate students who were from a LPN, and 10 semi-structured interviews with undergraduate students who were *not* from a LPN. It includes the motivation and research questions for conducting this study, participant recruitment, the methods used to collect and analyse the data, and finally a discussion of the results. This study helped answer RQ-2.

Chapter 5: Study III: Exploring Individuals Attitudes about Higher Education

This chapter presents a follow up empirical study to validate the results from the first two studies. The motivation and research questions for conducting this study, participant recruitment, methods used to collect and analyse the data, and discussion of results are included. This study helped answer RQ-3. In addition, this chapter included a second literature review of existing technologies used to overcome the barriers reported. This literature review helped shape the focus of this research, as it was identified that there are limited technologies present which support individuals in overcoming friends influence when making the decision about higher education.

Chapter 6: Design of the Persuasive Technology: Interactive Storytelling Game

Taking into account the results from the first three studies, a persuasive technology was designed to overcome one of the barriers reported in the studies. In this chapter, the design and development of the persuasive technology, an interactive storytelling game, are detailed. Design Thinking was used to structure the design of the persuasive technology. It helped answer RQ-4.

Chapter 7: Study IV: Using a Persuasive Interactive Storytelling Game to Mitigate Peer Pressure

Chapter 7 includes an empirical study of the persuasive technology designed in Chapter 6. It details the motivation and research questions for conducting this study, participant recruitment, methods used to collect and analyse the data, and discussion of results are included. This study helped answer RQ-5.

Chapter 8: Discussion and Conclusion

In this final chapter, the work conducted in this research is discussed, highlighting the main contributions made in HCI, and the limitations and possibilities for further work in this area.

Chapter 2: Background and Related Work

This PhD research is focused on higher education in UK, peer pressure and influence from friends, and persuasive technologies. This literature review reflects all these topics. First, the higher education statistics in UK are introduced briefly covering the under-represented groups in higher education, followed by studies conducted which identify the barriers and motivators to enter higher education. Then, a review of projects conducted by universities and Widening Participation teams to promote higher education, and the technologies which they use to support them is covered. Then, a review of how peer pressure from friends is addressed in other domains is presented, including the technologies and strategies that are adopted to combat peer pressure (from friends). Finally, a detailed review of the persuasive technologies, the persuasive design models, persuasive design principles, and how they are being implemented within the various domains, specifically in the education sector, is covered.

Reviewing the higher education statistics reported by the HESA (Higher Education Statistics Agency) and HEFCE (Higher Education Funding Council England), directed the motivations for conducting the first three studies of this research. It was, however, after the third study (Chapter 5), that another literature review was conducted to identify a gap which this research addressed – technologies were used in a limited way to overcome peer pressure from friends when making a decision about higher education. This literature review is presented towards the end of Chapter 5, in section 5.5. Background research conducted to better understand how the target group addressed for this research, i.e. mid-adolescents, use technology, is detailed in Chapter 6. This was essential in order to help develop a persuasive technology which facilitates this target group in making an informed decision about their future.

2.1 Higher Education in UK

Higher Education (HE) includes any qualification at Level 4 and beyond (above higher grade level and equivalent such as A levels. It includes sub-degrees, undergraduate degrees and post-graduate qualifications (HEFCE, 2018). Courses of higher education are mainly delivered by higher education colleges, higher education institutions (HEIs) and some further education colleges. For this research, the primary focus will be on the higher education data of young undergraduate entrants (those who are below the age of 21) who are England domiciled. We will be looking at first degree undergraduate entrants. 'First degrees' are those that, for the most part, lead to a bachelors degree qualification such as BA or BSc (HESA Definitions: Level of Study, 2018).

2.1.1 Participation of Under-Represented Groups

The Higher Education Statistics Agency (HESA) reports that certain groups in the UK are under-represented in Higher Education (HE) relative to the HE population as a whole (HESA, 2018). The under-represented groups are disproportionately lower in number relative to the general population. These groups are:

- (i) Students from state schools or colleges
- (ii) Students from Low Participation Neighbourhoods (POLAR3)

'State schools or colleges' (i) are all schools or colleges that are not denoted as 'independent' (Government Digital Service, 2016). Students from sixth-form or further education colleges, for example, are included as being from state schools. The second underrepresented group are students from Low Participating Neighbourhoods (POLAR3) (ii). POLAR3 classification is used to assess whether a neighbourhood falls under a low participating area (HESA POLAR3, 2018). POLAR stands for 'Participation of Local Areas' and is calculated by OfS (Office for Students). Local areas are given a score of 1-5 based on how many young people from those areas have historically gone into higher education. The 20% of areas with the lowest proportion of young people entering HE are called 'Low participation neighbourhoods' (HESA POLAR3, 2018). POLAR is re-calculated every few years.

Prior to 2017, students from socio-economic classes 4, 5, 6 & 7 were also classified as an under-represented group. However, this classification as a measure was discontinued following concerns about the quality of the data collected for this classification. The information on socio-economic classification are taken from the National Statistics Socio-Economic Classification (SEC, 2016) and are outlined in Table 1.1 below.

Class	Socio-Economic Classification
1	Higher Managerial / Professional Occupation
2	Lower Managerial / Professional Occupation
3	Intermediate Occupation
4	Small Employers and Own Account Workers
5	Lower Supervisory / Technical Occupations
6	Semi-routine Occupations
7	Routine Occupations

Table 2.1 – Socio-Economic Classification

Data from HESA 'HE Undergraduate Full-time Student Enrolments' (HESA Underrepresented, 2018) and 'Widening Participation Summary' (HESA WP Summary, 2018) was used to create the graph presented in Figure 1.1 below. This graph illustrates a comparison of the number of England domiciled *young* participants (aged 21 and below) from the underrepresented groups entering a full time undergraduate degree for enrolment years 2013/14 to 2016/17. It is important to note that the underrepresented groups

are *not* mutually exclusive – there tends to be a degree of overlap. So for example, a student entering higher education can be living in a Low Participation Neighbourhood (LPN) and come from a state school.

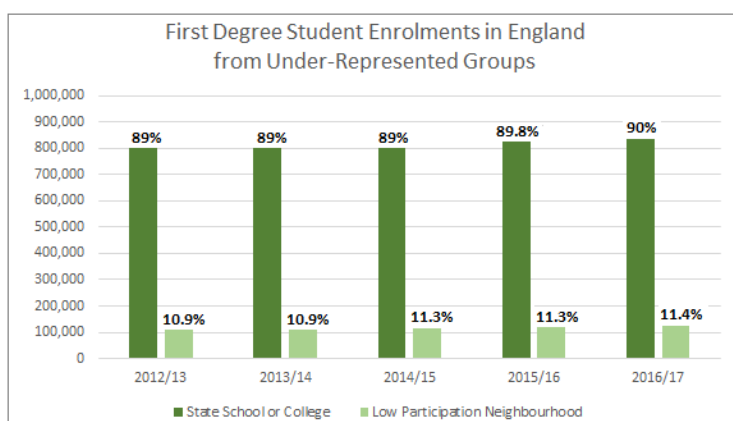


Figure 2.1 – Student Enrolments in England from Under-Represented Groups

According to the statistics, in the enrolment year 2016/2017, the percentage of young entrants who entered higher education was 766,035 (58%) (HESA Student Enrolment, 2018). Out of this 58% of young students entrants, 90% came from state schools or colleges, whereas only 11.4% of the entrants came from a low participation neighbourhood. Over the past four years, an average of 89% of young entrants came from state school or college, and an average of 11% came from a LPN. As seen from Figure 1.1 above, a trend can be seen here where the number of students entering from a LPN is the lowest throughout the years; only about 11% of the students come from this underrepresented group compared to the HE population as a whole. Although the number of young entrants are increasing over the years, the increase is minimal, by 0.1%. There is no significant change in the figures.

A study conducted by the Higher Education Funding Council of England (HEFCE) in 2013 reported trends in young participants in higher education (HEFCE, 2013). They confirmed that there is a large difference in the participation rates of young people across the different regions of England; a large gap remains between young people living in *advantaged* and *disadvantaged* areas. ‘*Young people in the most disadvantaged areas would need to treble their participation rate in order to match the rate of those from the most advantaged areas*’ (HEFCE, 2013). In addition, they reported that a young person from a disadvantaged area, but who was living in London experienced a much greater increase in participation rate than those who are equally disadvantaged but live outside London.

2.1.1.1 Participation of Under-Represented Groups – Russell Group

The Russell Group is a self-selected association of twenty-four public research universities in the United Kingdom (The Russell Group of Universities, 2019). The 24 universities which form the Russell Group can be found on - <http://russellgroup.ac.uk/>. Statistics on the participation of under-represented groups in higher education broken down by HE provider were taken from the HESA website (HESA, Participation by HE Provider, 2018), and then filtered to only display statistics of the 24 universities which represent the Russell Group. The data was then used to create the graph below (Figure 2.2).

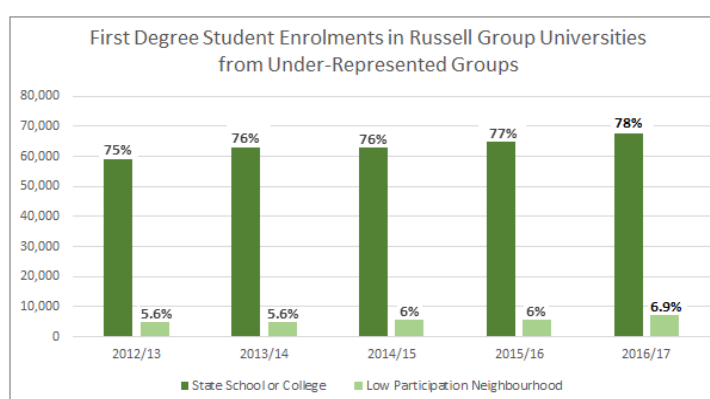


Figure 2.2 – Student Enrolments in Russell Group Universities from Under-Represented Groups

As seen from the graph above, Figure 2.2, it was evident that the number of entrants from both under-represented groups, 'State School or College' and 'Low Participation Neighbourhood (LPN)' are relatively low for Russell Group universities. On average over the past five years between academic years 2012/13 to 2016/17, 76% of students who enrol into a Russell Group university come from a state school or college. Whereas compared to all the universities in England, on average 89% of students are enrolled from this under-represented group (as seen in the previous section). In addition, the number of entrants from a LPN into a Russell Group university is extremely low, almost half compared to other universities. On average *only* 6% of entrants come from a LPN, while on average 11% of students from a LPN were enrolled into a university in England (as seen in the previous section).

After the 2016/17 HE enrolment statistics publication, the Head of Policy at Russell Group, Sarah Stevens, addressed this issue of the low number of entrants from under-represented groups being enrolled into Russell Group universities. She said, 'The increase in the proportion of students from low participation neighbourhoods and state schools progressing to highly selective universities is welcome, but it is clear there is more work to be done. This is why Russell Group universities will spend more than £250m this year on activities designed to encourage successful applications from students from disadvantaged and under-represented backgrounds.' (Stevens, 2017) She said that the members of Russell Group will now be working on more than 2000 schools across the UK to encourage more school students to think about higher education. They will also be taking the Advancing Access initiative, which is supported by all 24 Russell

Group universities. This gives teachers the support they need to help prospective students from under-represented groups navigate the university application process.

This review of the participation rate into higher education identified a trend in the student enrolment rate, the number of enrolments from a LPN is consistently the lowest, and that too by a huge margin.

2.1.2 Widening Participation

To increase the participation rate of individuals who fall within an underrepresented group in higher education, '*Widening Participation*' (WP) has become a strategic priority and major component for the UK government (HE Academy, 2005). Widening Participation projects and activities attempt to not only increase the number of young participants entering higher education, but also the proportion from under-represented groups. Universities along with various groups, such as 'Aim Higher', work on programmes/projects to raise aspirations and educational attainment amongst prospective students from these groups to prepare them for higher education, improve their employability prospects, ensuring success on their programme of study and giving them opportunities to return to learning throughout their lives. Some universities engage with the prospective student, their families and advisers in a wide range of WP awareness activities.

Google was used to search for WP projects run across UK, using the search term '*Widening Participation projects in UK*'. Numerous projects run by different universities were returned from the search, and after reviewing them, it was evident that the WP teams were running projects that were similar in nature. They included: talks, taster weeks, open days, mentoring sessions and workshops. In addition, it was also identified that the only kind of technology being used by most of the WP teams were emails (for contacting the relevant people), websites (which consisted of information or application forms to fill out), social media (to reach out to the students), or some universities used certain software and toolkits which could be downloaded and used. After studying these projects, it was clear that it would not have been possible to analyse and cover them all in this literature review. It was therefore decided that in order to represent the kinds of projects run by the WP teams, only the top 5 universities returned in the Google search results would be included in the examples reported (in table 2.2) as they were representative of the general WP projects run and it avoided cherry picking as well as self-selected bias. In addition, as each university had multiple projects running, only the top three projects run by the university were included. An overview of the kinds of projects run and the types of technology they used are presented in Table 2.2 below.

WP Project	Technology Used
1. University of Edinburgh (Edinburgh, 2018)	
<u>Pathways to the Professions</u> Provides advice and guidance to local state school students interested in applying for Medicine, Law, Veterinary Medicine or Architecture. Activities for the project include: - Observation Weeks – practical session giving an insight of the course. - Phone/email to give advice – school students can speak to admin team directly and are in touch with other students in university to ask for any guidance or help.	Website – to register Email – to seek advice
<u>Educated Pass</u> The programme works with local boys football teams and is delivered over the course of six sessions throughout the year, motivating the boys to continue their application as both athletes and learners. Activities for the project include: - Delivery of positive educational message through a renowned and credible football guest speaker. - Taster Sessions using current model students to outline the experiences of student life. - Workshop sessions – on the pitch and in the classroom.	None
<u>Reach</u> Provides advice and guidance to students interested in applying for Medicine, Law, Veterinary Medicine or Architecture, who attended selected state schools in the Scottish Borders and Forth Valley. This project is worked alongside the 'Pathways to the Professions' WP project, but only focusing on particular schools.	Website – to register Email – to seek advice
2. University of Cambridge (Cambridge, 2018)	
<u>Insight (Pre 16 Team Project)</u> Aimed at Year 9 students receiving Free School Meals (FSM). The project involves: - A number of events and talks held in Cambridge to provide information about university, various courses and university life. - Students to be able to speak to academic staff and student ambassadors about their subject choice.	None
<u>HE Partnership</u> Works with individual partner schools to design tailored programmes to support learners with the potential to make it to HE, but who lack the confidence or understanding of key concepts. The project activities include: - Information, advice and guidance sessions (IAG) – School based and covers specific topics like application process and Q&A session. - University Visits	None

- Subject Tasters at university of Cambridge. - Higher Education Getaways (HEGs) – offer two-day, one night experience for Year 10 learners. They experience a day of outdoor team building and social activities.	
<u>HE+ (Post 16 Team Project)</u> A collaborative project between the University of Cambridge and state schools and colleges across the UK. The university and schools in 14 regions collaborate to engage students. The project includes academic extension classes, subject masterclasses, information and guidance sessions and visits to the university.	None
3. University of Oxford (Oxford, 2018)	
<u>Compass: Young Carers</u> An online resource programme for Year 10 and 11 students with caring responsibilities in Oxfordshire, Buckinghamshire and Milton Keynes, aiming to raise aspirations and attainment to make students aware of their post-16 options. This project includes: - A free tool-kit includes interactive quizzes, lesson plans, information and links designed to help young carers to make an informed decision about their future education and careers. Also gives them confidence to communicate and pursue their ideas.	Tool kit – the tool is an online resource and is downloadable. Students can use their laptops/desktops to work with the tool.
<u>IntoUniversity</u> This programme provides a local learning centre where young people are inspired to achieve. It includes: - Academic Support and Mentoring takes place for individual students within the centre. - FOCUS groups in which the whole class can participate.	None
<u>Oxford to Oxford</u> A set of programmes and initiative working to make Oxford's assets accessible to schools and families. The programme organises school visits, trips and workshops at various locations for state school pupils at schools in Oxford. These projects work to support pupil attainments and promote connections between teachers, students, families and the university.	None
4. City University London (City, 2018)	
Taster Week Students who are predicted five GCSEs at grades 6 to 9 (previously A* to B), receive free school meals have parents who haven't attended university and come from a social group that is underrepresented in HE are eligible to apply. The programme gives students the chance to take part in lectures, group discussion and practical work as if they were a university students. All applications are made online.	Online application (via website) – Students need to apply online to sign up.
Snapshot Programme A mix of practical and academic workshops giving the student an understanding of HE. With the programme, students can: - Get an insight into the university to gain a clear picture of what to expect.	Online application (via website) – Students need to

- Hear inspirational stories from current students and graduates working in their chosen field. - Learn how to write a successful university application by talking to admission tutors.	apply online to sign up.
Masterclasses A set of classes ranging from Computer Science to Optometry allowing students to experience the subject. Students can - Experience a university lecture and experience using equipment's - Take part in workshops allowing them to build and design their ideas, e.g., they construct building in the Engineering Masterclass.	Online application (via website) – Students need to apply online to sign up.
5. Lancaster University (Lancaster, 2018)	
Target Lancaster Mentoring Programme Year 12 students (mentees) from WP backgrounds work with current Lancaster students (mentor) on a number of school/college sessions based around the questions and issues students have about university. The mentors and mentees are matched through shared areas of academic interest. The mentee must attend at least two mentoring sessions and a final day visit to Lancaster to receive a 'guaranteed offer' at the university at standard level for most subject areas.	Email – mentee and mentor keep in contact via email.
Residential Visits (part of Summer School Programme) The programme offers a unique student experience over four days. Students can: - Study the subject of their choice - Talk one to one with the admission tutor - Spend time with current Lancaster students - Enjoy social activities	None
Campus Day Visits Students are given a tour of the university, aiming to give a general introduction to HE. Topics such as student life, student finance, barriers to enter HE, UCAS and personal statements are discussed during the tour. Groups of students can participate in many taster sessions during their visit.	None

Table 2.2 – Examples of some Widening Participation Projects

As seen from the table above, numerous on-going projects ranging from taster weeks, Open Days, campus visits, and information and guidance sessions, are being undertaken by the Widening Participation teams to encourage pupils from under-represented groups to enter HE. Despite running numerous projects to widen participation, one could question why the participation rate of students from Low Participating Neighbourhoods (LPN) is still extremely low and not increasing significantly over the years.

It can also be noted that not much technology is used to facilitate WP projects. The only kinds of technologies being used are *emails* and *social media*, to communicate with the students and share event details, *websites*, to give students additional information and get in touch with an e-mentor or to get students to sign up/apply for the WP project (as seen in City University, where all their applications are made online). In addition, for some projects, tangible technologies such as projectors and screens are used within the classroom/environment to aid the learning process, helping students understand the lecture/lesson better.

Other Projects to Promote Higher Education

Certain universities in the UK run projects and activities to promote higher education. These projects are different to the Widening Participation as they do not just target pupils from backgrounds that are under-represented at university, but target all young pupils within UK, regardless of their background and age. At times these universities collaborate with companies, other universities and schools to form a consortium and run the project. For this literature review, a search was done on Google with the key words 'projects', 'higher education' and 'UK'. The list of project results returned were then read through to see whether they are part of a widening participation project - if the project is only targeted for pupils who are from an under-represented group. To give an overview, the first few projects or activities found in the list which were not part of the WP, as they focused on all pupils in UK were listed in Table 1.3 below.

Projects/Activities	Technology Used
<u>University Time Capsule</u> (Oxford Brookes University, 2019) An interactive day at Oxford (Headington Campus) which introduces Year 5 students to higher education and shows what it is like to be a student at university. Through interactive activities the event introduces the concept of higher education and emphasizes that everyone has the potential to achieve. Pupils are given a fun campus tour, work in teams to win points, and create posters to market a society of their choice.	None
<u>Raising Aspirations Teachers Pack</u> (University of Liverpool, 2018) The University of Liverpool has developed an innovative teaching pack which contains ideas and resources to inform primary children of the educational opportunities available.	None
<u>Santander Financial Literacy Programme</u> (Santander, 2018) The programme involves a number of talks which aim to improve financial literacy by helping young people develop basic money management skills and understand the implications of poor money management. It helps make them aware and ready for university life.	None
<u>Professor Fluffy's Primary Roadshow</u> (Greenbank, 2018) A classroom-based project that delivers sessions to both Year 5 and Year 6 pupils by current students and recent graduates from Liverpool university. The two hour programme aims to raise awareness and aspirations of university. The children get an insight into what being a student is like, what courses they can study, where they can go to university and what happens at graduation. The session includes: - An interactive Professor Fluffy website session - Professor Fluffy comic activity - Graduation ceremony	Website – to deliver the interactive Professor Fluffy session
<u>ELP Project</u> (JISC, 2007)	Pebblepad (E-portfolio)

E-portfolio was used to record evidence for a module that supported learner progression into higher education. Students were encouraged to think about university and reflect their skills and abilities. One of the key tasks was to get students to complete their personal statement for the UCAS application.	
File - Pass Project (Mahoney, 2006) Child care learners on a Key Skills Programme became more motivated and were keener to attend, as a result of using an e-portfolio on their course. Learners were encouraged to document their thoughts in blogs to help their understanding.	Pebblepad (E-portfolio)
L4All Project (De Freitas, et al., 2006) Learners developed an online timeline to help them look into the future. Learners found that completing an online life timeline made them think about what they were going to do with their future. Personalized support and advice was incorporated in the timeline, to help learners make decisions about their future.	Web based portal – To develop timeline
MANSLE Project (Jisc Learners Perspectives, 2012) Social networking tools are used for this project. The leader of the project encouraged students to share their research findings and issue discussions with their peers. Social media here was not just used for sharing personal content but also to work out how to tackle the potential to move to university.	Social Networking Sites
Realizing Opportunities Project (Realising Opportunities, 2018) This project provides students with skill and information to help them make informed decisions about their future to raise their aspirations to progress to university. Students are supported through the programme by their local RO university and a dedicated e-mentor.	Website – To contact e-mentor

Table 2.3 – Projects to Promote Higher Education

In addition to the projects above, there were numerous one-to-one career guidance and university course advice sessions run by universities. Several schools as well held workshops dedicated to help pupils start making an application for HE, and answer any HE related queries. These workshops and advice sessions run by the universities and schools were open to all pupils, not just those who are part of an underrepresented group. One thing in common in all these projects is that there is limited use of technology. Like the WP projects, technology is used to contact students and/or to give them additional information about a workshop, session or event. Use of e-portfolio and contacting e-mentors to get advice is also seen.

In addition, it was also noted that most these projects were more focused towards helping students make an informed decision about their future. They were promoting higher education, unlike the WP projects, where the main focus was to encourage the individuals to enter higher education. The projects included mentors (Realising Opportunities, 2018), talks/discussion (Jisc Learners Perspectives., 2012) and web based portals to create a timeline (De Freitas, et al., 2006) to encourage students to think about their future. There was however no focus on mitigating influence from friends or family members, these projects just focused on helping the students make an informed decision by allowing them to think about their future options.

2.1.3 Motivators and Barriers to enter Higher Education

In this section, existing work which focuses on understanding reasons and factors which influence and individuals to enter or not enter higher education is covered. It was this part of the literature review, as well as the statistics presented earlier, which steered the motivation for running the first three studies in this research, and defining the first two research questions (RQ-1 and RQ-2). Conducting this literature review identified a limitation in the existing work; all the studies conducted focus on participants from across UK, they did not identify what barriers or motivators are encountered by individuals from a LPN in particular, which results to such a low number of entrants from these neighbourhoods to enter higher education. In addition, these studies did not look into how technology played a role in the decision making. To address this, it was decided to conduct study 1 and 2 (reported in Chapter 3 and 4). Prior studies conducted which focus on exploring the barriers and motivators to enter HE are reported in this section.

2.1.3.1 Motivators: Why Students choose to enter Higher Education

This section explores various studies conducted to find out students' motives for entering higher education (HE) and what factors affected their reasoning.

When a number of students were asked what their main reason was to enter HE for a report on 'Student Motives, Aspirations and Choices' (Leeds, 2017) by University of Leeds, the two most frequent reasons were: (i) to help get a job (or a better job), or (ii) to pursue a particular career which required a qualification. The third and fourth most frequent reason students gave were intellectual issues. These were, (iii) students were interested in the subject, and (iv) students wanted to continue studying and learning. In the study, the researcher divided the student's reasons to enter higher education into three categories.

1. *Instrumental* - Associated with the outcomes of the course and students' long-term job and career prospects.
2. *Intellectual* - Related primarily to the students intrinsic interest in the course and/or the institution
3. *Social Norm* - Related to any kind of social pressure or norm affecting the student's decision.

The research consisted of a postal survey of a nationally representative sample of full and part time students, only students in their second year and above were surveyed. A total of 1,270 usable questionnaires were received and the response rate was 63%.

The younger students for this research (under 25 years old) were more likely to say that the most important reason for going to university was to help them get a job (33% compared to 21%), and less likely stated that they needed a desire for a change in their direction in life (3% compared to 18%). The younger full

time students also valued the university experience, social life, independent living and associated activities contributed to their personal development and their transition into adulthood and into employment.

Another study carried out in 2005, A Survey of Student Attitudes, Experiences and Expectations (Round, 2005), confirmed the reasons stated by the previous study. The results of their study concluded that 'general job prospects' were the most frequently named reason why students entered higher education. This was closely followed by the 'self-esteem' reason of simply wanting to achieve a degree. Just over 25% named family influence. First generation students were significantly more likely to enter HE due to a *subject interest*, whereas second generation students were more likely to say that they entered HE due to *family influence*. Those who stated that the wishes and expectations of their family were important in their decision were less likely to agree that subject interest played a part.

In addition, the NUS Student Experience Report, (NUS, 2008) carried out surveys to get an overview of students HE experience across the UK. Their research results also tie in the previous mentioned studies results, suggesting that many students see university as a means to an end, with only 29% of the participants saying that the main reason they wanted to go to university was 'for the experience'. However, the most popular responses by students when asked why they wanted to enter HE were: 'to gain a qualification' (68%), 'to improve my chances of getting a job' (53%), and 'to improve my earning potential' (44%).

They also established that the key influences for wanting to go to university cited by students are affected by their socio-economic background: 27% of students in socio-economic Group A (referred to as socio-economic class 1 - Higher Managerial / Professional Occupation) cite their parents/guardians as their key influence in wanting to go to university, compared to only 6% of students in socio-economic background Group DE (referred to as socio-economic class 6 and 7 – Semi-routine and Routine Occupations). Conversely, only 2% of students in socio-economic Group A (class 1) state that their teachers play a vital role, compared with 13% of those in socio-economic Group DE (class 6 and 7). It was also evident from the results that 'Friends/Siblings' play an important role in influencing the decision to go to university for socio-economic classes 6 and 7, and 'Parents' play the least importance in influencing their child's decision. Figure 2.3 below is taken from the report (NUS, 2008), illustrating the key influences on students when deciding to go to university.

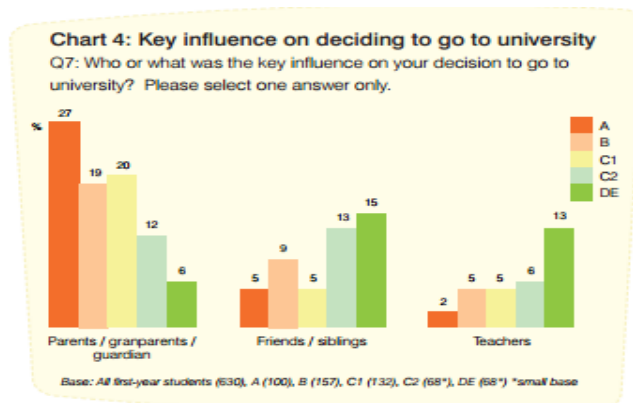


Figure 2.3 – Influences on deciding to go to University (NUS, 2008)

The study also suggested that students can fit into *four* basic segments that relate to their motivations for choosing to enter HE. These segments are not mutually exclusive as there tends to be a degree of overlap:

1. *Academics* Focus on learning and gaining academic skills. Main reason to enter HE is to learn.
2. *Next Steppers* Have a clear goal and choose a degree with that in mind. Main reason to enter HE is because they need a qualification to enter a specific field.
3. *Option Openers* Do not necessarily have a clear goal, although they may have a vague idea of an area of interest. Main reason to enter HE is to learn about interesting subject.
4. *Toe Dippers* Primarily attracted to university for the lifestyle/living experience, but similar to Option Openers, hope to have more opportunities presented to them afterwards. Main reason to enter HE is to have a social life, or were influenced by their friends as they were all going.

A trend can be seen from this study, where participants from Group DE (socio-economic class 6 and 7) are usually classified as a 'Toe Dipper', whereas, participants from Group A (socio-economic class 1) are more likely to be classified as 'Academics' or 'Next Steppers'.

2.1.3.2 Barriers: Why Students choose NOT to enter HE

This section explores various studies conducted to find out the reasons why students decide not to participate in HE, and what factors act as barriers and constraints.

Although there has been an increase in the number of university entrants from disadvantaged backgrounds in recent years, as individuals believe that a qualification will bring improved job and career prospects,

improving earning and job security, a study (Connor, Tyers, Modood & Hillage, 2004) conducted by the Department for Education and Employment (DfEE) explored the decisions affecting the participation in HE of individuals from lower social class and concluded that there are many discouraging factors which restrict or impact an individual's decision to enter HE. There were two most common reasons why an individual from such a background chose not to enter HE: they either wanted to start employment, earn money and be independent at an earlier age, or they had a career or job goal in mind which did not require a degree qualification.

The study also suggested that the individuals were worried about the cost of studying and being in debt. They showed concern about not being able to find a job after their degree to pay off the debt. It was reported in 'The Guardian' news that university fees in the biggest barrier students face when deciding to enter HE (Adams, 2013). Other factors include not being able to cope with the academic pressures and workload, the application process itself, personal issues such as arranging childcare. On the whole, the study mentions that students from lower social class appear to have a lower level of confidence about their ability to succeed in HE and in taking career decisions than those from a higher social class.

Prior education and family background can influence an individual's decision about HE entry in numerous ways. The survey carried out for this research (Connor, Dewson, Tyers, Eccles, Regan & Aston, 2001) also proved that various people play an important role in the decision process. For a potential entrant coming from a low social class, college tutors and teachers play a vital role as they are seen as the key positive 'influencers'. The same result was also concluded in by a study in the previous section (study (NUS, 2008)), where participants from a low socio economic background were heavily influenced by their teachers, whereas those from a higher socio economic background were more influenced by their parents/guardians. This study also concluded that although plenty of information about HE is available to potential entrants, it is often seen as being too general and overly complex. The main gaps in information content are on the financial aspects of HE study, three quarters of the full time students in the survey did not feel they had sufficient information about how much it was likely to cost to be a student.

A similar study was carried out, by the University of Glasgow (Forsyth & Furlong, 2003) which investigated the barriers and constraints faced by students from disadvantaged backgrounds. For this study 81 in-depth interviews were conducted of participants who had taken part in a previous study by the university. This sub sample selected represented a full range of student career paths from dropouts through to degree year students. The barriers and constraints reported by these participants were:

1. A lack of familiarity with HE, which often resulted in young people enrolling in inappropriate courses or unsuitable institutions, resulting in them dropping out.
2. A lack of funds, which limited their choice of course/institution.
3. A fear of debt, resulting in the student lacking confidence as they are worried that they will not be able to find a job at the end to pay off this debt (this was stated in previous study too, study (Connor, Dewson, Tyers, Eccles, Regan & Aston, 2001).
4. Feeling of cultural isolation, particularly at prestigious institutions, compromising the disadvantaged students identity and lower morale.

In addition, a SPICe (Scottish Parliament Information Centre) Briefing on the Barriers to Widening Access to Higher Education (Mullen, 2010) states that factors such as socio-economic background, age, gender, income, family circumstances and geography (where an individual lives) all appear to affect an individual's choice to participate in HE. These factors are not mutually exclusive and do overlap. The value an individual places on achievement in a HE qualification, in terms of their future employments and earning prospects is also a determining factor.

As seen in the previous section, the study from the NUS Student Experience Report, (NUS, 2008) also confirms this briefings (Mullen, 2010) points. Factors such as the socio-economic background play a vital role when it comes to deciding about entering HE. There are factors which can play a positive *motivating* role in entering HE, while the same factor can play a negative role (barrier), encouraging an individual to not enter HE. For example, the study (NUS, 2008) reported that family and friends 'influence' also plays a vital role in determining whether or not they want to enter HE. Those from socio-economic class 1 (Higher Managerial / Professional Occupation) said that their parents, grandparents, and/or guardians were the key influence in deciding to go to university, and their teachers influence played the least part. However, those from socio-economic class 5 and 6 (Semi-routine and Routine Occupations) stated that their *friends* were the key influence, after which it was their *teachers*. These students are normally classified as those who are primarily interested in going to HE because all their friends are going and do not feel left out. The 'social norm' as mentioned as one of the motivators to enter HE in a study conducted by the University of Leeds (Leeds, 2017) affects the student's decision. The second literature review conducted for this research (Section 5.5) identified that limited focus has been paid towards using technology to address this factor. Existing work and studies focus on minimising parental influence, by giving them additional information and guidance via email, websites and forums, with the aim of raising their awareness about higher education so that they encourage their children to enter. However, overcoming friends' influence is not addressed to that extent.

2.2 Peer Pressure

The factor 'friends' influence' can play a vital role in the decision making process of entering HE for individuals who are from socio-economic classed 5 and 6, or in other words, for those who come from an under-represented group. In the studies analysed in this section, this is one of the reasons reported which plays a major role in deciding about HE. Individuals change their decisions about HE if there is any kind of social/peer pressure or norm. For this research, this factor will be investigated further as it is one of the key influencers in affecting a student's decision (especially those from an under-represented group). It can play both a positive and negative role, hence, this factor was the primary focus of this research. It is explored further in the next section – Peer Pressure.

Peer pressure is the influence an individual feels from others in their peer group. The individual may be encouraged to change their behaviour, attitudes, and even values to match their peers, so that that they feel accepted within their friends group. Based on various studies, it was made evident that individuals are most likely to be susceptible to peer pressure when they are middle adolescents (aged 15-17) ((Survelum,

2010), (Kimberly, 2002), and (Steinberg & Monahan 2007)). These studies are thoroughly examined further on in this section. People are susceptible to peer pressure because of their fear of not belonging.

Peer pressure can be both positive and negative and can be presented explicitly/directly or implicitly/indirectly. Explicit, or direct peer pressure involves a clear instruction from someone in the group telling the individual how to behave. For example, not going to class because your friends have told you not to and to go play with them instead. Implicit, or indirect peer pressure is not so obvious. Although it is not as powerful as direct influence, it can still greatly influence the decisions of an individual. Indirect peer pressure is what one sees and hears others doing. For example, if others are dressed in a certain way, the individual will follow them to fit into the group.

For this research, we will be focusing on how peer pressure can play a vital role in influencing an individual's decisions about entering HE, especially those from under-represented groups. An individual will normally be making a decision about whether to go or not to university before they are 18 years old, in their mid-teens, when they are at a mid-adolescent age. Hence, for this literature review the role of peer pressure on mid-adolescents was explored.

Peer pressure and Social Development

All the studies and research articles read for this literature review, indicated that mid-teens develop an increased interest in their peers and are highly influenced by them. As concluded in Steinberg and Monahan's research, there is a lower resistance to peer influence among adolescents than adults (Steinberg & Monahan, 2007). The decisions and opinions of their friends matter a lot, and they even give them more importance than their family (especially parents). Kimberly stated in her study (Kimberly, 2002) middle adolescents prefer their friends to family. There is also an increase in risk taking. This was further proven in a study conducted (Albert, Chein & Steinberg, 2013), where the researchers found that adolescents are motivated to take part in a risky behaviour in the presence of their peers. If they were alone then they are less likely to take part in that behaviour.

According to the Peer Pressure Survey by Survelum Public Bank (Survelum, 2010), only 10% of those surveyed about peer pressure say that they have never been influenced by peer pressure, and 40% of these young people said that peer pressure distracts a person from reaching his/her goals. 28% of them also said that giving into peer pressure helps them move up the social ladder. These young people stated that their peers have influenced them both positively and negatively.

In addition, Oregon government published the stages of healthy adolescent development (Oregon, 2009), where they broken down the adolescent stages into early (10-14 years), mid (15-17 years) and late (18-21 years). Each stage has its own set of development characteristics. Here they stated that a middle adolescent will develop strong peer allegiances, whereas the late adolescent decisions and values will be less influenced by peers. Middle adolescents will also conflict with more with family. Two more studies, (World Health Organisation, 2010) and (Clark & Loheac, 2007) concluded that middle adolescents have intense peer group involvement and as they have such strong peer friendships, peer groups are most important and determine their behaviour. Peer groups and interaction with peers are a fundamental part of

young peoples' lives and are important for their cognitive, social and emotional development (Bagwell, Coie, Terry & Lochman, 2000). Furthermore, adolescents' social development is significantly influenced by peers' relations (Tsitsika, et al., 2014), which today are often mediated through social networking sites.

2.2.1 Strategies and Technologies used to Overcome Peer Pressure

To identify what technologies and/or projects already exist currently to help combat peer pressure, a search was done on the ACM Digital Library, IEEE Xplore, Google Scholar, Springer Link (to search for papers published in the Persuasive Technology conference from 2006 to 2018) and Google. A number of searches were carried out with different search criteria and included keywords such as 'peer pressure', 'overcome', 'mitigate', 'influence'. YouTube was also used to gather additional information on how peer pressure can be overcome. YouTube has numerous videos each giving advice on how to address any issues related to peer pressure and what the consequences of peer pressure can be.

After doing the literature review it was evident that negative influence and peer pressure is being addressed in various domains. There are numerous blogs, articles, inspirational and motivational videos informing individuals of the ways to combat peer pressure. The different suggestions and advice given to individuals who are battling with peer pressure are identified below. Please note that these suggestions identified all come from various sources (from the literature review), not just one source. Individuals are being advised to use various strategies to handle peer pressure. Overall, they are being told to:

1. Find a positive role model. Having a mentor (or peer mentor) or speaking to someone who you can trust, whether it is a friend, family member, or counsellor for support and guidance. A number of mentoring programs have been built which incorporate a 'buddy system' to help support children and teenagers through the stresses of school, family and friends. Some examples include:
 - [Big Brothers Big Sisters](http://www.bbbs.org/) – <http://www.bbbs.org/> - An organisation in America which helps children realize their potential and build their futures. The staff members of this network match a mentor to a child between ages 6 -18. A girl is matched with a 'big sister' mentor and a boy is matched with a 'big brother' mentor. The aim is to provide children facing adversity with strong professionally supported one-to-one relationships that change their lives for the better. The mentor and child meet on a regular basis at the Big Brothers Big Sisters workplace (in their local area).
 - [Learning Mentor](#) (Unison, 2019) - Work with school and college students and pupils to help them address barriers (and potential barriers) to learning through supportive one-to-one relationships and sometimes small group work. They address barriers/issues such as bullying, peer pressure, family issues/concerns, lack of confidence/low self-esteem, low aspirations, mental health issues, relationship difficulties etc.
 - [TAPS Peer Mentor \(App\)](https://www.taps.org/peermentor/mobileapp) – <https://www.taps.org/peermentor/mobileapp> – a mobile app used to communicate with a peer mentor. The mentor offers a source of companionship and hope. The app is designated for surviving military family members, and the mentors are survivors too. TAPS (Tragedy Assistance Program for Survivors) is a non-profit organisation endorsed by the

Department of Defence, who offer compassionate care to all those grieving the loss of a loved one who died while serving in the Armed Forces. TAPS provide comfort and hope 24/7 through a national peer support network and connection to grief resources.

2. Make friends with others who share common interests, values, and beliefs or join a community or group whose members share common interests with you and are similar to you. This approach is suggested by majority of the sources – articles (Bell, 2013), blogs (Meyers, 2017) and counselling services (University of California, 2018). Individuals are being encouraged to widen their social network, so that they have other options of support if a friendship goes wrong. A number of programs, those which use technology (like apps or websites etc.) as well as those which do not use technology (social groups and events), have been developed which address 'similarity', so that individuals are able to socialise and interact with others who are similar to them. This gives them hope that there are others like them and that they are not alone. Some examples include –
 - Wisdo (App) – <https://wisdo.com/> - A peer-to-peer support and wisdom network, connecting people with similar life experiences. Users can connect with other individuals (via the mobile app) who share similar feelings and emotions (loneliness, depression etc.), and seek advice and comfort. They can interact with people who have 'been there', by either posting in a group or sending them a private message. They can join a particular group and take part in the group chat. There is a facility to connect with an expert or 'Guide', who gives users advice and guidance about what they should do.
 - Fitness coach Cody (App) (Techcrunch, 2013)- After users download the mobile app, they're asked to identify their goals, whether it is running 10 miles or reducing a little bit of stress. The coach, uses this content to generate tips and recommend workouts, information and venues based on their activity and interests. Users can also interact with other users who have the same goal. The coach recommends friends who have the same interest and creates fun competitions between users with the same interests.
 - Al-Anon Meetings – <https://www.al-anonuk.org.uk/>- help and hope for families and friends of alcoholics. Members share their own experience, strength, and hope with each other. They meet others who share the same feelings and frustrations, and are in a similar situation. The members come together to learn a better way of life, to find happiness whether the alcoholic is still drinking or not. The meeting location, timings and information is listed on the website.
 - Student Room (online forum) – <https://www.thestudentroom.co.uk/> - potential students are brought together in a social environment where they can discuss a particular topic
3. Have inner strength and confidence that you are making the best choice at that given time. If it does not feel right, it probably is not, so just have the confidence to say 'NO'. Having self-esteem and confidence will allow individuals to make their own decision and push back on peer influence. Blogs written by Julien Meyers (2017) and Lona Bailey (2018) have suggested this technique. They said that in order to overcome peer pressure, an individual should think about what their core values are,

why they have them and what they mean for their future. Once they understand their values, they will be more confident and assertive about their decisions and will stick with them.

4. Raise awareness (Lee, 2018) about peer pressure so that individuals understand the consequences of peer pressure so that they learn to say 'no' when they are influenced into doing something they are not comfortable with. This strategy has been strongly emphasised by blogger Quran Riddick (Riddick, 2015). She herself was a victim of teen peer pressure, therefore decided to raise awareness on this issue so that people across the world can understand this problem better and have ways to overcome it. She has written two blog posts, and created her own website - <http://qridnick.wixsite.com/teen-peer-pressure-1> -, along with a YouTube video, and a Teen Peer Pressure survey. On her website, she posts videos related to peer pressure, and posts real life stories of other teens who went through peer pressure and what their advice would be. She makes it clear that there is a relationship between peer pressure and bullying, therefore believes that if teens are aware of the consequences and effects of peer pressure, they are less likely to give in and will be able to combat it.

KS1 Peer Pressure Thinking Cards - <https://www.twinkl.co.uk/resource/t-p-53-ks1-peer-pressure-thinking-cards> - is another activity/game created for KS1 children aimed to raise awareness about peer pressure. The kids are presented with a scenario on a card, and they have to discuss what they think the right thing to do is.

5. Make a Vision Board/Dream Board – A YouTube video giving advice on how to handle peer pressure - <https://www.youtube.com/watch?v=Lao7gqr27JA> - suggest building a vision board. A vision board is a collage of pictures and quotes of one's dreams and visions, designed to serve as a source of inspiration and motivation. It is a visual representation of the things you want to have in your life. Vision boards work by programming the part of the brain responsible for attention. By writing down your goals and focusing your mind on the things you want in your life you are able to see new ways to achieve these things in reality.

A study conducted by TD Bank (Zimmerman, 2016) proved that visualising is most effective for small business owners to meet their entrepreneurial goals. Those business owners who took time to visualise their company are more successful and more likely to reach their goals than those who don't. TD Bank surveyed more than 1100 people and 500 small business owners nationwide to learn about their visualisation practices. Almost two-thirds of the business owners believe that visualising goals helps them map and develop their business plans. 82% owners used a vision board and said that they had accomplished more than half the goals they included on that board, and 76% of the owners said that their business is where they envisioned it would be when they started it (on the vision board). TD Bank (Zimmerman, 2016) partnered with psychologist Dr. Barbara Nussbaum, to analyse the results of this study. She said, 'by visualizing our personal and financial goals we can focus on them more, they feel more real and they feel more possible. We also become better at actually moving toward them'. In addition, Olympic athletes use imagery as mental training to improve performance (Clarey, 2014), and Psychology Today (Adams, 2009) reported that the brain patterns activated when

a weightlifter lifts heavy weights are also similarly activated when the lifter just imagined (visualized) lifting weights.

As these studies suggest, vision boards are most effective when it comes to achieve goals, hence if an individual has a vision board which they look at every day, then even if there is negative influence or negative peer pressure, it will not affect the individual as they have a clear vision in their mind of what they want to do. He/she will be able to push away the negative peer pressure and not let it influence him/her. Examples of apps and websites which allow individuals to create digital vision boards include –

- *Dreamitalive (website)* – <http://www.dreamitalive.com/> - users are able to create a digital vision board, or dream board. They can then share their vision board with the Dream It Alive community or keep it private (visible only to them). They can view other users dream boards too, and comment, save or even connect with the user.
- *The Hay House Vision Board (App)* - <https://www.hayhouse.com/the-hay-house-vision-board-app> - allows users to create a digital vision board (via the mobile app) for each goal and share with friends.
- *Family Vision Board Activity* (Parent Map, 2016) - . This is an activity recommended for parents. The whole family gets together and creates a board with their visions. They all then try to motivate one another to meet their goals.
- *Affirmation Board Blog* (Frances, 2019) - This blog talks about how building an affirmation board together with a vision board can help reach your goals.

Each of the five strategies have been powerful in overcoming peer pressure in their own way. There may be times where more than one strategy need to be implemented. It was also evident that only mobile apps, websites and online forums were used as technologies to combat peer pressure.

2.3 Persuasive Technology

In this section, a literature review of Persuasive Technology is conducted. As persuasive technology will be used as a solution in this research, it will first be explored in detail (in this section), which will facilitate in the design and build of a persuasive technology solution which helps individuals make an informed decision about their future by mitigating the peer pressure from friends. The Behaviour Wizard (covered in section 2.3.1.3) along with the PSD model (covered in section 2.3.2.2) were used primarily to inform the design of the persuasive technology. Details of the design and implementation of this persuasive technology as a solution are presented in Chapter 6.

Persuasive technology can be defined as “any interactive computing system designed to change people's attitudes or behaviour” (Fogg, 2002), through persuasion, not through coercion. Coercion implies force; while it may change behaviour, it is not the same as persuasion - which implies a voluntary change. As BJ Fogg stated, ‘it marries the traditional modes of persuasion, using incentives and information, with the innovative capabilities of devices to change users' behaviour, persuasive technology is seen as a new

paradigm that is applied within numerous domains, such as marketing, healthcare, environment and education' (Fogg, 2002). Examples of how persuasive technologies are applied in various contexts, including how they are used in the education section are covered later within this chapter (Section 2.3.5). All these examples are applied to the existing persuasive models (including BJ Fogg's Behaviour Model, Behaviour Grid and Behaviour Wizard) and persuasive design principles to show which models and principles are most popularly used in each sector. Reviewing these technologies revealed that there is limited use of persuasive technology in the education sector, to motivate individuals to make an informed decision about their future.

The next section presents the existing persuasive models, which can be employed to design a persuasive technology.

2.3.1 Persuasive Models

To understand how a persuasive technology should be designed, BJ Fogg, who was the first to articulate the concept of using computers to persuade people in changing their behaviour, has designed two models; Fogg Behaviour Model and Fogg Behaviour Grid. He also identified the Fogg Behaviour Wizard, which combines the Behaviour model and behaviour grid. These models are used to facilitate the design of the persuasive technology. This section details what each of the models are, and how they can be used. This research used the Behaviour Wizard to inform the design of the PT (covered in chapter 6).

2.3.1.1 Fogg Behaviour Model (FBM)

'The Fogg Behaviour Model shows that three elements must converge at the same moment for a behaviour to occur: Motivation, Ability, and Trigger. When a behaviour does not occur, at least one of those three elements is missing.' (Fogg, 2009 (Behaviour Grid)). This model was developed to understand the drivers of human behaviour. The model asserts that for a target behaviour to happen, a person must have sufficient motivation, sufficient ability and an effective trigger. If any one of the elements is lacking, the target behaviour will not happen.

The Behaviour Model can be used by designers of persuasive technology to figure out what element is lacking from their design due to which a target behaviour is not taking place. A persuasive design focuses on increasing motivation, increasing ability (simplicity), and triggering behaviour.

Elements of Motivation

BJ Fogg created a framework for motivation that has three core motivators, each with two sides (Fogg, 2009 (Behaviour Grid)). These can be harnessed within the technology to increase the motivation. The three core motivators include:

- Motivator #1: Sensation (Pleasure/Pain)
- Motivator #2: Anticipation (Hope/Fear)
- Motivator #3: Belonging (Social Acceptance/Rejection)

Elements of Ability (Simplicity)

Increasing ability is not about teaching people to perform a specific task, people are likely to increase the ability to perform a task if it is 'simple'. The designers should therefore focus on creating persuasive experiences that allow user to perform it easily and simply. For example, Amazons' 'one click' shopping, makes it easier to buy items online. Simplicity changes behaviour.

Simplicity has six parts; *Time, Money, Physical Effort, Brain Cycles, Social Deviance and Non-Routine*. These six parts relate to each other and each one must be present for a task to be simple. If one part fails, simplicity is lost. It must be taken into account that each person has a different simplicity profile. These factors vary by individuals and also by context. In creating persuasive technologies designers must remember that what's simple for one person is not necessarily simple for another.

Elements of Trigger

A trigger is something that tells people to perform a behaviour now. Although people might have the motivation and the ability they may need a signal telling them to perform it now. Three types of triggers as follows:

- Spark as Trigger- For people with low motivation but high ability. This type of trigger is called a 'Spark'. Sparks can range from texts to motivational videos that inspire hope.
- Facilitator as Trigger – For people with high motivation but low ability. This type of trigger is called a 'Facilitator'. The goal of the facilitator is to trigger the behaviour while also making the behaviour easier to do. Facilitators can be embodied in text, video, graphics and more. For example, one click.
- Signal as Trigger- For people with high motivation and high ability. This type of trigger is called a 'Signal'. The signal doesn't seek to motivate or simplify the task, it just serves as a reminder.

2.3.1.2 Fogg Behaviour Grid

The Fogg Behaviour Grid outlines 15 types of behaviours (Fogg, 2009 (Behaviour Grid)). The purpose is to help users (designers, researchers etc.) identify more clearly and exactly about the kind of behaviour they are attempting to change. Each of the 15 behaviour types requires different psychology strategies and persuasive techniques. To succeed in designing a behaviour change intervention, the *type* of behaviour that needs to be changed need to be understood clearly, and that is the point of the Behaviour Grid. It helps users understand the type of behaviour are trying to change, and then which persuasive strategies they need to address accordingly.

In the Behaviour Grid (figure 1.4 below), the rows refer to the different behaviour *durations* – Dot, Span and Path. The durations of the behaviours increase as one moves down the grid. The columns refer to behaviour familiarity or change – Green, Blue, Purple, Gray and Black. The first column (Green) deals with a new behaviour, whereas the second column (Blue) deals with doing a familiar behaviour. The next two columns

deal with familiar behaviours, where one increases or decreases its intensity or duration; Purple behaviours are increasing in intensity/ duration, and Grey behaviours are decreasing in intensity/duration. Finally, Black behaviours are those behaviours which are being stopped. Figure 2.4 below displays the Behaviour Grid.

	GREEN Do new behavior	BLUE Do familiar behavior	PURPLE Increase behavior intensity	GRAY Decrease behavior intensity	BLACK Stop existing behavior
DOT One time	GREEN DOT Do a new behavior one time	BLUE DOT Do familiar behavior one time	PURPLE DOT Increase behavior one time	GRAY DOT Decrease behavior one time	BLACK DOT Stop behavior one time
SPAN Period of time	GREEN SPAN Do behavior for a period of time	BLUE SPAN Maintain behavior for a period of time	PURPLE SPAN Increase behavior for a period of time	GRAY SPAN Decrease behavior for a period of time	BLACK SPAN Stop behavior for a period of time
PATH From now on	GREEN PATH Do new behavior from now on	BLUE PATH Maintain behavior from now on	PURPLE PATH Increase behavior from now on	GRAY PATH Decrease behavior from now on	BLACK PATH Stop behavior from now on

Figure 2.4 – Fogg Behaviour Grid

As mentioned earlier, each of the 15 behaviours types uses different psychology strategies and persuasive techniques. For example, the methods for persuading people to buy a book online for the first time (Blue Dot Behaviour) are different than getting people to quit smoking forever (Black Path Behaviour). The Stanford Behaviour Wizard Team (Behaviour Wizard, 2019) have produced some guidelines about how each behaviour type should be addressed.

Undertaking the first three studies for this PhD research recognised the need for a persuasive technology which aims to mitigate peer pressure from friends to be essential, as many individuals were unable to make an informed decision about higher education due to the friends' influence. It was therefore identified that the behaviour type we were attempting to change was a *Green Span* behaviour, as the users were expected to do a new behaviour (Green) of mitigating peer pressure from friends for a period of time (Span), when they were making the decision about higher education. Techniques suggested by the Stanford Behaviour Wizard Team (Behaviour Wizard, 2019) proposed that in order to address this behaviour type, the persuasive technology should, (i) boost *motivation*, (ii) increase *ability*, and (iii) deliver the *trigger*. This is covered in details in Chapter 6, design of the persuasive technology.

2.3.1.3 Fogg Behaviour Wizard

'The Behaviour Wizard is a method for matching target behaviours with solutions for achieving those behaviours' (Fogg, 2017). It is a systematic way of thinking about behaviour change. The Behaviour Wizard expands the Fogg Behaviour Grid (Fogg, 2009 (Behaviour Grid)) and the Fogg Behaviour Model (FBM) (Fogg, 2009 (Behaviour Model)) by combining them both into one easy-to-use solution. With this model, the designers first identify which type of behaviour they are addressing from the Fogg Behaviour Grid.

Once the designers have identified the type of behaviour they are addressing, the Fogg Behaviour Model (FBM) is then used as a guide to recognise which of the three elements, Motivator, Ability or Trigger, is missing, and not allowing the behaviour to occur (Step 2). The final step (Step 3), is to follow the real world techniques and guidelines Stanford Behaviour Wizard Team has created for achieving that specific behaviour (Behaviour Wizard, 2019). As each behaviour type has its own set of strategies and ways to achieve it, this guide is extremely useful for a designer to follow. Fogg explains which of the three elements must be down played or focused on for the target behaviour to be achieved. For example, if you want someone to perform a new behaviour for just one time, then you are seeking a 'Green Dot Behaviour', such as, registering online for a new insurance policy. The main challenge that we face while triggering a Green Dot behaviour is a lack of ability. Since Dot behaviours occur only once, the intended person must have enough knowledge to successfully complete the action on the first attempt. Otherwise, frustration, and quitting, may occur. To achieve a Green Dot Behaviour, three elements must come together at once. As the Fogg Behaviour Model describes, you must **trigger** the behaviour when the person is both **motivated** and **able** to perform it. If any of these three elements is missing, the behaviour will not occur.

1. Couple the **trigger** with a motivational or facilitative element.
2. Increase the **ability** of the subject by explaining the novel behaviour in terms of one that is familiar.
3. Increase the **motivation** of the subject by explicitly highlighting the benefits of the action.

2.3.2 Persuasive Design Principles

In addition to the persuasive model identified in the previous section, a number of persuasive design principle or strategies which could be incorporated into a technology to make it '*persuasive*' have been identified by some researchers. One or more of the strategies can be incorporated within the technology, to increase the levels of persuasion and behaviour change. The strategies identified by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013), Robert Cialdini (Cialdini & Goldstein, 2002) and Harri- Oinas (Oinas-Kukkonen & Harjumaa, 2009) are outlined in this section.

2.3.2.1 Persuasion Strategies (by BJ Fogg, Ran Cheng and Robert Cialdini)

At the moment the persuasion strategies that are being used for persuasive technology have been borrowed or adopted from persuasion theories from fields such as psychology, communication, media and so on. Since these subjects have a history of investigating different types of persuasion and effects, BJ Fogg, the current leading persuasive technology expert, has described a few strategies typically used by

persuasive technology tools that simplify or facilitate certain activities (Fogg, 2002). He believes that the theories and methods of the subjects above can transfer well into captology (using computers to persuade users to perform a behaviour). An outline of the 7 persuasion strategies identified by Fogg, along with a description and example of how it could be used in a persuasive technology are outlined in the Table 1.4 below.

Persuasion Strategy	Description	Example of How it Could Be Used
1. <i>Reduction</i>	This strategy is used to make a complex task simpler, usually by eliminating some of the steps of a sequence required to achieve a certain goal.	Mobile application that lists the exercises you need to do in order to achieve your goal.
2. <i>Tunnelling</i>	The technologies are designed to reduce 'uncertainty', by taking users through a predetermined sequence of actions or events, step by step, to encourage certain behaviours.	Website that offers information about treatment opportunities to users after they have taken a test on how addicted they are to a certain medication.
3. <i>Customization/ Tailoring</i>	A personalised message and information receives much more attention from the user rather than a general message. This may influence the person decision more effectively as the users are provided with personally relevant material.	Personal trainer mobile application that provides different information content for different users – tailored to their needs.
4. <i>Suggestion</i>	Technologies are premised on the idea of intervening at the 'right time'.	Website that suggests users recommended movies to watch depending on their search history.
5. <i>Self-Monitoring</i>	These technologies will allow users to monitor themselves to modify their attitudes/behaviour to achieve a pre-determined goal or outcome.	Mobile app that allows users to monitor their calories.
6. <i>Surveillance</i>	These technologies allow one party to monitor the behaviour of another party through observation. When people know they are being watched they will act differently.	Mobile fitness app where two groups compete against one another to see who takes the most steps during the day.
7. <i>Conditioning</i>	These technologies make use of conditioning often in the form of a positive reinforcement, to reinforce target behaviour when they occur. To be most effective, conditioning must occur immediately after the performance of a behaviour. Positive reinforcement is a common motivational technique used.	A praise message for users who ate healthy food during the day. The message reinforces their point, telling users that they are fit since they ate healthy food.

Table 2.4 – Fogg Persuasion Strategies

In addition, Ran Cheng reported a handful of persuasive strategies in his paper 'Persuasion Strategies for Computers as Persuasive Technologies' (Cheng, 2013). These are outlined in Table 1.5 below.

Persuasion Strategy	Description	Example of How it Could Be Used
1. <i>Just-In-Time persuasion</i>	A persuasive message that is highly related and available at just the moment people make a decision	A mobile app that tells users that the food they are eating is health/not healthy (once they scan the food item)
2. <i>Comparison</i>	This kind of persuasion is most likely to be used by manufacturers promoting the sale of their products in an e-commerce environment. A comparison is given to customers when they face lots of similar products and hesitate to make the decision on which one to choose.	A website that gives users a comparison of their prices with a competitors.
3. <i>Simulating Experience</i>	Users are presented with a simulated environment which is very similar to the real counterpart. With the simulated environment the users will obtain some experiences and make decisions based on these experiences. This simulating experience is vital as the users are likely to make the same decisions in their real life.	Before and after pictures of people who have lost weight are presented on a website.
4. <i>Personalizing</i>	A Personalized message and information receives much more attention from the user rather than a general message. This may influence the decision as the users are provided with personally relevant material.	Personal trainer mobile application that provides different information content for different users – tailored to their needs.
5. <i>Recommendation</i>	Recommended systems are used to make recommendation for different users depending on their interests or opinions. The idea here is to intervene at the 'right time'. People feel more motivated to perform a behaviour at a certain time.	Website that suggests users recommended movies to watch depending on their search history.
6. <i>Monitoring and Tracking</i>	If a user's behaviour is being monitored or tracked, it is very like that their behaviour will change. This strategy may however result in the loss of personal freedom or privacy, it is a controversial persuasive technique due to the ethical issues related to it. It may be seen more like coercion.	Mobile app that allows users to monitor their calories.
7. <i>Competition and Recognition</i>	Competition and recognition can be used to motivate people's behaviour since it is in the nature of a human to win in contests and gain glory (in most cases). People are afraid of being socially rejected, hence would perform well in order to be accepted and recognized in society and within friends and family.	A mobile app that displays results of the winning group who has taken the most steps during the day.

Table 2.5 – Ran Cheng Persuasion Strategies

Cialdini's Theory of Influence (Cialdini & Goldstein, 2002) reported seven key principles in delivering persuasion. These are:

1. **Reciprocity** – People tend to return a favour, thus the pervasiveness of free samples in marketing.
2. **Commitment and consistency** – If people commit, orally or in writing, to an idea or goal, they are more likely to honour that commitment because of establishing that idea or goal as being congruent with their self-image. Even if the original incentive or motivation is removed after they have already agreed, they will continue to honour the agreement. An example is children being made to repeat the Pledge of Allegiance each morning.
3. **Social proof** – People will do things that they see other people are doing. For example, in one experiment, one or more confederates would look up into the sky; bystanders would then look up into the sky to see what they were seeing. At one point this experiment was aborted, as so many people were looking up that they stopped traffic.
4. **Authority** – People will tend to obey authority figures, even if they are asked to perform objectionable acts.
5. **Liking** – People are easily persuaded by other people that they like. Cialdini cites the marketing of Tupperware in what might now be called viral marketing. People were more likely to buy if they liked the person selling it to them. Some of the many biases favouring more attractive people are discussed. See physical attractiveness stereotype.
6. **Scarcity** – Perceived scarcity will generate demand. For example, saying offers are available for a 'limited time only' encourages sales.
7. **Unity** – The more we identify ourselves with others, the more we are influenced by these others.

2.3.2.2 Persuasion Strategies (by Harri Oinas) - Persuasive Systems Design Model (PSD)

Harri Oinas designed the PSD (Persuasive Systems Design) model that defines the software characteristics for a generic Behaviour Change Support System (BCSS) (Oinas-Kukkonen, 2010). He claimed that although the widely used framework developed by Fogg (Fogg Behaviour Model, detailed in the previous section 2.3.1.1, and Fogg Persuasive Strategies, detailed in section 2.3.2.1) provides a useful means for understanding persuasive technology, it does however seem too limited to be applied directly to a persuasive system development and/or evaluation. He stated, '*A weakness of this model is that it does not explain how the suggested design principles can and should be transformed into software requirements and further implemented as actual system features*' (Oinas-Kukkonen & Harjumaa, 2009). To be able to design and evaluate the persuasiveness of a software system, it becomes essential to understand both the information content and the software functionalities. Hence, Oinas describes the system design principles under four categories of the software system characteristics. Each category is focused on a different area and include 7 design principles each. These four categories are: -

1. Primary Task Support:

Focus on supporting the carrying out of the users primary activities. The design principles in this category are reduction, tunnelling, tailoring, personalization, self-monitoring, simulation and rehearsal.

2. Human-Computer Dialogue Support:

Help towards achieving the goal set for using the BCSS as there is some degree of system feedback to its users. The design principles in this category are praise, rewards, reminders, suggestion, similarity, liking and social role.

3. System Credibility Support:

Relate to how to design a system so that it is more believable and thereby more persuasive. The design principles in this category are trustworthiness, expertise, surface credibility, real-world feel, authority, third-party endorsements and verifiability.

4. Social Support:

Describe how to design the system so that it motivates its users by leveraging social influence. The design principles in this category are social learning, social comparison, normative influence, social facilitation, cooperation, competition and recognition.

The 28 design principles identified in the PSD model, along with a description of each are outlined in Table 2.6 below.

Software System Characteristic	Design Principle	Description
Primary Task Support	Reduction	A system that reduces complex behaviour into simple tasks helps users perform the target behaviour, and it may increase the benefit/cost ratio of a behaviour.
	Tunnelling	Using the system to guide users through a process or experience provides opportunities to persuade along the way.
	Tailoring	Information provided by the system will be more persuasive if it is tailored to the potential needs, interests, personality, usage context, or other factors relevant to a user group.
	Personalisation	A system that offers personalized content or services has a greater capability for persuasion.
	Self-monitoring	A system that keeps track of one's own performance or status supports the user in achieving goals.
	Simulation	Systems that provide simulations can persuade by enabling users to observe immediately the link between cause and effect.
	Rehearsal	A system providing means with which to rehearse a behaviour can enable people to change their attitudes or behaviour in the real world.

<i>Dialogue support</i>	Praise	By offering praise, a system can make users more open to persuasion.
	Rewards	Systems that reward target behaviours may have great persuasive powers.
	Reminders	If a system reminds users of their target behaviour, the users will more likely achieve their goals.
	Suggestion	Systems offering fitting suggestions will have greater persuasive powers.
	Similarity	People are more readily persuaded through systems that remind them of themselves in some meaningful way.
	Liking	A system that is visually attractive for its users is likely to be more persuasive.
	Social Role	If a system adopts a social role, users will more likely use it for persuasive purposes.
<i>System Credibility Support</i>	Trustworthiness	A system that is viewed as trustworthy will have increased powers of persuasion.
	Expertise	A system that is viewed as incorporating expertise will have increased powers of persuasion.
	Surface Credibility	People make initial assessments of the system credibility based on a first hand inspection.
	Real-world feel	A system that highlights people or organization behind its content or services will have more credibility.
	Authority	A system that leverages roles of authority will have enhanced powers of persuasion.
	Third-party endorsements	Third-party endorsements, especially from well-known and respected sources, boost perceptions on system credibility.
	Verifiability	Credibility perceptions will be enhanced if a system makes it easy to verify the accuracy of site content via outside sources.
<i>Social Support</i>	Social Learning	A person will be more motivated to perform a target behaviour if (s)he can use a system to observe others performing the behaviour.
	Social Comparison	System users will have a greater motivation to perform the target behaviour if they can compare their performance with the performance of others.
	Normative Influence	A system can leverage normative influence or peer pressure to increase the likelihood that a person will adopt a target behaviour.
	Social Facilitation	System users are more likely to perform target behaviour if they discern via the system that others are performing the behaviour along with them.

	Cooperation	A system can motivate users to adopt a target attitude or behaviour by leveraging human beings' natural drive to co-operate.
	Competition	A system can motivate users to adopt a target attitude or behaviour by leveraging human beings' natural drive to compete.
	Recognition	By offering public recognition for an individual or group, a system can increase the likelihood that a person/group will adopt a target behaviour.

Table 2.6 – Persuasive Design Principles - PSD Model

From the different persuasive design principles mentioned above, it is evident that Oinas, Fogg and Ran Cheng agree that *Tailoring/Personalization*, *Suggestion/Recommendation* and *Self-Monitoring/Tracking* is a persuasive strategy that must be incorporated when designing a persuasive system. There is also an overlap between the principles of *Reduction*, *Tunnelling*, *Self-Monitoring*, and *Conditioning/Praise* by Oinas and Fogg. They both confirm that these design principles are important for a persuasive system. Whereas Oinas and Ran Cheng agree that *Comparison*, *Competition* and *Recognition* are important design principles that must be considered when designing a persuasive system.

2.3.3 Kinds of Technologies used to deliver Persuasion

As seen from the previous section, a number of persuasive strategies ranging from Reduction to Tailoring, where each strategy is different. However, the aim of each strategy used, whether it used on its own or with a combination of other strategies, is to ensure that the user is persuaded to perform the target behaviour. Various technologies have been developed which are used to deliver persuasion, with the intension of incorporating the persuasion techniques within them. Some of the technologies used to deliver persuasion are summarised in the Table 1.6 below.

Technology Type	Description	Examples
1. <i>Smart or Interactive Devices</i>	An electronic device that provides multimedia information and is generally connected to other devices or networks via different wireless protocols such as Bluetooth, 3G, Wi-Fi etc.	SMART interactive Whiteboard (<i>Rapid, 2017</i>)
2. <i>Mobile Technology (includes apps or games created which are compatible with a smartphone)</i>	Is the technology used for cellular communication. A standard mobile phone now has been embedded with web browsers, instant messaging and also used as a GPS navigation device.	Apple smartphone

3. <i>Tangible Technology</i>	These are tangible objects that are interfaced with computers.	Wireless Blood pressure Monitor (<i>Topbloodpressuremonitor, 2017</i>).
4. <i>Display Technology</i>	Is an output device for presentation of information in visual or tactile form.	Interactive outdoor Kiosk
5. <i>Pervasive (Ambient Technology)</i>	Refer to electronic environments that are sensitive and responsive to the presence of people.	XBOX with Kinect
6. <i>Wearable Technology</i>	These are clothing and accessories incorporating computer and advanced electronic technologies. They are also known as fashion technology, wearable devices or fashion electronics.	Apple Watch
7. <i>Social Media</i>	Are computer-mediated tools that allow people to create, share, or exchange information, ideas and pictures/videos in virtual communities and networks.	Facebook, Twitter, Snapchat etc.
8. <i>Web Technology</i>	Are means by which computers communicate with each other using markup languages and multimedia packages. It allows us to interact with host information – like websites.	Any website which uses HTML (hypertext markup language) and CSS (Cascading Style Sheets). E.g. www.google.co.uk
9. <i>Virtual Reality Headsets/Glasses</i>	Virtual reality are computer generated environments which can be explored and interacted with by a user. This user becomes part of this 'virtual' world and is able to manipulate objects or perform various actions. A headset or glasses are worn by the user to see this immersive virtual world and interact with it.	Samsung Gear (Controller, 2017)

Table 2.7 – Technologies used to deliver persuasion

As seen from Table 1.6 above, there are various types of technologies which are used to deliver persuasion. We cannot say whether a specific technology type is most effective to deliver persuasion, and become a

persuasive technology. Each technology type has its own pros and cons depending on the situation they are being used in and the type of persuasion they are delivering. The persuasive strategies which are being incorporated into the technology are also vital, not all technology types can incorporate all the persuasive strategies, some technologies will be better to use than the other. For example, to incorporate the persuasive strategy 'simulation', it would be ideal to use a virtual reality headset as this technology type will give the user the best immersive experience. Using a display technology will not be as effective to deliver the persuasion strategy of simulation.

2.3.4 Applications of Persuasive Technology

Persuasive technology, which can take the form of websites, apps or other technology types, uses the traditional modes of persuasion by incorporating incentives and information within a technology to change a user's behaviour. This nature of persuasive technology has allowed it to be applied within numerous domains, such as in marketing, healthcare, environment and education. For example, Amazon uses a persuasive 'one-click buy' button on their website to influence the buying behaviour of their customers. As this button is aimed to make their online buying simple.

Further examples of how persuasive technology is applied within the health, environment, safety and education domain are detailed in this section. This was done to get a general idea of which technology, behaviour type and design principles are most commonly addressed to in the different domains, and to determine whether there are any themes within these domains.

2.3.4.1 Healthcare

A Google search was done with the search criteria 'persuasive technology' and 'healthcare'. The top five search results that were returned which stated that the technology is a 'persuasive technology' are included in the examples below.

1. A prototype program was developed and evaluated that targeted college students. This program integrated Web and cell phone technologies to deliver a smoking-cessation intervention. The individualized quitting program is delivered to the user by means of cell phone text messaging and assessment tools delivered with the program Web site (Obermayer, et al., 2004).
2. A mobile phone application called 'Chick Clique' combined with a pedometer is developed to help motivate teenage girls to exercise by exploiting their social desire to stay connected with their friends. Friends register on the application and create a group with friends from their social circle. The number of steps taken by each friend within the group is displayed in the application and notified to other group members. Information, messaging and praise is provided by the application at opportune times in order to improve the motivation of the friends. The pedometer is worn by the teenagers as a fashion accessory - a belt. (Toscos, et al., 2006).
3. FireFly toothbrush has a bright LED light inside that flashes for 60 seconds after pushing on the handle. The flashing light is used to persuade children to brush longer, possibly contributing to improved oral health. (Hester, 2013).

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4. A mobile phone based fitness journal, *Houston*, is designed to track and share progress onwards a daily step count goal within a small group of friends. The software has a sharing feature where users are able to send their step count to buddies, see buddies progress with respect to goals, send a message to any/all buddies and request a buddie step count. A pedometer is worn as a wristband to monitor the step count. Each users goal is calculated according to his/her weight and average step count (Consolvo, Everitt, Smith & Landay, 2006)
 5. Withings Wi-Fi-enabled scale incentivizes weight loss. There is also a free Health Mate app that synchronizes with the scale. This app acts as a coach, setting weight loss goals and breaking them down into weekly achievable targets while keeping the user focused with relevant tips and reminders. The users can also notify their achievements to their Twitter followers or Facebook friends (Eagle & Greene, 2014).

A detailed analyses of each of the technologies is included in Appendix E.1 – Healthcare. In summary, the following was evident for the persuasive technologies in the

healthcare domain:

- Type of technology - Various types of technologies are being used to deliver persuasion. All six applications use a different type of technology, so no one type of technology is most commonly used to deliver persuasion in the healthcare sector.
- Behaviour Grid – Purple and Green Path behaviours are more likely to be targeted. 'Path' behaviour refers to those behaviours which are going to start 'from now on'. All six applications targeted a path behaviour, however at different intensities – Two of them targeted the behaviour to be increased from now on (Purple Path), two wanted a new behaviour to be started from now on (Green Path), whereas one application wanted a behaviour to be stopped from now on (Black Path). All applications focus on starting, stopping or increasing/decreasing a behaviour from now on. None of the applications want a behaviour to be carried out one time only or for a certain period of time.
- Behaviour Model – Although four applications used a mixture of various motivator, ability and triggers to make their application persuasive enough, two of the applications used a combination of 'Trigger (Spark) and Motivator (Hope)' to persuade the user to perform the target behaviour. 'Spark' as a trigger is used to target people with low motivation but high ability. Hence, a combination of Sparks along with giving/showing users *hope* is the most commonly used for the six applications analysed within the healthcare sector.
- Design Principle – The most popular design principle used for the applications analysed are 'Tailoring' and 'Self-Monitoring'. 5 of the 6 applications use both these principles to make their application persuasive. The second most commonly used design principles are 'Tunnelling' and 'Personalisation'. 4 out of the 6 applications comprise of both these principles. Personalising and modifying the persuasive technology to adapt to the user and tailoring it to his/her needs is an evident theme emerging from the persuasive technologies designed for the healthcare sector. A

user is more likely to perform a behaviour if the application/persuasive technology is designed specifically for them targeting their individual needs.

2.3.4.2 Environment

A Google search was done with the search criteria 'persuasive technology' and 'environment'. The 4 search results which stated that the technology is a 'persuasive technology' are outlined below:

1. OPOWER, a software company that promotes home energy efficiency. Instead of showing a plain power bill, OPOWER collects energy data from the home and displays it in a chart that compares a user's energy use to that of his/her neighbours in aggregate. A 'smiley face' is put on the person who used less energy than their neighbours (Laskey & Kavazovic, 2011).
2. In hybrid cars, including the Toyota Prius and Ford Fusion Hybrid, display panels tell the driver how efficiently he/she is driving at the moment. Ford Fusion causes a digital plant to grow (or die) on the dashboard screen as the persons driving efficiency increases or decreases, whereas Toyota Prius plots the information on a bar graph. (Show, 2017).
3. One popular green application on Facebook is called 'I am Green'. Users provide the application with a list of their green behaviours. Each green behaviour gets you a leaf, and you are compared to your friends who have also installed the application. The users can click on friends green behaviour to learn more about it. Furthermore, popular behaviour are advertised.
4. An energy saving competition was run between dormitories on the Oberlin campus (Petersen, Shunturov, Janda, Platt & Weinberger, 2007). The dormitories that saved the most energy, over a certain period, would win a prize. The researchers provided one group of dormitory with real-time consumption information they could view on an interactive display in the lobby of the building. Dorms who had access to viewing their consumption showered significant energy reduction than those who did not have the access.

A detailed analyses of each of the technologies is included in Appendix E.2 – Environment. In summary, the following was evident for the persuasive technologies in the healthcare domain:

- Type of technology – Various types of technologies are being used to deliver persuasion, from social media sites to interactive devices. However, two out of the four applications are using 'Interactive Devices' to deliver persuasion.
- Behaviour Grid – All four applications are targeting a different kind of behaviour. Three out of the four however, are focusing on a path behaviour. 'Path' behaviour refers to those behaviours which are going to start 'from now on'. Although three of the applications target a path behaviour, all three are at different intensities – one of them targets the behaviour to be increased from now on (Purple Path), one focuses on a new behaviour to be started from now on (Green Path), whereas one application wants a behaviour to be stopped from now on (Black Path). Lastly, one of the application wants a behaviour to be decreased for a certain period of time (Grey Span).

- **Behaviour Model** – All four applications used a mixture of various motivator, ability and triggers to make their application persuasive enough. However, using Trigger (Spark) and Motivator (Social Acceptance) are the most commonly used models for applications within the environment sector. 'Spark' as a trigger is used to target people with low motivation but high ability, showing users that they will be socially accepted if they perform a target behaviour will give users the motivation and persuade them to perform a behaviour.
- **Design Principle** – The most popular design principle used for the applications analysed are 'Recognition and Praise', 'Social Comparison', 'Social Facilitation', 'Reminders' and 'Self-Monitoring'. 2 of the 4 application applications use these principles to make their application persuasive. Getting praised and being socially accepted and liked by your friends/family/neighbours is an evident theme emerging from the persuasive technologies designed for the environment sector. A user will perform a behaviour relating to helping/protecting the environment if they know they are being watched, compared and praised by others.

2.3.4.3 Sales and Marketing

A Google search was done with the search criteria 'persuasive technology', 'sales' and 'marketing'. Only two search returned which stated that the technology is a 'persuasive technology'. These were:

1. Amazon.com – 'one click' shopping. The click one ordering places the order automatically and lets the user skip the shopping basket.
2. An online auction system (Onsale.com) that treats bidding as playing and buying as winning. This website is a virtual auction space allowing people to competitively bid on items in real time. It motivates people to participate in live auctions and buy products.

Detailed analysis of these two technologies can be found in Appendix E.3. We can summarise that:

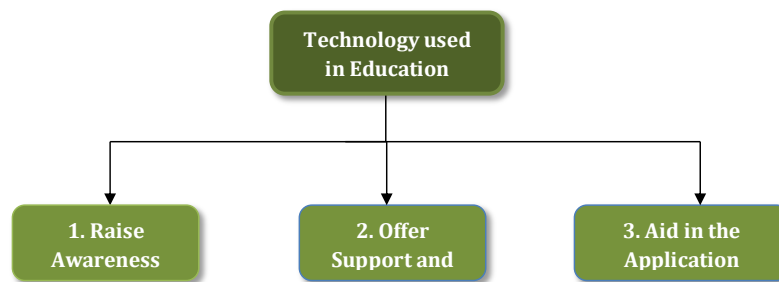
- **Type of technology** - Both the applications use web technology (websites) to deliver persuasion.
- **Behaviour Grid** – Both applications are targeting a different kind of behaviour. One focuses on a 'Purple Path' behaviour, whereas the other application is targeting a 'Green Dot' behaviour.
- **Behaviour Model** – Both application used different behaviour models. They both use a different motivator, ability and/or triggers to make their application persuasive enough. The first used Ability (Brain Cycle), while the second application used Trigger (Spark). 'Spark' as a trigger is used to target people with low motivation but high ability, and showing user that they can perform a behaviour even if they are not used to it or have never performed it before will give users the motivation and persuade them to perform a targeted behaviour.
- **Design Principle** – The most popular design principle used for the sales/marketing applications analysed are 'Reduction' and 'Personalisation'. Both the applications use these principles to make their application persuasive. Making the target behaviour easier to perform (even if they have never performed it before) and making it more tailored, suited to individual needs is an evident theme

emerging when designing persuasive technologies for the sales/marketing sector. A user will perform a behaviour relating to sales/marketing if they find the target behaviour easy to perform.

2.3.5 Persuasive Technology in Education

As persuasive technology (PT) has evolved, it has been applied within a number of sectors including the area of education, where persuasive technology has been designed to help with the teaching process and encourage learning. Examples of such technologies vary from helping Autism Diagnosed young people Navigate and Develop socially (HANDS) (Mintz, & Aagaard, 2012) to the development of an educational software to motivate children to read and write (Lucero, Zuloaga, Mota & Muñoz, 2006). The HANDS Project developed a mobile device to help teenagers diagnosed with autism to handle daily situations which they find difficult to handle themselves. The software designed by Eindhoven University of Technology and Universidad Tecnológica Metropolitana to motivate children to read and write claimed that by designing activities that integrated Gardner's Multiple Intelligence theory to their software, they were able to motivate children to read while acknowledging individual differences in their learning process. The persuasive strategy of 'similarity' and credibility was applied for this project, where a well-known literary character 'Papelucho' was included within the software so that children could relate with the character easily.

However, in this research, the role of persuasive technology within the higher education sector will be studied. How students can be motivated and encourage to enter university will be investigated. At the moment a number of strategies have been adopted by various universities to encourage learners from Primary Schools up to Year 12/13 to enter higher education. These strategies are focused on three main areas – Awareness, Support and Application.



'Awareness' refers to telling students about the different university, career and course options that are available to them. Based on a study by the Department of Education, it was evident that the main barrier and constraint experienced by young people relate to lack of availability of provision and their knowledge and awareness of post-16 options available to them. (Spielhofer, et al., 2010). Almost a quarter of young people participating in education or training post-16 say that they would have done something different if they had been *aware* of all the courses they could have done. Secondly, there is a lot of 'support' required by students to be able to make take this step. They need guidance and help to clarify and questions/doubts

that are constraining them from entering higher education. If they have support available, it is more likely that potential students are encouraged to study further. In addition, support is also vital for enrolled students, as they will need help and guidance at times during their academic year in higher education. If they do not find means of finding support, they may end up dropping out of university. Lastly, the 'application' process is what some students struggle with as it is fairly new to them. Universities and other groups aim to help students with the application process.

For the literature review to search for persuasive technologies used to promote higher education, Google, ACM Digital Library, IEEE Xplore and the papers published in the Persuasive Technology conference were searched with the following keywords: 'persuasive technology', 'higher education', 'awareness', 'guidance' and 'application'. Surprisingly, the results returned were of the ongoing projects that are being run to promote higher education (the ones reported in Section 2.1.3), although they do not state that they are using a persuasive technology. In addition, the results also included the HANDS project to help autism diagnosed young people navigate and develop social skills (Mintz & Aagaard, 2012), and of the educational software developed to motivate children to read and write (Lucero, Zuloaga, Mota & Muñoz, 2006). None of the results returned of the projects/activities which promote higher education stated that they used any kind of 'persuasive technology'. These projects (which have already been reported in Section 2.1.3) were then assessed further to see whether they are persuasive in any way, or if they use any kind of persuasive strategies. This would determine whether they can be classified as a persuasive technology (even though they do not state they are persuasive), and if there are any particular traits or persuasive strategies which are more commonly used in technologies within the education sector. This analysis is outlined in Table 1.7 below. In addition, the projects are categorised depending on whether they 'raise awareness', 'offer support and guidance', or 'aid in the application process'.

	Projects/Activities	Technology Used
Raise Awareness	<u>MANSLE Project</u> (Jisc Learners Perspectives., 2012) Social networking tools are used for this project. The leader of the project encouraged students to share their research findings and issue discussions with their peers. Social media here was not just used for sharing personal content but also to work out how to tackle the potential to move to university.	Social Networking Site
	<u>Professor Fluffy's Primary Roadshow</u> (Greenbank, 2018) A classroom-based project that delivers sessions to both Year 5 and Year 6 pupils by current students and recent graduates from Liverpool university. The two hour programme aims to raise awareness and aspirations of university. The children get an insight into what being a	Website – to deliver the interactive Professor Fluffy session

	student is like, what courses they can study, where they can go to university and what happens at graduation.	
Offer Support and Guidance	ELP Project (JISC, 2007) E-portfolio was used to record evidence for a module that supported learner progression into higher education. Students were encouraged to think about university and reflect their skills and abilities. One of the key task was completion of the personal statement for the UCAS application.	Pebblepad (E-portfolio)
	File - Pass Project (Mahoney, 2006) Child care learners on a Key Skills Programme became more motivated and were keener to attend, as a result of using an e-portfolio on their course. Learners were encouraged to document their thoughts in blogs to help their understanding.	Pebblepad (E-portfolio)
	L4All Project (De Freitas et al., 2006) Learners developed online timeline to help them look into the future. Learners found that completing an online life timeline made them think about what they were going to do with their future. Personalized support and advice was incorporated in the timeline, to help learners make decisions about their future.	Web based portal – To develop timeline
	Realizing Opportunities Project (RealisingOpportunities, 2018) This project provides students with skill and information to help them make informed decisions about their future to raise their aspirations to progress to university. Students are supported throughout the programme by their local RO university and a dedicated e-mentor.	Website – To contact e-mentor
Aid in the Application Process	No project found which uses technology	

Table 2.8 Projects which use technology to promote higher education

As seen from the table above, technology is most often used to help offer support and guidance to the students. Projects aimed at raising awareness were mostly those in which a talk/lecture was given. There were also projects where pupils were taken into universities so that they could experience university life and see what course they could apply for. Again, no particular technology is used when taking students to experience university life, except for maybe a website to either fill out the application form (in some cases) or to research and read up on additional information. Moreover, no projects were found which use

technology to aid in the application process. These were normally face to face sessions held by teachers, instructors, or advisors who help potential students apply to university, make the application, and check their personal statements. Students might just use websites to research and find additional information.

After assessing the technologies used in the 6 projects, it was evident that they all classified as persuasive technology, as they were using some kind of persuasion strategy. Detailed analysis of each of the projects can be found in Appendix E.4 – Education. A summary of the findings include:

- Type of technology - The most popular type of technology used within the education sector are websites, with 4 out of the 9 projects using it to deliver persuasion. In addition, three of the applications use e-portfolio (in the form of a website). The remaining two applications use social media and mobile technology. The most commonly used type of technology for the education sector are websites.
- Behaviour Grid – 6 of the 9 applications, almost 70% of the applications, are targeting the 'Green Span' behaviour. 'Span' behaviour refers to those behaviours which are carried out for a period of time. In this scenario, 6 of the applications are targeting users to perform a new behaviour for a certain period of time. The remaining three applications are focusing on a user to perform a new behaviour once (Green Dot), to increase a new behaviour from now on (Purple Path) or to do a new behaviour from now on (Blue Path). Persuasive technologies within the education sector are more focused towards getting users to carry out a new behaviour for different durations (for a certain time etc.).
- Behaviour Model – Although the applications used a mixture of various motivator, ability and triggers to make their application persuasive enough, three of the applications used a combination of 'Ability (Non-Routine) Motivator (Hope)' to persuade the user to perform the target behaviour. As the users are not used to performing this target behaviour the technology is intending for the users to perform, the technology is designed in a way to make the target behaviour easier so that any user who has not performed this behaviour before is able to do so, increasing their brain cycle and overall ability. Users are also given/shown *hope* of their future etc. Both these elements are combined and are most commonly used to address individuals within the education sector.
- Design Principle – The most popular design principle used for the applications analysed is 'Social Facilitation'. 5 of the 9 applications embed social facilitation within their applications. Users are more likely to perform a behaviour better when in the presence of others. They may even decide to perform the behaviour if they see others performing it as they are easily influenced. 'Tailoring' is the second most commonly used design principle used when designing persuasive technology for the education sector. 2 of the applications use a combination of social facilitation and tailoring. Personalising the persuasive technology to adapt to the user and tailoring it to his/her needs as well as allowing the users to look at the behaviour of their peers is an evident theme emerging from the persuasive technologies designed for the education sector. A user is more likely to perform a behaviour if his/her peers are performing it, as he/she will want to be socially accepted.

2.3.6 Criticism of Persuasive Technology

As detailed in the previous sections, PT is being widely used in a number of domains ranging from the education to the health sector. Although PT is being used as a powerful tool to persuade users to perform a target behaviour, associating computers and persuasion has become a topical debate. A review by Robert Johnson (Johnson, 2004) highlights several shortcomings. Firstly, Johnson states that while B.J. Fogg's work is interested in end users, however the focus of PT is design-centred and system-centred. This means that user testing and user input are omitted when designing a persuasive technology. Johnson critiqued that such an omission is not keeping with current user-centred, usability-design philosophy.

Secondly, Johnson appraised B.J. Fogg's captological design. Fogg writes, 'Captology (using computers as persuasive technology) does not include *unintended consequences*; it focuses on the attitudes and behaviour changes intended by the designers of interactive technology products'. Johnson emphasised that a user-centred design philosophy includes an examination of both intended *and* unintended consequences of technology, however Fogg's captological design focuses on attitude and behaviour changes *excluding* the unintended consequences. Another researcher, Verbeek (Verbeek, 2009) agrees with Johnson and highlights that unintended consequences need to be incorporated in the design process by better understanding and predicting them.

In addition, Atkinson (Atkinson, 2006) contributed in critically reviewing Fogg's book- *Persuasive Technology: Using Computers to Change What We Think and Do* (Fogg, 2002). In her paper, she was concerned about the ethical issue of persuasive technology. She outlined that a fundamental ethic is that the designer's intent should be exposed at the beginning of user engagement with a program/technology, whereas Fogg (Fogg, 2002) stated that a key component of Captology is examining ethical issues in the intentions, methods, and intended outcomes of PT. He cites that coercion and deception are always unethical, therefore has offered a 7-step stakeholder analysis framework as a methodology for the analysis of ethics in PT (Fogg, 2002). Atkinson however, stated that Fogg's ethical reminders are "not incorporated into his discourse" (Atkinson, 2006). She emphasized that what is missing is "a rigidly defined context of what constitutes an ethical application of persuasion principles". She also proposed a new term, "Compusuasion" as the ethical term that would describe the unintended or unforeseen behavioural change that go along with persuasive technology, thus accepting the responsibility.

2.4 Summary

Two areas of this literature review were important in directing the next steps to this research. Firstly, the literature revealed that the number of entrants into higher education is extremely low, and from a LPN. Although prior studies have attempted to understand the barriers and motivators to enter higher education, the work was limited; there was limited focus on what barriers and motivators do individuals from a LPN encounter which result to such a low number entering HE. In addition, these studies did not involve exploring the role of technology in the decision making. Secondly, a review of the technologies used in the

Commented [WS5]: I think this should be extended to include other concerns such as the ethics of persuasion. I don't think you have done enough here.

Commented [A6R5]: Added a paragraph on ethics of PT as criticism.

education sector presented that there was limited use of persuasive technology. Social networking sites and website were the main kinds of technologies used to enable individuals to make an informed decision about their future.

Identifying these limitations were the main drivers to conduct the first two studies for this research. The first study (Chapter 3) explored what barriers do individuals from a LPN face, whereas Study 2 (Chapter 4) explored what motivates individuals from the same neighbourhood (LPN) to enter and what role technology played in their decision making. The role that technology plays in their decision making was also addressed. These studies were conducted in such a manner so that a comparison between the barriers and motivators to enter higher education could be made, to identify an opportunity to use technology as a solution. The next chapter presents the first study undertaken for this research.

Chapter 3:

Study 1 - Factors Influencing the Decision to Not Enter HE

This chapter reports the first study undertaken for this research. This study was conducted to understand why the student enrolment rate from a Low Participating Neighbourhood (LPN) is significantly low. This chapter first covers the motivation to conduct this study, along with the research questions it aims to answer. This is followed by the method and study design, including the procedure, data collection, analysis and results. In the end, a discussion of the results along with the motivation and reasoning for conducting the next exploratory study are detailed.

3.1 Motivation and Research Questions

As identified in the previous chapter (Section 2.1.2 – Under-represented Groups Participation), a trend can be seen in the student enrolment figures; the number of students from a LPN entering higher education is extremely low throughout the past five years. On average, only 11% of the entrants come from a LPN compared to the higher education population as a whole. Although there are various attempts made by the Widening Participation teams to increase the number of enrolments from LPN's (detailed in Section 2.1.3), no significant increase in the figures can be seen. As this study involved exploring the factors which influence the decision to not enter HE, it was decided to recruit participants from a LPN, as it would help understand better which factors play a significant role in impacting these individuals decision, leading them to not enter higher education.

There have been previous studies conducted which explore the reasons why students decide to not participate in higher education (covered in Section 2.1.4.2). They concluded that various factors, such as income, family circumstances, peer influence etc., act as barriers or constraints which lead the student to not enter higher education. Whilst these studies were useful in giving us an insight about what factors act as barriers to enter higher education, there was a limited focus on individuals from a LPN. These studies generalised their results as they recruited participants from all over the UK, hence it could not be identified which what factors in particular act as a barrier or constraint for someone who comes from a LPN. In addition, these studies do not explore what role technology played in the decision making of not entering higher education. Therefore, the motivation for conducting this exploratory study was to understand why individuals from a LPN are more likely to not enter higher education, and what role technology plays in their decision making.

This study aimed to answer the first research question:

RQ-1: What factors influence individuals to not enter higher education?

This research question was broken down into three more specific questions. Hence, this study contributed in answering the following:

- **RQ-1.1:** What barriers/constraints do individuals from a LPN encounter resulting them to not enter higher education?
- **RQ-1.2:** What could motivate individuals from a LPN to enter higher education?
- **RQ-1.3:** What role does technology play in the decision making for individuals from a LPN?

3.2 Method and Study Design

This study was an interview based study which involved 10 participants. The qualitative data gathered from the interviews enabled me to explore the factors which influence individuals to not enter higher education, as the interviews allowed me to further understand and comprehend the reasons given by the participants. In addition, a questionnaire was used to gather demographic information of the participants. Further details about the procedure, participants and ethical considerations are detailed in the next section.

3.2.1 Procedure

To address the research questions, this study was run with ten individuals who came from a LPN and had also decided to not enter higher education. The study was conducted in one face to face session with each of the participants. Each recruited participant was required to sign an informed consent first, before taking part in the study. Once signed, they were asked to fill in a demographic questionnaire, and then take part in a semi-structured interview which was audio recorded (for analysis purposes). The questionnaire was used to collect the participant's demographic information, whereas the semi-structured interview was used to collect in depth information about why the participant chose not to enter higher education, and explore what factors impacted their decision. Each session took about half an hour to complete. The Consent form, Participant Information Sheet, questionnaire and interview questions can be found in Appendix A.

3.2.2 Participants and Ethical Considerations

To undertake this study, the first step was to seek ethics approval (Appendix A.1). The study commenced as soon as the ethics was approved by the Computer Science Research Ethics Committee of City, University of London. The ethics form submitted indicated that the participants recruited in this study were not disadvantaged in any way, and that their participation was voluntary. The identifiable data collected from the participants was their name and home postcode, which was used to check if the participant came from a Low Participating Neighbourhood. Both the name and postcode was de-identified when reporting the results; participants were assigned an anonymous participant number (P1, P2, P3 and so on) so that their names were not used, and their home postcodes were generalised to an area (a postcode of SL2 was generalised to Slough area). No international students were involved or recruited for the study. The study was run with UK based participants only.

Before taking part in the study, the participants were given an Information Sheet, which briefed them about the study and how their data will be kept confidential and de-identified when reporting the results. The information Sheet clearly stated that there is no harm to the participants for taking part in this study, and that their participation is voluntary. An informed consent was obtained from the participants before they took part in the study.

Participant Recruitment

The inclusion criteria for this study was that the participant must, (i) be aged between 18-21 years, (ii) be based in UK, (iii) come from a Low Participating Neighbourhood (LPN), and (iv) have completed A Levels/ BTEC or any other Level 3 qualification but chose to not go to university. Convenience sampling was used to recruit participants from 'Slough' area through contacts and friends. Slough area was chosen to start recruiting because it is classified as a LPN according to the POLAR 3 classification (HESA, 2016 (POLAR 3)). However, to confirm that the participant did come from a LPN, each participant's home postcode was checked against the LPN POLAR 3 postcode check (<http://www.hefce.ac.uk/postcode/>) at the time of recruitment. As the participants were above 18 years of age, they were not vulnerable in any way.

Participant Details

Ten participants were recruited for this study; including 6 females and 4 males. Table 3.1 below displays a profile summary of the 10 participants involved with the study. As seen from the table, half of the participants had BTEC as their highest level of qualification, whereas four did A-Levels, and one had an NVQ/VCTC qualification. In addition, all the participants for this study would be classified as a 'First generation student', if they ever decided to go into higher education in the future. First generation students are defined as those 'not having a parent who graduated from college with a baccalaureate degree' (Thayer, 2000). Four of the participants however did have sibling(s) who had been to university.

Participant No.	Current Status	Gender (M/F)	Ethnic Background	Highest Level of Qualification	Parents been to university	Siblings been to university
P1	Events Coordinator	M	Asian	BTEC (Level 3)	No	No
P2	Sales Advisor	M	Asian	2 A-Levels	No	Yes
P3	Security Officer	F	African	BTEC (Level 3)	No	No
P4	Sales Advisor	F	Asian	3 A-Levels	No	Yes
P5	Housewife	F	Asian	3 A-Levels	No	No
P6	Looking for a job	F	Asian	BTEC (Level 3)	No	Yes
P7	Bank Cashier	F	Asian	BTEC (Level 3)	No	Yes
P8	Branch Manager	M	White UK	4 A-Levels	No	No
P9	IT Technician	M	White UK	BTEC (Level 3)	No	No
P10	Sales Advisor	F	White UK	NVQ/VCTC	No	No

Table 3.1 - Study 1 Participants Data

3.2.3 Data Collection

A mixture of qualitative and quantitative data was collected from the participants. The participants were asked to fill in a questionnaire first and then take part in a semi-structured interview. Both the questionnaire and interview were completed within the same session following the consent process. The semi-structured interviews were used as the primary source for capturing data which helped answer the research questions. The interview questions consisted of four parts: the first part involved questions which aimed at understanding the participants intentions, why they chose to not enter higher education (although they met all the requirements needed), and what barriers or constraints did they encounter which led them to make this decision (answering RQ-1.1); the second part asked what could motivate them go to higher education (answering RQ-1.2); the third part included questions aimed to understand whether technology played any role in their decision making (answering RQ-1.3), whether they used technology of any kind to search for higher education relate content, or if social media facilitated them in any way to make a decision to not enter higher education; and finally the last part of the interview involved more general questions, asking the participants what their attitude towards higher education is, and whether their family and friends have been to university or if they had any influence on their decision. To gather this essential first-hand data and understand the reasoning at the same time, it was ideal to have an informal conversation with the participants in the form of a semi-structured interview. It would not have been possible to explore the data to this extent and level of detail if a different data collection method was employed. Each interview lasted for about 10 to 15 minutes.

The questionnaire was used as an add-on to understand what background the participant comes from, which may have led to the choices he/she made. The aim of the questionnaire was to gather demographic details, as well as to confirm that the participant was from a LPN (through their home postcode). In the questionnaire, participants were also asked to indicate what their highest level of qualification is, and what social media do they and their parents use. Responses to the questionnaire were not analysed in any way, they were only used to describe and understand the demographic details of the participants. The questionnaire and interview questions can be found in Appendix 2.

3.2.4 Data Analysis

The audio recordings from each interview were transcribed for analysis purposes. The audio recordings were transcribed fully, so that pauses (transcribed as '...') and utterances (transcribed as 'umm', 'uh' etc.) were all included. No notes were taken during the interview. In the interview, there was no mention of the participant's home location (signifying that he/she is from a LPN), and any identifiable information such as the participants name was anonymised when transcribing by substituting it with the participant number. For example, "*Hi Aamna*" would be de-identified and transcribed as "*Hi [P1]*".

NVivo, a qualitative data analysis software, was used to analyse the interview data. All the transcripts were imported into NVivo for the qualitative analysis. Thematic analysis using a combination of inductive and deductive approach was used to analyse the data.

Thematic analysis is a method for identifying patterns or themes within data (Braun & Clarke, 2006), and is widely used for qualitative data analysis across various domains. Unlike other qualitative methodologies (such as Grounded Theory), 'it is not tied to a particular epistemological or theoretical perspective' (Braun & Clarke, 2013), which makes it quite flexible. As it is theoretically-flexible, it meant that different frameworks and approaches (such as inductive and deductive) could be used to explore and understand the data fully. This made thematic analysis an ideal method for answering the three research questions (RQ-1.1, RQ-1.2, and RQ-1.3) being addressed for this study.

The purpose of the thematic analysis is to identify patterns within the data to answer the research questions. To identify these patterns for this analysis in a systematic way, Braun and Clarke (2006) developed a six-phase process to follow, Figure 3.1 below. This process was used as a guide to analyse the data for this study and report the results.

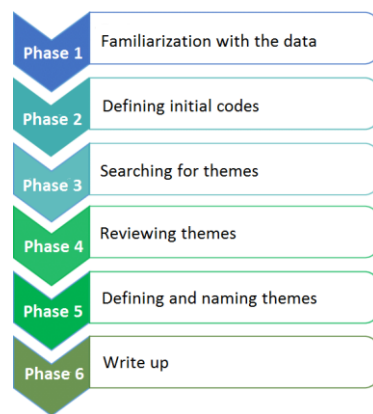


Figure 3.1 – Braun and Clarke (2006) Thematic six-phase

Personally transcribing the audio recordings of the interviews was when the familiarisation phase began (*Phase 1*). Each transcript was read multiple times to understand and familiarize with the data fully. Once the data was familiar with, an initial set of codes were defined and applied to the whole data set (*Phase 2*). As this studies main focus was to explore why individuals from a LPN do not enter higher education, what could motivate them to enter and how technology played a role in their decision making, a *deductive* analysis was used to explore these three initial codes – *Barriers*, *Motivators* and *Use of IT*. The transcripts were read through multiple times, each time focusing on a different initial code. Every time the participant mentioned or commented on anything related to that initial code, then the code was applied to that sentence mentioned. For example, if the transcripts were being read through to apply initial code 1-*Barriers*, then any reasons the participants gave which stopped them from entering higher education was marked under this initial code.

In addition, due to being familiar with the data, it was recognised that the deductive analysis was preventing unanticipated and additional themes from the data to be found. Therefore, applying an *inductive* analysis

was essential; it followed after the deductive analysis. From the inductive approach, 3 additional initial codes were defined – *Attitude*, *Awareness* and *Widening Participation Activities*. It was important to define these as they contributed to answering the research questions further. In the end, there were 6 main initial codes derived from this stage. The definition of each code is detailed in Table 3.2 below.

Code	Definition
1. Barriers	Statements revealing the reasons why the participant did not enter HE
2. Motivators	Statements revealing factors which can motivate the participant to enter HE
3. Use of IT	Statements regarding moments of using any kind of technology, applications or social media when making the decision about HE
4. Attitude	Statements describing the participants attitude toward HE
5. Awareness	Statements portraying the participants knowledge/awareness about HE related content, such as how to apply.
6. Widening Participation Activities	Statements regarding the participant mentioning whether the Widening Participation activities were useful

Table 3.2 – Initial Codes Derived from Phase 2 of Thematic Analysis

Once the initial codes were defined, the next phase was to search for and develop themes (or sub-codes) for the codes (*Phase 3, 4 and 5*). Inductive analysis was applied to find emerging patterns and themes within each initial code. To do this, all the section of the transcripts which had been coded under a particular initial code were read through. Similar responses given by the participants were grouped together to form a sub-code under the initial code. For example, if two participants revealed that they did not enter higher education because of financial reasons, then 'Finance' was applied as a sub-code under the code 1: Barrier to enter higher education. All other responses (which were not similar) were also marked/highlighted as a sub-code, to include all emerging themes within the data.

An important factor to take into consideration when applying the codes was the *frequency*. For this study, the frequency of each sub-code was measured as the number of participants who mentioned that code rather than the number of times the code was mentioned by the participant in the interview. There were instances during the interview where the participants were asked to elaborate on a particular point, hence it would not have been ideal to count the number of times the participant mentioned the code, as it would not represent the importance of the code. When reporting the results, the 'number of participants' who mentioned each code and sub-code is also included. So, for example if a participant repeated the same code more than once in their interview, then it was counted as one occurrence, or one frequency. However, if the same participant commented on multiple sub-codes, then both the comments were coded under the different sub-codes accordingly. For example, if a participant said that 'finance and family' played a part in stopping them from entering higher education, then the sub-code 'Family' was applied to this comment and counted as one frequency, as well as the sub-code 'Finance'. This was done to ensure that all the barriers reported by the participants were captured. The frequency also helped in identifying how important each barrier was in influencing the participant's decision (as it was mentioned by a number of participants).

The last phase of the thematic analysis, write up (*Phase 6*), involved a detailed analysis of the results. This is covered in Section 3.3 – Results.

3.2.5 Final Codes

The final coding scheme which emerged from conducting a thematic analysis consisted of 6 main codes: (i) Barriers, (ii) Motivators, (iii) Use of IT, (iv) Attitude towards HE, (v) Awareness about HE, and (vi) Widening Participation Activities. Each code has multiple sub-codes. The sub-codes for the barriers and motivators reported were grouped together to identify the theme which emerged. This gave a better understanding of the factors which influence individual's decisions to enter higher education. The sub-codes, including the number of participants who mentioned them are detailed in Table 3.3 below.

Theme	Sub-Codes	Number of Participants
1. Barriers – Reasons for not entering HE		
Finance	1.1 Concerned about finance and debt	5
	1.2 Seeing graduates not able to find a job (related to degree)	3
Influence	1.3 Friends' influence	2
	1.4 Family was not supportive	2
Help and guidance	1.5 College was unhelpful regarding HE material	1
	1.6 Late in submitting UCAS application	1
Self-Esteem	1.7 Not interested in education as I am not clever	1
	1.8 Not confident as not sure about university life	1
Indecisive	1.9 Indecisive	1
Job	1.10 Found a job	1
Personal	1.11 Did not want to travel far	1
	1.12 Wanted a break from education	1
2. Motivators – What could motivate the participant to enter		
Job	2.1 Getting a relevant job/work experience after graduating (without prior experience)	5
	2.2 Company offers a promotion and pays for degree	1
Influence	2.3 Seeing others go to university	2
	2.4 Change of parents mind-set and attitude	2
Indecisive	2.5 Be certain of what to do in the future	1
Personal	2.6 Need more time to think about Higher Education (HE)	1
	2.7 Flexible Study	1
3. Use of Information Technology (IT)		
N/A	3.1 Receiving university related information	7
	3.2 Searching for courses/universities	3
	3.3 Applying to university	2
4. Attitude towards higher education (HE)		
N/A	4.1 No qualification required to progress within a company	3
	4.2 Family/friends could not find job with a degree	3
	4.3 Experience is more important	2
	4.4 Rather work and earn money than spend at university	2
	4.5 Degree will help with career progression	2
	4.6 Might not get a job with a degree	1
	4.7 Qualification not important to do well in life	1
5. Awareness about higher education (HE)		
N/A	5.1 Aware of help available for:	
	5.1.1 Student Finance	8
	5.1.2 Confidence Builder sessions/schemes	1

	5.1.3 Mature Student Help	1
	5.2 Able to apply to university myself – without any help	2
	5.3 Not aware of university life	2
6. Widening Participation Activities		
N/A	6.1 Did not attend	5
	6.2 Attended	
	6.2.1 Did not find it useful	3
	6.2.2 Found it useful	2

Table 3.3 – Final Codes for Study

The most important codes that helped answer the research questions were codes 1, 2 and 3; 'Barriers' (answering RQ-1.1), 'Motivators' (answering RQ-1.2), and Use of IT (answering RQ-1.3). The remaining three codes served the purpose of collecting additional information to help enlighten new areas and/or interpret the research questions further. Details of the sub-codes, including the participants who mentioned them can be found in Appendix A.6.

3.3 Results

This section analysis the six main codes identified from the data. Each section begins with the code, its definition, sub-codes and the number of participants who mentioned that sub-code. In addition, sub-codes for the Barriers code were grouped into a *theme*, to help give a better picture of what reasons or themes impact an individual's decisions. Then, a detailed analysis of the patterns and themes which emerged from the code are outlined, followed by a discussion in the end (Section 3.4) of the key findings which arose from running this study, and the motivation for undertaking the next study.

Code 1- Barriers

Definition: Statements revealing the reasons why the participant did not enter HE		
Theme	Code 1 – Barriers Sub-codes	Number of Participants
Finance	1.1 Concerned about finance and debt	5
	1.2 Seeing graduates not able to find a job (related to degree)	3
Influence	1.3 Friends' influence	2
	1.4 Family was not supportive	2
Help and Guidance	1.5 College was unhelpful regarding HE material	1
	1.6 Late in submitting UCAS application	1
Self - Esteem	1.7 Not interested in education as I am not clever	1
	1.8 Not confident as not sure about university life	1
Indecisive	1.9 Indecisive	1
Job	1.10 Found a job	1
Personal	1.11 Did not want to travel far	1
	1.12 Wanted a break from education	1

Table 3.4 – Sub-codes for Code 1 - Barriers

One of the main research questions explored was to understand what barriers were encountered by these participants, which led them to make the decision to not enter higher education. The sub-codes in Table

3.4 above outline the reasons mentioned by the participants that resulted in their choice of not entering higher education, along with a count of how many participants cited this reason. The barriers are listed descending order, with the one that was most frequently mentioned first. Similar barriers are also grouped together to identify a distinct theme. Some participants stated more than one barrier/reason that hindered in their ability to enter higher education. In addition, it was also useful to know that from these 10 participants, four did not make any attempt to apply to university as they were certain that they will not go, two could not enter because of their parents, two started searching and thinking about going (but did not take any further initiative to apply), one missed the UCAS deadline while one submitted the UCAS application but did not enter higher education because she found a job. Each participant encountered one or more barriers which resulted in them not entering higher education.

'Concerned about Finance and Debt' was the most recurring reason given by the participants. Half of the participants (5 out of 10) stated that the expense of higher education was *one* of the reasons they decided not to go. However, none of the participants claimed that finance was the only barrier they faced when making their decision; it was more of an additional reason. Finance was always a reason that participant mentioned along with another one. For example, a participant stated, *"Just because I fear that if I go and do a 3 year degree, which cost 27 grand, I am going to change my mind again, and want to do something completely different [P8]"*. Although he was worried he would change his mind after doing a degree, he was also considering his finance, as he does not want to waste money on a degree that he might not use or want to pursue his career in.

The second most frequently mentioned reason was 'Seeing graduates not able to find a job related to their degree'. Three of the participants said they do not want to enter higher education because they saw family members and/or friends who graduated but were unable to find a job in their field. Looking at these graduates influenced them in a negative manner and demotivated them from doing a degree. They instantly assumed that they will also end up like them if they graduated. This led them to believe that it is better to start working straight away so that they could work their way up within the company. They saw experience to be more important than a qualification. One participant said- *"So, you look at it sometimes and you feel like what's the point of going into university and get a degree when you are not going to get a job.....because I had friends and family members who did go to uni 3 years 4 years, and then it was hard for them to get a job even with a degree. Because they ask for experience [P9]"* Another participant revealed that seeing a graduate working in the same position as her (as a sales assistant) put her off the idea of going to university and made her believe that university is a 'waste of time'. She said, *"I got another colleague who has been to university, done a Psychology degree, whose also doing it full time, so she just wasted 3 years of her life doing the same job as me, we are getting paid the same, when I had no degree and I still got that job [P4]"*. By looking at her colleague's current status, the participant was influenced and certain that going to university is a 'waste of time'. These three participants were not aware of the graduate employability rate statistics or facts; they were making a decision based on a few people whom they have contact with.

'Friends' influence', 'Family was not supportive', and 'College was unhelpful' was the next most common reason given. Two of the participants stated that their friends played a major role in their decision making.

One of them even decided to take a gap year (although he wanted to go to university). He said, *'I had to take a gap year because all my friends told me uni is a waste of time [P1]'*, while the other started working straight away to earn money because all his friends decided to do so. On the other hand, two participants (both female) said that their family was a barrier; their parents did not allow girls to go to university, it was against the norm. One of them (P3) commented saying *"bad people go to university [P3]"*, this is what her dad had told her. Both these participants were keen to go to university but were not allowed by their parents.

Being able to seek advice and guidance at the right time was also crucial for some participants. Two of them stated that they were unable to apply to university because they did not have enough information to be able to make a decision about entering HE. One of them did try to seek guidance and advice to find out what options are available to her, however, due to her college not providing help at all, she decided to look for a course and university for herself. As she was unaware of where and what to look for, this impacted massively on her decision to not enter HE. She said, *"...it just got all a bit confusing and so I left it [P10]"*. This participant was interested in entering higher education, and if she had more knowledge and help at the time when she needed it most, it might have changed the decision she made. On the other hand, there were participants who were able to get the help and guidance they wanted, but however, it was very late. By the time someone reached them to provide advice, it was too late; the participant had already made their decision to not go. P8 said, *"At the point that they had the talks it was a bit too late for me and I decided I didn't really know what I wanted to do [P8]"*.

Other reasons which resulted in the participant to not enter higher education were: wanted a break from education, not clever enough, indecisive, found a job and got late in submitting UCAS application. Most of these reasons stated were accompanied with another reason. For example, the participant who wanted to take a break from education claimed that finance was also a barrier – she said she was not ready to spend so much on education. In the end, we can conclude that the theme finance, and influence were most influential in impacting an individual's decision, as reasons related to these themes were most frequently mentioned.

Code 2 – Motivators

Definition: Statements revealing factors which can motivate the participant to enter higher education		
Theme	Code 2 – Motivator Sub-codes	Number of Participants
Job	2.1 Getting a relevant job/work experience after graduating (without prior experience)	5
	2.2 Company offers a promotion and pays for degree	1
Influence	2.3 Seeing others go to university	2
	2.4 Change of parents mind-set and attitude	2
Indecisive	2.5 Be certain of what to do in the future	1
Personal	2.6 Need more time to think about Higher Education (HE)	1
	2.7 Flexible Study	1

Table 3.5 – Sub-codes for Code 2 - Motivators

The second research question explored with this study was finding out if there was anything that could motivate these participants to enter higher education in the future. The sub-codes for Code 2 are outlined above in Table 3.5. These include factors that could motivate the participants to enter higher education. They are listed in descending order, with the one that most frequently said first. All participants just mentioned one factor that could influence their decision except one; she said that she wants her company to pay for her degree *and* offer a promotion.

As seen from the table above, half of the participants, 5 out of 10, said that if they are certain that they will find a job related to their degree after they graduate, they would be happy to enter higher education. What is constraining them to enter is the thought that they might not be able to find jobs after spending 3 years in university. They were in touch with family, friends and/or work colleagues who were in this situation, so they were more cautious of not making the same decisions as them. Some of the comments made by the participants when asked about what could motivated them to enter HE in the future were, *"If there is like a definite job at the end of it [P9]"*, *"If I see someone getting a degree and getting a job according to that. Rather than just making them you know part time or anything like that to say you need experience [P1]"*, and *"If I know I have got a job, I have got fixed money coming in, you know, things like that [P2]"*. A point to note here is that all these participants were unaware of the graduate job roles and the concept of sandwich courses and placement year. One of the participant (P7) even stated that if her current employer paid for her degree and gave her a promotion, then she would consider going into higher education.

The second most common motivator to enter higher education was 'seeing others go to university' and 'change of parent's mind-set'. Some of the participants did make an indirect comment during their interview, which revealed that although they were happy to not enter higher education, at times they did however feel insecure or vulnerable when they saw either their sibling or friend going to university. P4 said that she feels insecure when she sits with her friends and they start talking about university. She said, *"Because every time we get together now for dinner, they are always talking about university and I do feel left out sometimes [P4]"*. Another participant claimed that her sister went to university. When asked what she thought about her sister, she said, *"When I see her, it might change my mind over time [P7]"*. So having a close family or friend going to university could influence an individual to change their mind and enter higher education as well. Whereas, two of the participants (both female) stated that they would be happy to go to university if their parents allowed them. Family influence plays a significant role for these participants.

Being certain about what to do in the future was another motivator, mentioned by P8. He said that because he is indecisive, he did not know what to do, therefore ended up not entering HE. However, if he was sure of what to do, then that could motivate him to enter. He said, *"If I suddenly had a guaranteed idea of what I wanted to do in the future. Umm.. but until I knew exactly what I wanted to do I wouldn't be able to settle and do the three year studying [P8]"*. Similarly, P6 claimed that she needed time to think deeper about HE in order to make a decision. She too is confused, not knowing what area she wants to go into. These participants need help and guidance, so that they are able to make a decision about their future.

Code 3 – Use of Information Technology (IT)

Definition: Statements regarding moments of using any kind of technology, applications or social media when making the decision about higher education

Code 3 – Use of IT Sub-codes	Number of Participants	Technology/Application Used
3.1 Receiving university related information	7	College portal, Email, Facebook, University website
3.2 Searching for courses/universities	3	Google, University website
3.3 Applying to university	2	Google, Email

Table 3.6 – Sub-codes for Code 3 – Use of IT

This section refers to the use of any kind of Information Technology (IT) that was mentioned or spoken about during the interview. With this information, what role IT played during the decision making of entering higher education would be examined. The sub-codes of when IT was spoken about during the study include, (i) receiving university related information (such as Open Day invitations), (ii) searching for courses/universities, and (iii) applying to university. The table above, Table 3.6, displays the kind of technology or application that was used.

Almost two third of the participants (7 out of 10) received higher education related information while they were in college, via a combination of IT and non-IT methods. Their colleges promoted higher education and kept students informed about any university activities including, events, Open Days or Taster Weeks hosted by universities. The ways this information was conveyed from the college staff to the students were somewhat similar for the seven participants. Although IT was used for all seven participants, there were non-IT methods used too, such as leaflets. A combination of both IT and non-IT techniques were implemented by the colleges.

From these seven participants, two mentioned that they had a college portal on which information about university activities were displayed. Three of them commented on emails being sent out to them regarding the university activities. Another stated that emails and Facebook were used to know about university activities; she had liked a few universities Facebook page. And another two participants mentioned the use of websites to search for university activities. Both said that their college was not very helpful or proactive when it came to telling their students about activities hosted by universities. For one of them the teachers would just give them links to the university websites and they had to look for the Open Days themselves. She said, “...they make us search you know ourselves, go on the website and search for Open Days [P5]”. The other said they had brochures handed out in college with the website links on them for them to search themselves, saying, “It was just brochures, looking through and then you just go on their website if you wanted to find out more information [P3]”. The non-IT methods that were used to promote university related information and activities (such as Open Days and Taster Weeks) were physical signs, posters, leaflets and brochures with the dates and details on them. Participants stated that the leaflets would have websites and links for the students to find out more information. P3 said, ‘No they had leaflets given out which had

the dates on them.' [P3]. Also, three of the participants mentioned that their teachers would tell them verbally about the activities being hosted by universities.

Three of the participants used IT to search for universities and courses. From these three, one claimed that he was very good with IT (P9) and had no problems in searching for the relevant material. However, another said the exact opposite (P10). She said she started looking for a course online, as she was interested in entering higher education but left it because she found it too confusing. The participant did try looking twice, and failed both times. She said, *"I did maybe twice during college. Umm but it just got all a bit confusing and so I left it [P10]"*. As she had a different background (which was not IT based), she found it difficult to look for the information she needed online. However, this participant was active on social media. The remaining two participants mentioned IT being used in college, when their teachers started helping them with the university applications. They said that the personal statements and UCAS applications were worked upon on their college desktop computers. The teachers also gave them website links on paper so that they could look at them to get more information when they are home. Emails were used to exchange data between the students and teachers. None of these participants ended up applying to higher education.

Code 4 – Attitude

Definition: Statements describing the participants attitude towards higher education	
Code 4 – Attitude Sub-codes	Number of Participants
4.1 No qualification required to progress within a company	3
4.2 Family/friends could not find job with a degree	3
4.3 Experience is more important	2
4.4 Rather work and earn money than spend at university	2
4.5 Degree will help with career progression	2
4.6 Might not get a job with a degree	1
4.7 Qualification not important to do well in life	1

Table 3.7 – Sub-codes for Code 4 - Attitude

Asking the participants to reflect on how they felt about higher education was vital in understanding why they chose not to go. Every time a participant mentioned something that represented their attitude towards higher education, it was coded. This would give a clearer picture of how these participants felt towards higher education which could help determine if the attitudes of individuals from a LPN were any different to those who are *not* from a LPN, leading them to not enter HE. Hence, this new code was with the inductive analysis – to find out further information regarding the choices participants made about higher education. Table 3.7 display the various comments made by the participants which revealed their attitude towards higher education, listed in descending order, with the one that most frequently mentioned first.

By analysing the sub-codes, we can determine that majority of the participants felt that a degree was not important to do well in life or to get a good job or progress within the company, experience was more important. P1 mentioned, *"If someone who applies for the same job who hasn't been to uni but has some*

experience, they will get the job [P1]" and another mentioned, "I think practical experience is key [P2]". Both these participants were assertive that with experience they would be able to get the job easily. Some even believed that spending three years to start from a junior role and work their way up in the company will be more beneficial than getting a degree. They felt that working and earning money straight away was more important. [This result confirms the finding reported by previous studies, one which was conducted by the Department for Education and Employment (DfEE) (Connor, Tyers, Modood and Hillage, 2004) and the other by The University of Glasgow (Forsyth & Furlong, 2003), where the participants had a career in mind which did not require a degree. In addition, another factor reported in the study conducted by DfEE (Connor, Tyers, Modood and Hillage, 2004), which impacted an individual's decision to enter HE was their belief that they wanted to start employment straight away and so that they could earn money, rather than having to spend it on university fees. Again, this factor is similar to one reported by two of the participants in this study – Code 4.4: 'Rather work and earn money than spend at university'.

Another recurring factor which a lot of the participants mentioned indirectly was their belief that because their family and/or friends were not able to find a job related to their degree, then they will not either. Looking at these individuals gave them a negative attitude about higher education. Two of the male participants said they had family members (one spoke about his brother, and the other targeted his cousin) whom they saw stressing and worrying because they were unable to find a job related to their field. They also had a debt on their shoulder which they had to pay off after graduating. The third female participant said she had a colleague who was working on the same job and wage as her. The participant believed her colleague was unable to find a job in her field after completing a degree, therefore had to start off as a junior, just like the participant. This attitude of participants is strongly related to the attitude 'Might not get a job with a degree'. They look at a few individuals around them and put themselves in the same position, thinking that they will also end up like them. P1 said, "So you look at it sometimes and you feel like what's the point of going into university and get a degree when you are not going to get a job [P1]". Without researching or trying to find out why these individuals are not getting a job, they just believe that they will also not get a job.

Commented [WS7]: Any others?

Commented [A8R7]: Added another study conducted by The University of Glasgow

Code 5 – Awareness

Definition: Statements portraying the participants knowledge/awareness about higher education related content, such as how to apply.

Code 5 – Awareness Sub-codes	Number of Participants
5.1 Aware of help available for:	
5.1.1 Student Finance	8
5.1.2 Confidence Builder sessions/schemes	1
5.1.3 Mature Student Help	1
5.2 Not aware of application process	2
5.3 Not aware of university life	2

Table 3.8 – Sub-codes for Code 5 - Awareness

Participants were asked in their semi-structured interview whether they were aware and up to date with the general HE related information. This information would help identify whether the participants have enough knowledge to be able to enter higher education, and would further prove whether the lack of knowledge and awareness prevented these participants to not enter higher education. Factors such as information regarding student finance, the application process and career guidance and advice available were discussed with participants. Table 3.8 above summarises the participant's responses.

Some participants did agree that having more knowledge could have changed the decision they made. Perhaps the role of technology could play a vital role in this category, as having enough and the right information could help overcome the barrier of not entering higher education for some participants. Technology could act as a '*facilitator*' to convey sufficient knowledge and information.

Awareness about the financial help available seemed evident amongst the participants. They all stated that they had enough information regarding 'Student Finance' and would not need help to apply for it. However, it was just a matter of paying it back, which acted as a barrier for them. Examples of participant's statements included, "*It's just like a loan and I don't like the worries of having to like paying it back [P9]*", "*Yeah, but still you have to pay them back and I don't really like that fact [P2]*". However, only one participant said she had no information about the finance options available to her. She said, "*I have no idea of none of them, but it would be nice to find out. Just for future reference, if I decide to go to university [P3]*". Moreover, participants also mentioned that they were aware of the confidence building workshops and mature student help available. However, they did not attend any.

Out of the 10 participants, two stated that they were not sure of the application process. They said that they needed guidance if they were to enter higher education. One of the participant stated, "*I know you have to go via UCAS, but that's about it [P4]*". Only one of them specifically mentioned that he would not need any help to apply if he was to apply to university. He said he was familiar with technology and would be able to find the right course and university himself, stating, "*Google is my best friend to be honest. I mean everything can be found on it [P2]*".

In addition, two participants mentioned that they were not aware of the student life at university. One commented saying, "*I think there's only young people at university [P4]*". This comment of hers made it evident that she did not know about the diverse age group of students that enter higher education and study together. If she were made aware of this, it could make an impact on the decision she made. Another participant mentioned her parents did not allow her to go into higher education because they thought university was a place to fool around and have fun, it was where all the wrong people went. The parents need more awareness with regards to the type of people that enter university, and what the rules and regulations are. They need more exposure to university life so that they can see what a student's university life is, as they are passing on this misconception into their children's minds too, changing their attitude towards university and higher education.

Code 6 – Widening Participation Activities

Definition: Statements regarding the participant mentioning whether the Widening Participation activities were useful	
Code 6 – Widening Participation Activities Sub-codes	Number of Participants
6.1 Did not attend	5
6.1 Attended	
6.1.1 Did not find it useful	3
6.1.2 Found it useful	2

Table 3.9 – Sub-codes for Code 6 – Widening Participation Activities

It was important to understand whether the participants had attended any Widening Participation (WP) activities, and if they found them useful. As the aim of these WP activities is to increase the enrolment rate from disadvantaged areas, including LPN, it was therefore essential to understand whether these participants had attended these activities, and if so, then why did they still make the decision to not enter higher education. Some of the WP activities include, open days, taster weeks, talks and lectures organized by universities and WP teams. WP events and activities are covered in more detail in section 2.1.3 – Widening Participation.

Half of the participants (5 out of 10), did not attend any university activities. One of the participant did not because she was not aware of any activities being hosted because she could not find any information related to them. If she had the information she would have attended them. Some of the other participants did not attend because they had already made up their mind that they will not enter higher education. Thus, they lost interest in the university activities as they did not see any benefit in attending them. P4 said, “*I didn’t think I needed to because I knew I will not end up going to university so I didn’t see a point of going there [P4]*”.

Although the other half attended the activities, only two of them found them useful. The remaining three (P2, P8 and P9) stated it was not useful at all. P2 said, “*They were talking too much... I didn’t like it [P2]*”. Whereas P8 mentioned that by the time they had these talks and activities, he had already decided to not go to university, they were a bit late for him. He said, “*I went to them, but I wouldn’t say I was really in attendance... [P8]*”. Findings from this code suggest that a different approach to widen participation might need to be taken, as the current approach is not proving to be effective (as stated by one third of the participants). As detailed in the previous chapter, section 2.1.3, that despite the numerous WP projects and activities being run, the student enrolment rate from a LPN are not increasing as much as they should. We can therefore assume that this could be a reason; WP activities are not effective because the individuals are not finding them useful.

3.4 Discussion

This study aimed to explore why the higher education enrolment rate from a LPN is extremely low. Individuals from a LPN who had decided to not enter higher education, even though they fulfilled the criteria to go, were recruited to understand what barriers they encountered which led them to make this decision. This would help identify if there is any particular factor that individuals from a LPN face, or if there is any specific trend in these neighbourhoods, which steers them to make this decision to not enter. The sample include male (n=4) and female (n=6) participants. Data collected was analysed to answer the research question defined for this study - RQ-1: What factors influence individuals to not enter higher education? This research question has three sub-questions - RQ-1.1, RQ-1.2 and RQ-1.3. Answers to them are presented in this section below, followed by inspirations for conducting the next study.

Barriers and Motivators to enter Higher Education

The first key point analysed was that *all* the participants recruited for the study would be classed as 'First Generation Students' if they were to enter university, as both their parents had not engaged in higher education. This was a co-incidence and was not part of the inclusion criteria. First-generation students tend to have lower graduation rates than their non-first generation peers (Engle & Tinto, 2008). According to Engle and Tinto, "research has shown that low-income and first-generation students are less likely to be engaged in the academic and social experiences that foster success in college, such as studying in groups, interacting with faculty and other students, participating in extracurricular activities, and using support services". This factor of being a first generation student, can contribute to a lot of the barriers which were stated by the participants. Previous studies have shown that are a number of challenges which need to be addressed when it comes to breaking down the barriers for First generation students, such as providing them with opportunities for working on campus, having better relationships with the faculty, and providing services that address their needs (Stebbleton & Soria, 2013). Figure 3.2 displays the twelve barriers reported by the participants.

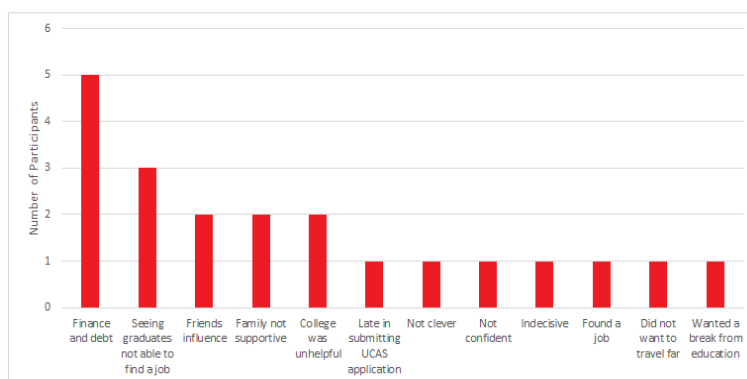


Figure 3.2 – Barriers to enter Higher Education

Half of the participants (5 out of 10) in this study reported that they were concerned about finance and debt, which was why they reconsider engaging into higher education. Fear of debt tends to be a greater deterrent for students from low socio-economic backgrounds. A number of studies where barriers to entering higher education were explored, found similar results; finance was one of the main reasons that constraints students to think about higher education. Some examples include, 'The Barriers to Participation in Education and Training' (Spielhofer, Golden, Evans, Marshall, Mundy, Pomati & Styles, 2010), where a quarter out of the 2029 young people interviewed viewed finance as a constraint when deciding what to do after Year 11 and 'Trends in Global Higher Education: Tracking an Academic Revolution' (Altbach, Reisberg & Rumbley, 2010), where it was reported 'Cost remains an enormous barrier to access. Even where tuition is free, students have to bear indirect costs such as living expenses and often loss of income'. There were also studies (Machin & Vignoles, 2006) and (Callender, 2006) that stated that the relative participation rates of students from advantaged and disadvantaged backgrounds have widened because of the financial assistance.

It was also evident that male participants were more concerned about matters such as finding a job, earning money as soon as possible, and progressing/growing within the company they work for, as compared to females. They had all made up their mind that they will not rest with the current status they have, they want to move, grow and make their career prospects better by using their skills and experience. Although one was indecisive about what he would want to pursue a career in, he was still confident that he wants to move up within the company he is in. The females on the other had seemed more confused and hesitant regarding their career prospects. Some did say they will want to work their way up, but were not as confident as the males. They also did not speak much about 'money', as compared to the male participants. According to a report from the Higher Education Careers Service Unit (HECSU) (Chowdry, et al., 2013), the university participant rate for males had dropped, as they believed that males felt responsible to look after their families and finances. Females however did not express any such feelings of responsibility; their university participation rates had increased.

The next most recurring response was the belief that graduates cannot find jobs. Three participants assumed that they would not be able to find a job after a graduating, because they had seen and were influenced by their family or friends who graduated but were unable to find a job related to their degree. Seeing others influenced them greatly, and made them believe that going to university is not beneficial (giving them a negative attitude towards higher education). This attitude could only be changed if they are made aware of the opportunities and career prospects they have after graduating. Some were worried about finance and practical experience; again, it comes down to their lack of knowledge of the internship/work placement opportunities available to them during their course that would cover both their areas of concern. 'The Barriers to Participation in Education and Training' (Spielhofer, et al., 2010) research conducted also covered the same aspect. In this research paper nearly two-thirds of the 2,029 participants lacked awareness of the appropriate courses and range of options available to them. By having enough awareness, they would not be influenced by seeing others. Family and friends' influence also played a significant role for some participants, as they decided not to go because of them.

In the end, after analysis the barriers reported, it was clear whether there was no specific factor which led individuals from a LPN to not enter higher education, resulting in the extremely low enrolment rate. All individuals had their own reason. However, it was evident that majority of the individuals from a LPN would be a first generation student. As their parents had not been to university, it may have influenced them to believe that university is not for them either. These participants did reveal a trait of being influenced easily, as we saw in the second barrier that they were influenced to not go because of seeing others who could not find a job. Therefore, we can assume that because of the family background (being a first generation student), it could have influenced them to not consider higher education as an option for their future. In addition, from analysis of code 4, Attitude towards higher education, it was apparent that these participants felt that a degree is not important to progress. Again it was also evident from this code that they had a negative attitude towards higher education because of seeing where their graduate family and friends not being able to find a job (sub-code 4.2). All the factors reported in this study coincided with the results from the previous studies and existing literature.

Participants mentioned seven different factors which could motivate them to enter higher education. The most important being a job guarantee. If they know that they will get a job related to their degree, then they will consider entering higher education. This is strongly related to the barrier mentioned, where they claimed that they have seen other graduates who cannot find a job, which is why they chose not to enter. Two participants specifically mentioned that seeing others who are able to find a job related to their degree will trigger them to go to higher education as well. Having an encouragement or inspiration from a person you know (family or friends) could impact massively the participant's attitudes towards higher education. Figure 3.3 below outlines the seven motivators reported by the participants.

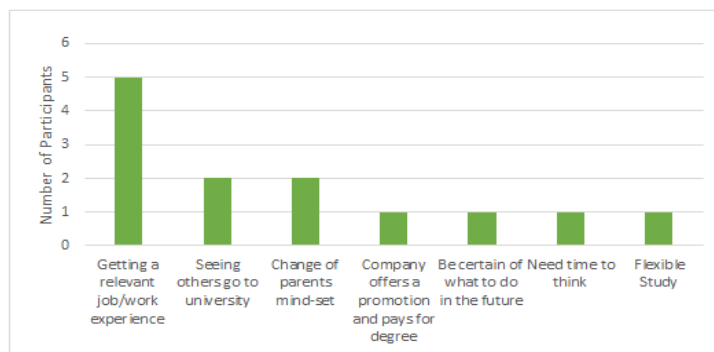


Figure 3.3 – Motivators to enter Higher Education

Role of Technology

The study showed that technology was used in three occasions only, (i) to receive higher education related material (such as Open Day invites), (ii) to search for university and course related information, *and* (iii) to complete and submit the university application. Applications such as Google, emails, college portal and university websites were used in the three occasions. The only social media mentioned by the participants

was Facebook, which was used to receive higher education related materials. All the participants use social media of some kind, however, none of them follow any universities or higher education related pages. None of the participants revealed that the technology played a role in their decision making.

3.5 Moving Forward: Inspiration for the Next Study

This study helped investigate the factors which influence an individual's decision to not enter higher education. It also helped us understand why the Widening Participation activities and projects are not effective in increasing the number of entrant in higher education from a LPN. As seen in the analysis of code 6 (Widening Participation Activities), one third of the participants did not find the talks arranged by the WP teams useful. They either felt like it was too much to take in, or it was delivered too late, when they had already decided to not enter higher education. In addition, it was also identified from this study that technology is not being utilised fully to help individuals make a decision about higher education. Emails and social media is only being used to give students information about HE related content, however, those who are not interested or who are still deciding do not pay attention to these posts.

To explore this topic further, it would be ideal to understand, in contrast, why some of the individuals' from a LPN do decide to enter. Although we did determine from this study what factors could motivate these participants to enter higher education, to get a view point of the motivators to enter higher education from individuals who actually did decide to enter was important, and the role that technology played in their decision making. This will help us explore why these individuals who came from the same neighbourhood (LPN) made a different decision, why the barriers reported did not impact them or how they overcame them. The next chapter presents this second exploratory study.

Chapter 4:

Study 2 - Factors Influencing the Decision to Enter Higher Education

This chapter reports the second exploratory study undertaken for this research. This study was similar to the previous study (Study 1); the procedure, study design, data collection and analysis were conducted in the same manner. The only difference was the number of participants and the research question it aimed to answer – what motivates individuals to enter higher education. The previous study, however, aimed to address what factors stop an individual to enter higher education. This chapter begins with the motivation to conduct this study, along with the research questions it aims to answer. This is followed by the method and study design, including the procedure, data collection, analysis and results. In the end, a comparison of the Study 1 and 2 results is detailed, which also includes a discussion and motivation for conducting the next study.

4.1 Motivation and Research Questions

The previous exploratory study (Chapter 3) helped in answering the first research question; understanding why individuals do not enter higher education. However, it was identified in that study that there is a need to explore this topic further. While we investigated the factors which prevent individuals from entering higher education, we also discovered that the current WP activities and techniques applied are not proving to be effective. Despite the numerous attempts to widen participation, the student enrolment rate from these neighbourhoods are not increasing, as the individuals from this neighbourhood are not finding them useful. To make a comparison, It was therefore important to understand what motivated some individuals from the same neighbourhood (LPN) to enter higher education - why they did not fall for the norm of a LPN, to not enter higher education, and how they managed to overcome the barriers (if they encountered any).

Although previous studies have been conducted which explore the reasons why individuals decide to enter higher education (covered in Section 2.1.4.1), there was a limited focus on individuals from a LPN. In addition, the studies do not explore what role technology played in their decision to enter higher education. Therefore, the aim for conducting this study was to understand what motivates individuals from a LPN to engage in higher education, how they overcame their barriers and what role technology played in their decision making. An additional part of the study included exploring the motivation to entering higher education of individuals who were *not* from a LPN as well. This was done to compare if there was any difference between individuals from a LPN and another neighbourhood. It was also done to further explore if there is any aspect in particular that individuals from other neighbourhoods have which encourages them to enter higher education, which individuals from a LPN do not have.

This study contributed in answering the second research question:

RQ-2: What motivates individuals to enter higher education?

This research question was broken down into four more specific questions:

- **RQ-2.1:** What motivates individuals from a LPN and other neighbourhoods to enter higher education?
- **RQ-2.2:** Is there a difference in the motivations of individuals from a LPN and other neighbourhoods?
- **RQ-2.3:** What could have discouraged the individuals to enter higher education?
- **RQ-2.4:** What role does technology play in the decision making?

4.2 Method and Study Design

Similar to the previous study, this study was also interview based. It involved recruiting 20 participants to explore the factors which influence individuals to enter higher education. A questionnaire was also used to gather the participants' demographic details. The procedure, participants and ethical considerations are detailed in the next section.

4.2.1 Procedure

To answer research questions RQ-2.1 and RQ-2.2, this study was divided into two parts - 2a and 2b. The first part, 2a, involved ten participants from a LPN, whereas the second part, 2b involved ten participants who were *not* from a LPN. This was done to ensure that the differences between the two groups (from LPN and not from a LPN) including their motivations to enter higher education was captured accurately, to answer the research questions. The procedure of running the study was exactly the same as the previous study (Study 1), where the recruited participants were met in one face to face session. Before taking part in the study, they were required to sign an informed consent. Once signed, they filled in a demographic questionnaire and then took part in a semi-structured interview which was audio recorded. All the participants (from both parts of the study) were asked the same questions and filled out the same questionnaire. Like the previous study, the questionnaire was used to collect the participant's demographic information only, while the semi-structured interview was used to collect in depth information which helped answer the research questions. The interviews for this study collected information about why the participant chose to enter higher education, and explored what factors impacted their decision. Each session took about half an hour to complete. The Consent form, Participant Information Sheet, questionnaire and interview questions can be found in Appendix B.

4.2.2 Participants and Ethical Considerations

Similar to the previous study, seeking ethics approval was essential (Appendix B.1). The study commenced as soon as the ethics was approved by the Computer Science Research Ethics Committee of City, University of London. The identifiable data collected from the participants was their name and home postcode, which was used to check if the participant were from a Low Participating Neighbourhood. Both

the name and postcode was de-identified when reporting the results in the same way as the previous study; participants were assigned an anonymous participant number (P1, P2, P3 and so on) so that their names were not used, and their home postcodes were generalised to an area. An Information Sheet was given to the participants which briefed them about the study and how their data will be kept confidential and de-identified when reporting the results. An informed consent was obtained before they took part in the study. All participants were over 18 years of age, so were not vulnerable in any way.

No international students were involved or recruited for the study. The study was run with UK based participants only. As participants for Study 2a came from a LPN as well, similar to the participants of the previous study, it was easier to make a comparison between the two groups and establish what makes an individual decide to enter higher education (as they came from the same background). Study 2b however, included participants from a different background as they were not from a LPN. This helped establish whether the attitudes of individuals from a different background was dissimilar, and whether they reported any different factors which motivated them to enter higher education.

Participant Recruitment

The inclusion criteria for the first part of the study (Study 2a) was that the participant must, (i) be aged between 18-21 years, (ii) be based in the UK, (iii) come from a Low Participating Neighbourhood (LPN), and (iv) be a first year undergraduate student. Convenience sampling was used to recruit ten participants from 'Slough' area through contacts and friends. A call for participant message was distributed via email and WhatsApp to these contacts, and those participants who met the criteria contacted the researcher. Like the previous study, Slough area was chosen to start recruiting because it is classified as a LPN according to the POLAR 3 classification (HESA, 2016 (POLAR 3)), and the participants home postcode was checked against the POLAR 3 postcode check (<http://www.hefce.ac.uk/postcode/>) to confirm that they came from a LPN. For this part of the study it did not matter which university or course these students were enrolled into, they only had to be first year undergraduate students from a LPN.

The only difference in the inclusion criteria for the second part of the study (Study 2b) was that the participant must *not* come from a LPN. Hence, the inclusion criteria for this part of the study was that the participant must, (i) be aged between 18-21 years, (ii) be based in the UK, (iii) not come from a Low Participating Neighbourhood (LPN), and (iv) be a first year undergraduate student. Again, convenience sampling was used to recruit ten participants; they were recruited from City, University of London campus. City University was chosen because it comprises of a diverse range of students coming from different cultures and background. Recruiting participants from various backgrounds and undergraduate course disciplines, ensured that the data collected was representative of the population. The participants' postcodes were checked to ensure they did not come from a LPN.

Participant Details

Altogether there were 20 participants recruited for this study; 10 for the first part (2a), and 10 for the second part (2b). Study 2a participants included 6 females and 4 males, who were from a LPN. Whereas, Study 2b

participants included 7 females and 3 males, who were not from a LPN. Table 4.1 below displays a profile summary of the 20 participants involved with the study. As seen from the table, the first difference we can see from the demographic data collected is that 6 of the 10 participants from a LPN were a 'First Generation Student', as their parents had not been engaged in higher education. However, only 4 participants who did not come from a LPN were a first generation student, as most had parents and siblings who had been to university.

	Participant No.	University	Gender (M/F)	Ethnic Background	Highest Level of Qualification	Parents been to university	Siblings been to university
2a - From LPN	P1a	Westminster	F	Asian	4 A-Level	No	No
	P2a	Brunel	M	African	3 A-Levels	Yes	Yes
	P3a	Brunel	M	Asian	BTEC (Level 3)	Yes	No
	P4a	Brunel	M	White UK	3 A-Levels	Yes	No
	P5a	Middlesex	F	Arab	BTEC (Level 3)	No	No
	P6a	High Wycombe	F	Asian	A-Level and BTEC (Level 3)	No	No
	P7a	Middlesex	F	Asian	3 A-Level	No	No
	P8a	Kingston	F	White UK	2 A-Levels	No	No
	P9a	Brunel	M	White UK	BTEC (Level 3)	Yes	Yes
	P10a	Middlesex	F	Asian	BTEC (Level 3)	No	Yes
2b - Not from LPN	P11b	City University	F	Asian	2 A-Levels	Yes	No
	P12b	City University	F	White UK	4 A-Levels	Yes	Yes
	P13b	City University	M	Arab	3 A-Level and 1 AS	Yes	Yes
	P14b	City University	F	Asian	BTEC (Level 3)	No	No
	P15b	City University	F	Asian	3 A-Levels	Yes	Yes
	P16b	City University	F	Asian	2 A-Levels and BTEC (Level 3)	No	No
	P17b	City University	M	White UK	3 A-Levels	Yes	Yes
	P18b	City University	M	Asian	BTEC (Level 3)	No	No
	P19b	City University	F	Asian	3 A-Levels	Yes	Yes

	P20b	City University	F	African	1 A-Level and BTEC (Level 3)	No	No

4.2.3 Data Collection

A mixture of qualitative and quantitative data was collected from the participants in the form of questionnaire and a semi-structured interview. As mentioned earlier, the study was conducted in the exact manner as the previous study (Study 1), therefore, the data collected from the interviews were used as the primary source for capturing data which answered the research questions. The only difference in this study (when compared to the previous study) was that the participants were asked a different set of questions to understand why they decided to enter higher education. The interviews consisted of four parts: the first part involved questions which aimed to explore the participants intentions, why they chose to enter higher education (answering RQ-2.1 and RQ-2.2); the second part asked if they had encountered any barriers which could have changed their decision to enter (answering RQ-2.3); the third part included questions aimed to understand whether technology played any role in their decision making (answering RQ-2.4), whether they used technology of any kind which facilitated them to make this decision; and finally the last part of the interview involved more general questions, asking the participants what their attitude towards higher education is, and whether their family and friends have been to university or if they had any influence on their decision. The questionnaire and interview questions can be found in Appendix 3. It also includes as comparison of the questions from Study 1 and Study 2

The questionnaire was used as an add-on to gather the participants' demographic information. The aim of the questionnaire was to find out:

- What ethnic background the participant is from.
- Which university and course the participant is enrolled to.
- Whether the participant comes from a Low Participating Neighbourhood (LPN)
- Whether the participant is a First Generation Student
- What their highest level of qualification is

4.2.4 Data Analysis

Analysis for this study was done exactly like Study 1, the previous study. The interview audio recordings were transcribed fully, and a thematic analysis (using a combination of inductive and deductive approach) was used to identify the themes and patterns within this qualitative data. Refer to section 3.2.4 (Data Analysis for Study 1) for a detailed explanation of how the audio recording were transcribed, why thematic analysis was used to analyse the data, how the thematic six-phase process was followed, and how inductive and deductive analysis were applied to define the codes. NVivo software was used for this study as well to conduct the thematic analysis.

As this study's main focus was to explore why individuals enter higher education (motivators), what could have influenced them to change their decision (barriers), and how technology played a role in their decision making, a *deductive* analysis was used first to define these three initial codes – *Motivators*, *Barriers*, and *Use of IT*. Every time the participant mentioned or commented on anything related to that initial code, then the code was applied to that sentence mentioned. As we were exploring the reasoning and differences between individuals from a LPN and not from a LPN, it was ideal to keep the codes for both parts of the study, 2a and 2b separate. This was so we could see exactly what motivators and barriers were reported by 2a participants (who are from a LPN), and compare it against the results reported by 2b participants (who are not from a LPN).

Moreover, reading the transcripts repeatedly helped recognise that there were additional themes within the data which could contribute to answer the research questions further. Therefore, applying an *inductive* analysis after the completion of the deductive analysis was essential. From the inductive approach, two additional initial codes were defined – *University Application* and *Widening Participation Activities*. Again, for comparison purposes, both these codes were applied separately to 2a and 2b participants. In the end, there were 5 main codes derived. The definition of each code is detailed in Table 4.2 below.

Code	Definition
1. Motivators	Statements revealing the reasons why participants chose to enter higher education
2. Barriers	Statements revealing factors which could have influenced them to change their decision
3. Use of IT	Statements regarding moments of using any kind of technology, applications or social media when making the decision about higher education
4. University Application	Statements describing how the participants applied to university, and whether they needed help and guidance
5. Widening Participation Activities	Statements regarding the participant mentioning whether the Widening Participation activities were useful

Table 4.2 – Initial Codes Derived for Study 2

Inductive analysis was then applied to find emerging themes and patterns within each of the five codes. All the section of the transcripts which had been coded under a particular code were read through, and similar responses given by the participants were grouped together to form a sub-code. A detailed description of how sub-codes were generated from the codes can also be found in section 3.2.4 (Data Analysis for Study 1), as the same technique was employed for this study. Similarly, for this study, the frequency for each sub-code was measured as the number of participants who mentioned the code, rather than the number of times a code was mentioned by a participant. So, for example if a participant repeated the same code more than once in their interview, then it was counted as one occurrence, or one frequency. However, if the same participant commented on multiple sub-codes, then both the comments were coded under the different sub-codes accordingly. For example, if a participant said that 'having a job and family influence' played a part in motivating them to enter higher education, then the sub-code 'Family' was applied to this comment and counted as one frequency, and the sub-code 'Job' was applied and counted as one frequency too. This

was done to ensure that all the motivators reported by the participants were captured. The frequency also helped in identifying how important each motivator was in influencing the participant's decision (as it was mentioned by a number of participants).

4.2.5 Final Codes

The final coding scheme which emerged from conducting a thematic analysis consisted of 5 main codes, each having multiple sub-codes. The sub-codes, including the number of participants who mentioned these sub-codes for both parts, 2a and 2b, are detailed in Table 4.3 below. This will allow us to make a comparison between the two groups, and assess the similarities and differences between them. Like the previous study, similar sub-codes for the motivators and barriers to enter higher education were grouped together to find emerging themes. This helped in understanding and analysing the factors better.

Theme	Sub-Codes	Number of Participants	
		2a (From LPN)	2b (Not from LPN)
1. Motivators – Reasons for entering HE			
Career Prospects/ Jobs	1.1 Helps getting relevant job after graduating	3	6
	1.2 Degree mandatory for profession (e.g. medical)	2	4
	1.3 Build a career	2	3
	1.4 Did not want to be stuck in a dead end job	-	1
Influence (Family and Friends)	1.5 Family:		
	1.5.1 Family expectation	2	5
	1.5.2 Family pressure – First in family to go	3	1
	1.5.3 Make family proud and set an example	2	-
	1.6 Seeing family and friends doing better with a degree	2	-
	1.7 Friends' influence:		
	1.7.1 All friends applied and/or decided together	2	2
Self-Growth/ Experience	1.7.2 Did not want to regret not going as friends went	-	2
	1.8 Experience university life, be independent and grow	3	1
Personal	1.9 Further educate myself / Reach a level of education	1	1
	1.10 To get graduation picture on the wall	-	1
	1.11 Was inspired by someone (wanted to be like them)	-	1
Indecisive	1.12 Wanted to try it out	1	-
	1.13 Indecisive – did not know what else to do	1	-
2. Barriers – What could have discouraged participant to enter			
Job	2.1 If they got an apprenticeship	1	2
Help and Guidance	2.2 If no help was available for applying	1	-
Influence (Family and Friends)	2.3 Friends' influence – there is no point going	2	1
	2.4 Family influence		
	2.4.1 Graduates do not succeed	1	-
	2.4.2 Apprenticeship is a better route	1	-
3. Use of Information Technology (IT)			
N/A	3.1 Receiving university related information	8	7

	3.2 Searching for courses/universities	6	4
	3.3 Searching for career options and placements	1	3
4. University Application			
N/A	4.1 Did seek help and guidance:		
	4.1.1 Teachers and career advisors helped	8	5
	4.1.2 Friends and family helped	2	3
	4.1.3 Help taken from university	1	-
	4.2 Could not have made application (needed help)	8	6
	4.3 Could have made application (without help)	2	4
5. Widening Participation Activities			
N/A	5.1 Did not attend	1	1
	5.2 Attended:		
	5.2.1 Did not find it useful	2	1
	5.2.2 Found it useful	7	8

Table 4.3 – Final Codes and sub-codes for Study

The most important codes that helped answer the research questions were codes 1, 2 and 3; 'Motivators' (answering RQ-2.1 and RQ-2.2), 'Barriers' (answering RQ-2.3), and Use of IT (answering RQ-2.4). The remaining two codes were used to help interpret the research questions further. Details of the sub-codes, including the participants who mentioned them can be found in Appendix B.6.

4.3 Results

This section analyses the five main codes identified from the data in detail. Each section begins with the code, its definition, sub-codes and the number of participants who mentioned that sub-code, and then an analysis of the findings which emerged from the code. Similar sub-codes for the Motivators are grouped together to identify relevant themes. The results are also compared against other previous studies conducted to examine whether the findings are any different. In the end, a discussion of the findings and how they helped answer the research questions, along with a comparison of the results with the previous study are covered.

Code 1- Motivators

Definition: Statements revealing the reasons why the participant chose to enter HE			
Theme	Code 1: Motivators Sub-Codes	Number of Participants	
		2a (From LPN)	2b (Not from LPN)
Career Prospects/ Jobs	1.1 Helps getting relevant job after graduating	3	6
	1.2 Degree mandatory for profession (e.g. medical)	2	4
	1.3 Build a career	2	3
	1.4 Did not want to be stuck in a dead end job	-	1
Influence (Family and Friends)	1.5 Family:		
	1.5.1 Family expectation	2	5
	1.5.2 Family pressure – First in family to go	3	1

	1.5.3 Make family proud and set an example	2	-
	1.6 Seeing others doing better with a degree	2	-
	1.7 Friends' influence:		
	1.7.1 All friends applied and/or decided together	2	2
	1.7.2 Did not want to regret as friends went	-	2
Self-Growth / Experience	1.8 Experience university life, be independent and grow	3	1
	1.9 Further educate myself / Reach a level of education	1	1
	1.10 To get graduation picture on the wall	-	1
Personal	1.11 Was inspired by someone (wanted to be like them)	-	1
	1.12 Wanted to try it out	1	-
Indecisive	1.13 Indecisive – did not know what else to do	1	-

Table 4.4 – Sub-codes for Code 1 - Motivators

One of the main research questions explored was to find out what motivated individuals from a LPN to enter higher education, and whether individuals from a different neighbourhood (not a LPN) had the same motivations to enter. Doing a comparison with individuals from a different neighbourhood allowed us to determine if there was any specific factor influencing the decision of individuals from a LPN. During the interview, the participant were asked to mention specifically what motivated them to enter higher education. These reasons stated are outlined as sub-codes in Table 4.4 above, for participants from both parts of the study; 2a and 2b. Some participants mentioned more than one reason which encouraged them to enter. Both these reasons were coded separately.

As seen from the table above (Table 4.4), a range of motivators were mentioned by the participants, with five different themes emerging. 'Helps getting a relevant job after graduating' (sub-code 1.1), was most frequently spoken about by participants from both groups. This result is similar to the previous literature and studies, including the one conducted by the University of Leeds (Leeds, 2017), the NUS Student Experience Report (NUS, 2008) and a survey conducted to assess Student Attitudes, Experiences and Expectations (Round, 2005), confirming that one of the main reason to enter HE is for better career prospects. More than half of the participants who did not come from a LPN (6 out of 10), and third of the participants from a LPN agreed that going to university and graduating will help them get a relevant job in the field, which is why they decided to enter higher education. They believe that experience is not enough, you need to have a qualification in order to get a relevant job. 3 of the participants from 2b also stated that they entered higher education to build a career, which also stated by 2 of the participants from a LPN. Some even claimed that having a degree was mandatory for the profession they wanted to enter. All these reasons show that participants expect a positive outcome from higher education and have high hopes about their future, job and career after graduating. P2a stated, "...obviously university can shoot you to a higher position quicker rather than if you just start work I think [P2a]". This positivity is seen across both groups, as it is one of the most recurring motivator that was specified by both these groups. Examples of comments made by the participants in their interview include, "I just thought if I wanted to succeed later on in my life then I needed a degree [P9a]", and "Knowing that with a degree I am more lily to get a high quality job. I know it was the right thing to do [P19b]".

The second most common reason stated by the participants was 'Family'. Half of the participants, not for a LPN said that their parents expected them to go to university, it was not their choice. P15b said, "university

Commented [WS9]: Others?

Commented [A10R9]: Included another NUS Student Report study

wasn't my choice, it was my parents". They even mentioned that their parents would it have been happy if the found out that their child does not want to go to university. P17b mentioned, "...*basically they would have chucked me outside the house, they even said that, I am not lying to you*". These participants didn't really have a choice about entering higher education, it was anticipated that they will go to university. There was more of a pressure from parents to go to university for participants not from a LPN, rather than those who were from a LPN. A reason could be because majority of the participants who were from a LPN were classified as a First Generation Student. As their parents had not been to university, they might not have expected their children to go too. However, three of the participants from a LPN did feel some pressure from their parents to go to university because they would be the first one to go to university (first generation students). 2 of the participants said that although they were not the oldest, they were still expected to go to university to set an example and make the family proud.

In addition to influence from family, friends' influence also played a significant role in motivating individuals to enter higher education. 6 of the participants (four from 2b and two from 2a), stated that they were influenced by friends. Either because all the friends were going and they did not feel left out, or because they did not want regret not going as they saw their friends going to university and enjoying it. They wanted to experience it too. One of the participant from 2b even mentioned that she, "*we all weren't sure of what to do, so we decided to give uni a go... my friends said that we can dropout if we didn't like it. We all are in City now [P16b]*". This proves that friends' influence can play a vital role in influencing the decision of individuals, regardless of whether they are from a LPN or not. They sometimes tend to make decisions to be socially accepted.

These results are similar to the ones reported in the NUS Student Experience Report, (NUS, 2008). This survey reported that participants from socio-economic class 6 and 7 (who are generally a first generation student), are attracted to university because of the lifestyle, experience and influence from friends. Their teachers and friends have a major role in impacting their decision. Whereas participants from a higher socio-economic class are more focused on learning and gaining academic skills. They have a clear goal in mind and choose a degree with that in mind. They are also more influenced by parents/guardians. A similar trend is seen in these results. 2a participants, those who come from a LPN, are more inclined to go to university because of the experience or wanting to try it out (as compared to 2b participants), while most of the 2b participants have a goal in mind and enter HE to build their career or learn further. There was no evidence that participants from a LPN are from socio-economic class 6 or 7, or that participants who are not from a LPN are from socio-economic class 1, it is an assumption made, as a LPN is normally associated with a socially deprived background.

Code 2- Barriers

Definition: Statements revealing factors which could have influenced them to change their decision

Theme	Code 2: Barriers Sub-Codes	Number of Participants

		2a (From LPN)	2b (Not from LPN)
Job	2.1 If they got an apprenticeship	1	2
Help and Guidance	2.2 If no help was available for applying	1	-
Influence (Family and Friends)	2.3 Friends' influence – there is no point going	2	1
	2.4 Family influence		
	2.4.1 Graduates do not succeed	1	-
	2.4.2 Apprenticeship is a better route	1	-

Table 4.5 – Sub-codes for Code 2 - Barriers

Another main research questions explored in this study was to find out what barriers these participants encountered, which could have hindered with their decision and led them to make a different choice. Table 4.5 above outlines the factors which could have influenced the participant to not enter higher education. The most common reason stated by participants that could have changed their decision to enter higher education was them believing that an apprenticeship was a better option to them. 3 of the participants (two from 2b and one from 2a) wanted to go for an apprenticeship rather than enter higher education, however ended up in higher education either because they did not get the apprenticeship or because they were influenced by some other factor to enter higher education.

'Friends' influence' was second most frequently spoken about factor when asked about any constraints faced when making the decision to enter higher education. 2 of the participants from a LPN, mentioned that their friends had a very negative attitude towards higher education, they said there is no point going to university. This influence did have a negative impact on the participants and did discourage them from making the decision of entering higher education, however their motivation to enter was higher, therefore they ended up in higher education. Another participant (from a LPN) mentioned that his father had a negative attitude towards higher education, and influenced him to not go either. He said, "*My dad used to say go to work because these students who go to uni they don't succeed anyways [P4a]*". He still however ended up going to university. A study by NUS (NUS, 2008) also reported that family and friends 'influence' also plays a vital role in determining whether or not they want to enter HE. Those from socio-economic class 5 and 6 (Semi-routine and Routine Occupations) stated that their *friends* were the key influence. These students are those who are interested in going to HE because all their friends are going. In addition, the University of Leeds (Leeds, 2017) mentioned that the 'social norm' affects the student's decision.

Code 3- Use of Information Technology (IT)

Definition: Statements regarding moments of using any kind of technology, applications or social media when making the decision about higher education

Code 3: Use of IT Sub-Codes	Number of Participants	
	2a	2b

	(From LPN)	(Not from LPN)
3.1 Receiving university related information	8	7
3.2 Searching for courses/universities	4	2
3.3 Searching for career options and placements	1	-

Table 4.6 – Sub-codes for Code 3 – Use of IT

This code refers to any kind of Information Technology (IT) that was mentioned or spoken about during the interview. With this information what role of IT played during the decision making of entering higher education would be examined. Technology was used in three different occasions by the participants, (i) to receive university related information (such as Open Day invitations), (ii) to search for courses/universities, and (iii) to search for career and placement opportunities.

As seen from the table, both groups, 2a and 2b specifically mentioned using technology (an application or social media) to search for their future options when making a decision to enter. Participants mentioned using various online technologies to search for HE related content. They used Google, specific university sites, online league tables and even YouTube to search for the course and institute they want to get into, Google was however most commonly used. For further details on the kinds of technology used along with the comments made by the participants are covered in section 4.4.1.3.

Code 4 – University Application

Definition: Statements describing how the participants applied to university, and whether they needed help and guidance		
Code 4: University Application Sub-Codes	Number of Participants	
	2a (From LPN)	2b (Not from LPN)
4.1 Did seek help and guidance:		
4.1.1 Teachers and career advisors helped	8	5
4.1.2 Friends and family helped	2	3
4.1.3 Help taken from university	1	-
4.2 Could not have made application (needed help)	8	6
4.3 Could have made application (without help)	2	4

Table 4.7 – Sub-codes for Code 4 – University Application

Table 4.7 above provides a summary of whether the participants sought any help or guidance when making the decision to enter higher education, and if so, then who they went to. The participants were even asked if they would have been able to make the university application themselves, without any help. Understanding this data helped investigate whether receiving help and guidance plays any role in motivating individuals to enter higher education. It was also used to explore whether extra help and guidance is available for individuals from other neighbourhoods (not a LPN), which further motivates them to make a decision to enter.

Majority of the individuals from a LPN sought help and guidance when completing their application for university. 8 out of the 10 said that their teachers and careers advisors at school/college helped them with their application process, whereas only two took help from family and friends. 1 of the participant even contacted the university he was applying to and asked them for guidance. These individuals did not seem to be confident in make the application, 8 of them stated that they did need help. On the other hand, individuals not from a LPN seemed to be more confident with almost half of them (4 out of 10) stating that they could have made the application themselves, they did not need any help or guidance. It could be the case that because they have siblings, parents or friends who are going to university, they were aware of the process and had an idea of what course they wanted to go into. This might not have been the case for 2a participants.

Code 5 – Widening Participation Activities

Definition: Statements regarding the participant mentioning whether the Widening Participation activities were useful		
Code 5: Widening Participation Activities Sub-Codes	Number of Participants	
	2a (From LPN)	2b (Not from LPN)
5.1 Did not attend	1	1
5.2 Attended:		
5.2.1 Did not find it useful	2	1
5.2.2 Found it useful	7	8

Table 4.8 – Sub-codes for Code 5 – Widening Participation

The 20 participants in the interview were asked if they attended any widening participation activities such as Taster Weeks, Open Days and talks, and whether they found them useful (if attended). 18 of the 20 had attended some kind of activity, and 15 said that they found these events and activities useful. They stated that these activities helped them understand university life better and gave them the confidence that they can go to university. These events/activities proved to be a facilitator for some the participants, triggering their decision to enter higher education. No such difference is seen between the two groups, both groups had access to and were able to attend the widening participation activities.

4.4 Discussion

This study aimed to explore what factors motivate individuals to enter higher education. It addressed individuals from a LPN who chose to enter higher education to explore how they were different; what made them enter and not follow the norm of a LPN to not enter. To investigate further, this study recruited additional undergraduate students who were from a different neighbourhood (not a LPN), to explore whether there any differences in their motivations to enter higher education. The first part of the study

(Study 2a) involved individuals from a LPN, whereas, the second part of the study (Study 2b) involved individuals who were not from a LPN. Both groups of participants were asked the same questions in their interview and filled out the same questionnaire so that a comparison of the results could be made. Data collected was analysed to answer the research question defined for this study.

The results described in this chapter show evidence that there was no major difference in the motivations to enter higher education between both groups; from LPN and not from LPN. Both groups reported similar motivations, only a subtle difference could be seen. More of the participants from a LPN were classified as a first generation student. Only four of the ten participants recruited had parents who had also been to university. They also showed traits of not being confident in their decision, where they required more help and guidance as compared to individuals not from a LPN. 8 of them took help from their school/college teachers and career advisors. However, individuals not from a LPN portrayed to be more confident in their decisions. Most of them knew exactly which course or university they wanted to go to, either because they researched their options themselves or had help from family members, or they knew which degree they needed in order to enter a specific profession.

Both groups mentioned that their reason to enter higher education was to 'get a relevant job'. This motivator was the most frequently mentioned by both groups. They believe higher education will equip them with the skills they need to secure a brighter future. Some even mentioned that seeing how some of their family member and friends have a good job after a degree has inspired them to enter higher education as well.

Another subtle difference observed was that there was more of an expectation from individuals who were not from a LPN to enter higher education. Their parents expected them to enter and made the decision for them, these individuals did not have a choice of their own. Some revealed that they were not happy with this decision, but they did not have any other option and could not say no to their parents. On the other hand, some individuals from a LPN said that they wanted to enter higher education to make their parents proud. They made this decision themselves and clearly stated that they wanted to set an example for their siblings and make their family proud. Friends' influence played a role for a few of the participants too (from both groups) which led them to enter higher education, even if they did not want to. We can therefore conclude that 'influence', from family or friends, led some participants to change their decision and enter higher education. They perform behaviours so that they are socially accepted amongst their friends and families.

Moreover, this study also revealed that technology was used in three occasions only – to receive higher education related material (via emails), to search for university/course related information, and to search for career and placement details via Google, specific university websites, and online league tables.

The next section presents a comparison of this studies results with the previous study.

4.4.1 Comparison of Study I and Study II Results

After analysing the codes and themes emerged from the two studies, a comparison of the results was made. With the research questions in mind, a higher-level view of the 'barriers/constraints to enter higher

education', 'motivators to enter higher education' and the 'role that IT played' codes were assessed. A direct comparison of these three factors was made and evaluated.

4.4.1.1. Motivators to enter Higher Education

In contrast to what study 1 participants mentioned as a barrier, '*it is hard to find a job with a qualification*', participants from Study 2 claimed that they decided to enter higher education to become independent and build a career to make a better career pathway. They said they knew that they would be able to get better jobs with a degree. One of the participants said, "*With a degree you just set the bar so high and hopefully if I get the best degree I know I will be outstanding [P4]*".

There is a contrast in the attitudes of the participants for this factor reported, as the participants who are in higher education say that they entered because they are confident that they will find a graduate job with a degree, whereas the participants who did not enter higher education state that they did not enter because they do not want to waste time as they a degree does not guarantee a graduate job role. There are two different mind sets of Study 1 and Study 2 participants.

Another motivator stated by a few of the participants was making their parents proud. As these participants were 'First Generation Students', students whose parents have not graduated with a degree and are the first ones from their family to go to university, their parents motivated and encouraged them to go into higher education. These participants felt responsible for going to university, graduating and setting a benchmark for their siblings and other family members. In general, parent's attitude towards higher education is a significant factor that influences their child's decision to enter higher education; parents who are positive will persuade their child since a young age to enter higher education, embedding into their minds how beneficial higher education is.

In addition, 'Help and Guidance' was a common theme that emerged from both studies, which can play a vital role as a 'motivator' to enter higher education. Study 2 participants confirmed that students need help and guidance to make a decision about going into higher education and starting the application process; all the participants said they would not have been able to apply without having guidance and help. When help was not available, these participants took the initiative to look for guidance and seek information to help with their decision-making.

However, participants in Study 1 were not concerned about seeking support and information themselves: they wanted help to come to them. The majority of them did not avail themselves of the 'Career Advisors' support and advice. They either felt it was no use or had already made their decision to not enter higher education so did not invest time in understanding what options were available to them. These individuals might have at least thought of higher education if they had an advisor who would offer tailored guidance, advising them on what the best career option is for them, someone who would approach these individuals themselves rather than the individual having to find guidance. As they did not have anyone approach them, these individuals did not make an effort to look for help either; this resulted in them leaving the higher education pathway. The information available online is seen as being too general and overly complex, discouraging Study 1 type of individuals to research on their own.

4.4.1.2 Barriers and Constraints to enter Higher Education

The most evident reason why individuals choose not to enter higher education is because they are concerned about the tuition fees. They are worried about taking a Student Loan for their education and having to be in debt later. Majority of them are concerned about their current finance position, and want to be earning money as soon as possible. To do this, they will take up any job, disregarding any other options available to them where they are not earning money; such as entering higher education and getting a formal qualification.

The next most popular reason for *not* entering HE amongst study 1 participants was their mind set and attitude; they believe that a job after completing their degree is not guaranteed. Results from the first study were similar to the ones obtained by the authors of 'Social Class and Higher Education' [9]. The biggest barrier and discouraging factor individuals face when making the decision to go into higher education along with finance) is their belief that they will not get a job related to their degree after they graduate, and will therefore end up wasting their time in higher education. They did not have any evidence for this belief they had; it was just their perception. There were also financial concerns linked to borrowing money and future debt.

Parents' attitude towards higher education also played a vital role in the individual's decision making. Two of the female participants for Study 1, did not enter higher education because their parents were the barrier; their parents did not allow them to enter. While some of the other participant's parents discouraged them from entering, there were also parents who were not concerned about whether their child goes into higher education or not, they supported the child with what decision they make for themselves without offering any advice or guidance. On the whole, these individuals appeared to have lower levels of confidence about their ability to succeed in higher education, getting a qualification or even making a decision regarding their future career, they were unsure of what to do. Examples of some of the comments the participants made were, *"I'm too indecisive. I fear that if I go and do a three year course, which cost 27 grand, I am going to change my mind again and want to do something completely different [P8]"*, and *"I know I am going to spend about 27 or 28 thousand pounds, so I would rather work three years and probably make double or triple of that money [P1]"*.

Such individuals need advice about the career options that are available to them. They are only thinking of the short term and making money at present; they do not consider how a qualification will help them earn more in the long run

However, in comparison, 70% of the participants (14 out of the 20) for Study 2 went to university because of their parent influence. They either wanted to make their parents proud or were expected to go to university by their parents and family. From the 14 participants, 4 encouraged their child to get a qualification, whereas the remaining were forced into going as it would not be 'acceptable' if the child did not enter. When the participants were asked how their parents would react if they decided they did not want to go to university, a few of them said, *"Well basically they would have chucked me outside the house. They even said that, I am not lying to you [P17b]"*, *"I am the oldest, so going to university was a big deal to my*

parents as they didn't go. There was kind of a pressure [P13]", and, "Oh, I don't think they would have been very accepting of me not going to uni [P15]".

'Experience is more important than a qualification' plays a vital role in an individual's decision making too. Many of the participants also go for jobs straight away, not just for the earning money, but for getting experience. They say that they can work their way up with their experience to reach their dream job and goals; they do not need a qualification to achieve it. Hence, a significant number of participants mentioned opting for an 'Apprenticeship' rather than going to university, as they are able to earn money and get the experience required, along with a NVQ Level 3 or 4 qualification (with some apprenticeships). 3 of the Study 2 participants stated that they wanted to go for an apprenticeship, rather than enter higher education. However, two of them were influenced by their parents to enter HE and get a formal qualification, while the third participant could not get an apprenticeship so had no choice but to enter HE.

Lastly, not having any 'help and guidance' can act as a barrier too. If an individual does not have any or enough information on how to enter higher education, they may be discouraged to make an application as they are not sure of what the process is and doubt themselves, resulting in them not entering higher education (even if they wanted to). One of the participants from Study 2 said that she wanted to go to university, but needed help applying. As soon as she was able to get the help, she made the application and is now doing the course she had always wanted to do. So not having the guidance, can make a big impact on an individual's ability to make informed decisions about their future.

4.4.1.3 Role of IT in Decision Making

The role that IT played in the participant's decision making is crucial for the purpose of this research. In order to explore the types of technologies used by the participants, it is important to understand the process of entering higher education; as each process may require a different kind of technology to be used. The ideal process and activities involved in entering higher education for a typical individual is drawn out in the data flow diagram below (Figure 4.1). This data flow diagram was created explicitly from the first and second study results, to understand the role of IT in decision making. Each individual's responses were considered and analysed to establish the process they go through when they are deciding to enter higher education. During the interviews, it was identified that there were two kinds of individuals; those who were uncertain about what they want to do and those who had a clear mind set about entering higher education. All of these individuals made some attempt to research and seek future opportunities for themselves. After gathering some information and researching, some individuals moved onto applying to university and submitting their application form (if they had decided to enter higher education). Figure 4.1 below illustrates this process of entering higher education.

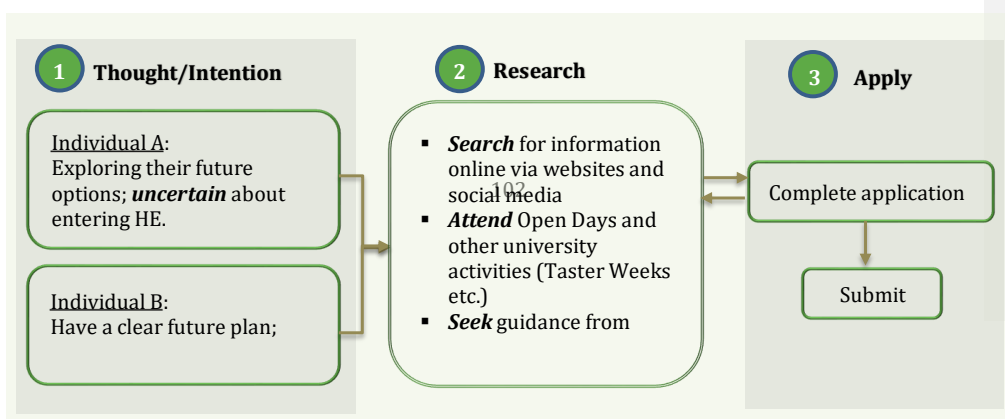


Figure 4.1 – Data Flow Diagram – The Process of entering Higher Education

As seen from the data flow diagram above, Figure 4.1, there are three stages/phases that an individual will go through in order to enter higher education. There may be some exemptions where an individual does not necessarily go through these phases, but in general, an ideal individual will go through these phases if they decided to enter higher education. The three phases are explained in more detail below.

Phase 1 – Thought/Intention

This is the first stage, where an individual has a thought of higher education. This is the first time where they think about higher education as an option for them. There are two kinds of individuals during this phase. They are:

- *Individual A –*

Those individuals who are unsure about their future. They are still exploring their future options, and are uncertain whether higher education is for them. They may change their mind set and enter higher education if they find a suitable course/university that meets their requirements.

- For these individuals it is important to use IT to give them enough information and guidance so that they can make an informed decision about their future.

- *Individual B -*

Those individuals who are certain about their future. Their intension is to enter higher education. They may or may not have done their research about which course or university they want to enter, but they do have a vague or clear idea of what they would like to do with their future.

- For these individuals IT will be used as a facilitator, giving them enough information, guidance and help so that they are able to choose the right course/university for themselves.

Phase 2 – Research

This is the second stage, where an individual researches their future options with higher education. They take different approaches to search and gather as much information as possible to make a decision. This may involve-

- **Searching** for information online via websites and social media
- **Attending** Open Days and other university activities (such as Taster Weeks)
- **Seeking** guidance from career advisors

The individuals' intentions of entering higher education may keep changing while they are in the Research phase. Some of these who wanted to enter HE may start contemplating their decision, whereas others who did not want to enter HE may change their mind and think it may be worth going. All individuals act differently, it all depends on how much useful information they are able to retrieve, and how much useful tailored guidance they are able to get which will help them decide about entering HE.

Phase 3 – Apply

This is the final phase. It involves those individuals who want to enter higher education; they will complete their application and submit it. However, it should be noted that just because an individual is in this stage does not necessarily mean they will enter higher education. There may be cases that an individual changes his/her mind about entering while completing the application or even after submitting it.

The technologies that Study 1 and 2 participants mentioned that they used for the first two stages of entering HE are outlined in the next section. For the final stage, where the participant completes and submits his/her application, the technology used is the UCAS website, as the university application has to be submitted via UCAS.

The next section details the technologies specifically stated and used by Study 1 and 2 participants. It was identified from their comments made which phase of the higher education process they used this technology for. The kind of technology/application used for phase 1 and 2; Thought/Intention and Research. Both sections start with a table which presents the number of participants who mentioned the use of technology in that phase, along with the participant number and their comment. In the end, a summary of how IT is used in the decision making is covered.

Technology Used by Participants for Phase 1 – Thought / Intention

	Partici pant No.	Comment	Technology/ Application Used	Total No. of Participants
Study 1	P1	<i>'When universities came over to my college they asked us to follow their Facebook page...'</i>	Social Media	3
	P7	<i>'We found out about Open Days through leaflets, emails and Facebook'</i>	Social Media, Email	

Study 2	P9	<i>'We used to have a college portal, or it was on our bulletin board [...] Yeah. We also had a Facebook page, through social media'</i>	Social Media, Email, College Portal
		None	0

Only 3 participants from Study 1 mentioned the use of technology that triggers their thought about considering HE as an option for them. It must be noted that 8 out of the 10 Study 1 participants fell under *Individual A* category, where they were uncertain of entering HE as they either encountered a lot of barriers and constraints to enter HE, or they just had a negative mind set about HE altogether which stopped them from entering HE and opting for other routes.

From the three who mentioned some kind of technology [Table 4.9 – Technology used for Phase 1 – Thought/Intention](#) which did spark their thought about entering HE, they all mentioned 'Social Media' as a means of technology which gives them an update or information about HE. By reading that post, it instigates their thought about HE, and even for a split second they do think joining that particular university (whose post it was about) or any other one. The second popular technology used to make one think about HE are '*emails*'. Participants said that they used to receive emails from universities or their colleges which gave them HE related information, such as upcoming events, open days or career fairs and talks. By receiving these emails even those individuals who have decided not to enter HE, are kept in the HE loop, where they are still in touch with HE related information. It does make all individuals think of having HE as an option for them. One of them even mentioned a college portal which kept posting regular updates about HE related material. As all students had to log into their college portal to access their college content, they could not miss seeing the HE related information posted on the college portal.

As all the 20 participants from Study 2 fell under *Individual B* category, they had an intention of entering HE, either because it was expected of them to enter because of their family, or because they wanted to grow, further educate themselves and build a career. None of these participants mentioned technology that triggered their thought of entering HE, as they were never in that phase. They knew they were going to enter, and just started doing their research and made their application.

Technology Used by Participants for Phase 2 – Research

	Partici pant	Comment	Technology/ Application Used	Total No. of Participants
Study 1	P3	<i>'...on brochures [...], they did have websites on their and I went on a couple...'</i>	University Websites	3

Study 2	P5	'...they make us search you know ourselves, go on the website and search for Open Day'	University Websites
	P9	'Yeah Google is my best friend to be honest..'	Google
	P1	'..I would definitely use Google as well and search what makes a good personal statement...'	Google
	P2	'..I don't remember the name, but it was like a complete university guide or something that had league tables for every subject and then the overall stuff they used to have'	Websites, Online League Tables
	P4	'The UCAS websites has some examples of sample statements so I worked around them and them my own'	UCAS website
	P6	'I went through Google into the university websites' '...I would go to each university website , go to the undergrad and check all the courses they have, what information they have and different things' '...you search online as well and loads of things come up..'	Google, Specific University Websites
	P7	'..I went on the UCAS website where it was giving information on online clearing. That was quite helpful because if I didn't have that at the time and I used that through my mobile, which was convenient' '..having that facility on your phone allows people to get more information and they are less ignorant about what to do' Table 4.10 – Technology used for Phase 2 – Research needed help with... '..to start basically I Googles past personal statements [...] and then all the information on how to do UCAS step by step there was videos on YouTube . So with the ability to access YouTube and having examples set already on the internet already gave me my guideline.'	UCAS website, YouTube
	P17b	'With the personal statement I looked at the Student Room website , so I looked at example personal statements and used them to kind of help me'	Student Room Website
	P20b	'I just used Google . We get books as well but we don't read books these days'	Google

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Only 3 out of the 10 participants from Study 1 mentioned use of some kind of technology to search for HE related information. 2 of them said that their college would make them go onto various university websites to search for related content and upcoming events and talks. The third claimed that he is not interested in entering HE at the moment, but if he changes his mind in the future he will use Google to find out the information he requires. Some colleges give their students the option to do their research themselves, they provide students with websites and tell them to do their own research. Students who are not motivated to enter HE already will just ignore this, and will make no effort to search for information online. Because of this they never find out the options available to them, and what career options they can go for, hence they end up making a decision to not enter HE as they do not have enough information and are not aware of the career options they can go for. Their decision is based on their mind set and attitudes towards HE which they pick up from their close family and friends, following their beliefs.

On the other hand, 7 of Study 2 participants mentioned using various online technologies to search for HE related content. As Study 2 participants are categorised as being *Individual B*, they all wanted to enter HE and did their research to search for the course and institute they want to get into. Their research included using Google, specific university sites, online league tables and even YouTube. A variety of technologies were used by the participants to search for information to help them make their decision.

4.4.1.4 Summary – IT Used in Decision Making

Majority of the participants stated in their interviews that they receive emails from colleges/universities about upcoming university events and updates, send emails to colleges/universities to gather information about universities and courses etc. The second most popular kind of technology used was websites, online league tables, social media. These technologies again served the purpose of data gathering and seeking information and guidance. Social media, most popularly Facebook, Twitter and Instagram are used to like/follow universities to get instant updates and look up information. 'Google' was the most eminent answer by the participants when they were asked how they research about a university or course. They all claimed that they use Google to type in specific information they would like to find out about.

Although a lot of technology is being used by participants to research and find out information regarding universities, their upcoming events and activities, searching for courses, and finally filling and submitting the application, the least technology is used in the intention/thought process of entering education. There must be an event or moment that triggers an individual's intention about entering higher education, so that they at least start to think about entering (not necessarily make a decision to enter). From the studies, participants have a thought about entering higher education through social media and emails only. These are the only kinds of technologies that change a participant's mind-set about entering higher education for even a split second. They receive emails and/or receive updates via colleges/universities social media pages telling them about the opportunities, grants/scholarships or upcoming events. These two are the only technologies which are used as a tool to trigger the participants first thought of entering higher education; minimal IT is used in this activity involved in entering higher education.

4.4.2 Key Findings - Contrast in Attitudes

In addition to finding that minimal technology is used to trigger an individual's first thought to enter HE, another interesting finding was that three factors reported by the Study 1 and 2 participants were contradicting. They were perceived differently by the participants, and due to the difference in opinions, the same factor acted as a barrier for some individuals (which stopped them from entering HE), whereas it acted as a motivator for another (motivating them to enter higher education). These three factors are:

1. Attitude towards graduate jobs

While Study 1 participants claimed that a graduate is not able to find a job which is why they decided to not enter higher education, Study 2 participant's believed that a degree helps in progressing and getting better jobs. Examples of statements revealing this contrast and difference in opinion are presented below:

- Study 1 (did not enter HE): *"...sometimes you feel like what's the point of going to university and get a degree when you are not going to get a job [P1]"*
- Study 2 (entered HE): *"A degree opens your doors and gives you better options [P5]"*

2. Influence (from family or friends)

Some of the Study 1 participants wanted to enter higher education but were influenced/expected to not go by their family or friends. They ended up not going because of them. However some of Study 2 participants did not want to enter higher education but were influenced/expected to enter by their family or friends. Both these participants were influenced, and they were unable to make a decision of their own. Examples of statements revealing this contrast are presented below:

Family influence:

- Study 1 (did not enter HE): *"My family weren't allowing me to go. My dad kept saying that there's bad people in university [P3]"*
- Study 2 (entered HE): *"Well basically they [parents] would have chucked me outside the house [P17b]", and "I don't think they would have been very accepting of me not going to uni [P15]"*

Friends' influence:

- Study 1 (did not enter HE): *"I had to take a gap year because all my friends told me uni is a waste of time [P8]"*
- Study 2 (entered HE): *"My friends were an influence because they were going to uni [P7]"*

3. Indecisive -

Lastly, one of the participant from Study 1 reported that they were indecisive so decided to not go to university. However, another participant stated that they ended up going to university because they did not know what else to do. This shows that being indecisive can lead some people to enter HE, while others to

no enter, so it can act as a barrier and a motivator at the same time. Comments made by these participants are displayed below:

- Study 1 (did not enter HE): *"If I know what to do then I will definitely consider higher education [P4]"*
- Study 2 (entered HE): *"I wasn't sure what to do so decided to try out university [P16b]"*

4.5 Moving Forward: Inspirations for the Next Study

The key findings from Study 1 and 2 analysis revealed that there is a difference in the way some factors are perceived by Study 1 and 2 participants. This meant that a factor could act as a barrier and a motivator to enter higher education at the same time. It was essential to validate whether a wider population around England also felt the same way about these factors; whether there was a difference in the way these factors were perceived by those who enter HE and those who did not. As both these studies had a limited number of participants, with only 10 participating for Study 1 (from Slough area) and 20 participating for Study 2 (from Slough area and City, University of London), it was not ideal continue the rest of this PhD research based on the results reported by these 30 participants (only). We needed to ensure that these barriers and motivators are encountered by a range of individuals. Hence, it was decided to run an online survey so that a vast variety and number of respondents could be recruited, as this would ensure the validity of the findings. This study is reported in the next chapter - Chapter 5.

Chapter 5:

Study 3 - Exploring Individuals Attitudes about Higher Education

This chapter reports the third study undertaken for this research. In the previous two studies (Chapter 3 and 4), we found that there were multiple motivators and barriers encountered, which encouraged or discouraged individuals to enter HE. However, as the number of participants recruited for Study 1 and 2 were limited, 10 for Study 1 and 20 for Study 2, we needed to conduct another study to validate these findings and ensure that a wider population encountered the same barriers and motivators reported. In the end, a detailed analysis of the technologies which exist to overcome these barriers is covered. This helped in identifying a gap in research and answering RQ-3 and RQ-4.

5.1 Motivation and Research Questions

Results from the previous two studies revealed that there was no significant difference seen in the barriers and motivators encountered by individuals from a LPN (when compared against participants who were not from a LPN), except that they were more likely to be a first generation student. A key finding from these studies revealed that three factors in particular (addressed in Section 4.4.2) act as a motivator and a barrier at the same, depending on how each individual perceived that factor. These factors include, (i) belief that HE will help get them a relevant job, (ii) influence from parent or friends, and (iii) indecisiveness. These factors either influenced individuals to enter higher education (acting as a motivator), or it influenced individuals to not enter higher education (acting as a barrier) -there was a difference in the opinions of individuals who entered HE and who did not enter HE.

The next step was to do a literature review of the technologies which exist to address the barriers reported. However, due to the limited number of participants recruited for the previous two studies, it was not ideal

to start the literature review based on these findings. Study 1 recruited 10 participants from Slough area only, while Study 2 recruited 10 participants from Slough area 10 from City, University of London. It was crucial to validate these findings and confirm that a broader audience encountered the same barriers and motivators reported. As majority of the participants recruited were from Slough area, there could have been some biasness in the results they reported, as they may give a specific factor more importance (due to the area and background they come from). Therefore, the motivation to run this study was to recruit a broader range of individuals across England. This would ensure that people from different backgrounds are involved in the study, and help evaluate whether their perceptions, which would then give more confidence and assurance to the findings. As the aim was to recruit a number of participants (more than 200) from across England, it was best to use an online survey to reach out to this vast audience and collect the responses.

In addition to validating whether a broader audience encountered the same barriers and motivators, this study also validated whether there is a statistical difference in the responses given by individuals who were in HE and those who were not. As identified in the previous two studies, there were three factors which were perceived as a barrier and a motivator due to the difference in opinions. This study therefore verified whether a broader audience also had a difference in opinions, and whether this difference was statistically significant. In the end, a literature review was conducted in an attempt to find an opportunity where technology could be designed to enable individuals to overcome their barrier.

This study contributed in answering the third research question:

RQ-3: Does a wider population around England also face the same barriers and motivators to enter higher education?

5.2 Method and Study Design

This study involved a quantitative analysis. An online survey was used which included Likert scale rating questions to gather responses about the individuals attitudes about higher education. Details about the procedure, participants and recruitments are outlined in the next section.

5.2.1 Procedure

This study involved an online survey, the participants were not met for a face to face session. The participants were sent a link to the survey which they clicked on to complete. Respondents could complete the survey on their smartphone or computer/laptop, there were no restrictions. Before beginning the survey, they were first presented with an online information sheet, which briefed them about the study and the inclusion criteria. After reading the information, the participants had to agree to take part in the study by signing an online consent. This online consent was presented in the form of a tick box, where by ticking the box the participant agreed that they were above 18 years of age, fulfilled the inclusion criteria, and were taking part in the research voluntarily. Once this was ticked, the respondents were able to access the survey

and take part in the study. The survey took about five minutes to complete. The online consent form/information sheet and survey questions can be found in Appendix C.

5.2.2 Survey Design

The aim of the survey was to find out whether a broader audience face the same barriers and motivators which Study 1 and 2 participants encountered. To ascertain whether the same factors affect a wider range of individuals. The survey involved gathering information like:

- What the participants current status is
- Which barriers and motivators play an important role in the participants decision making
- Which technology was used by the participants to search for or gather university related information

The survey was created on Qualtrics and was distributed to participants via a link generated by Qualtrics (https://cityunilondon.eu.qualtrics.com/jfe/form/SV_3W7BI06rCFFoP8p). The questions included a mixture of multiple choice, Likert scale rating and open-ended questions. The closed questions involved collecting data about how important the participants thought the barriers and motivators were in influencing their decision, whereas the open ended question gave the participants an opportunity to write additional comments and suggestions. Details of these questions are covered in section 5.2.4 (Data Collection).

The survey questions were branched into three categories/groups according to the participants' current status:

1. *Group 1* - Participant has decided not to enter university
2. *Group 2* - Participant is enrolled onto a university course; is a first or second year undergrad student.
3. *Group 3* - Participant is deciding whether to enter or not.

The questions to all three branches of the survey are similar, asking participants to rate what barriers, motivators and technologies they feel are most important to them when deciding to enter higher education, the wording and tenses were slightly different. Once the respondents selected what status they fell under, the survey questions were displayed accordingly. An incentive was included with this survey, where participants had a chance to be entered into a prize draw to win a £25 Amazon Gift Card. They were asked to enter their email address if they wish to take part in the prize draw.

As our study has 3 groups of participants; Group 1, those students who are currently in university, Group 2, those students who are not in university and Group 3, those students who are still deciding whether to go to university or not, they will be referred to as "In University", "Not in University", and "Still Deciding" respectively in the results and discussion section.

5.2.3 Participants and Ethical Considerations

Ethics approval was essential for conducting this study (Appendix C.1). The study commenced as soon as the ethics was approved by the Computer Science Research Ethics Committee (CSREC) of City, University of London. The ethics form submitted indicated that the participants recruited for this study were not disadvantaged in any way, and that their participation was voluntary. The only identifiable data collected from the participants was their email address, and that too was voluntary, if the participants wished to take part in the prize draw. Their email address was not used for any analysis. The participants were given a participant number based on the survey number. So for example, the first participant who filled out the survey was referred to as P1. No names or other identifiable data was collected from the participants.

Before taking part in the study, participants were first given a brief introduction, summarising the purpose of the research and the requirements criteria to meet in order to take part in the survey. It also stated clearly that no identifiable data would be collected from them, their answers will be kept confidential and that their participation is voluntary. This introduction served the purpose of an Information Sheet, and was displayed to the participant once they clicked on the link. At the end of the introduction, participants were required to tick a box. This was the informed consent obtained from the participants, stating that they met the criteria and were happy to take part. Participants could only access the survey once they had ticked the consent box. However, an additional precaution was taken to eliminate individuals below the age of 18 to take part in the survey; if the respondent selected their age as 'Below 18' in question 2, the survey ended immediately. As participants who took part in the survey were over 18 years of age, they were not vulnerable in any way.

Participant Recruitment

As the online survey focused on recruiting as many participants as possible, from different backgrounds (to ensure richness and validity of the results), the inclusion criteria was kept simple. There were only two criteria's defined for being eligible to take part in the survey: (i) aged between 18 and 22, and (ii) be based in England. The goal was to recruit a minimum of 75 participants from each of the three categories; those who are in university, those who have decided not to go to university so are working or unemployed, and those who are still deciding whether they want to go to university or not. This sample size would be enough to validate the initial findings (from Study 1 and 2) and make a conclusive decision about the future steps and technology to develop.

To recruit participants from each of the three categories listed above, a number of methods were used to reach out to this target audience. Convenience sampling was used initially to reach out to friends, family and colleagues who could take part if they fit the criteria, or who could forward the link on to anyone they knew who could be a potential participant. To recruit as many participants as possible, the survey was also added online on Call For Participants - <https://www.callforparticipants.com>. Furthermore, additional steps were taken to recruit individuals who fell under a specific category/group. These were:

-
1. Group 1 - Participant has decided not to enter university- As these participants were not in university, it could be that either they are working or are unemployed. Social media, such as LinkedIn, was used to post a link to the survey in order to recruit participants who were current working or doing an apprenticeship.
 2. Group 2 - Participant is enrolled onto a university course; is a first or second year undergrad student - An email (with the link to the survey) to City University HCID group was sent out asking the recipients forward the email to any group or individual who they feel fit the criteria. WhatsApp, Twitter, Facebook and Snapchat were also used as social media to forward the link of my survey to friends who were first/second year undergrad students (excluding City University students). They could then forward on the link to their university friends and classmates.
 3. Group 3 - Participant is deciding whether to enter or not - As these participants were still deciding whether they want to enter university, there was a probability that they were in college/secondary school completing their A Levels or BTEC. Hence, Whatsapp, Twitter, Facebook and Snapchat were used as social media to forward the link to the survey to friends who were currently in college/secondary school. They were asked to forward the link to their friends and classmates as well.

Participant Details

A total of 266 responses were collected for this study; 133 of the respondents were from Group 1 (in university), 51 of the respondents were from Group 2 (not in university), and 82 of the respondents were from Group 3 (those who are still deciding). As the home postcode was collected within the survey, it was evident that the respondents came from all across UK. The majority were from North East and South Central England. Other respondents were from areas such as East Anglia, Midlands and South West England.

5.2.4 Data Collection

The focus of the survey was to collect quantitative data as it would help answer RQ-3. The survey can be found in Appendix C.3 (page 275). However, there were two open ended questions included in the survey to gather additional information, in case the respondent wanted to add any extra comments. The first question asked participants if there were any additional factors which motivated them to enter university - *'Please state briefly what motivated you to go to university?'* (for respondents who are in university), and *'Please state briefly what would motivate you to go to university?'* (for respondents who were still deciding or who were not in university) or, *'Please state briefly what is motivating you to go to university?'* (for respondents who are still deciding but said they might go to university). The second question asked participants if they encountered any additional barriers (other than the ones mentioned in the rating scale question) which might have or have stopped them from entering higher education, - *'Please state briefly if there was anything that stopped you from going to university?'* (for respondents who are in university), and *'Please state briefly why you do not want to go to university?'* (for respondents who were still deciding and

said they might not go to university, and those who were not in university). These questions were only included to see if any additional factor is mentioned by the respondents.

The quantitative data collected from the survey are detailed in the next section. As the aim of conducting this study was to validate whether a diverse range of individuals encountered the same barriers and motivators to enter higher education, the quantitative data included Likert scale questions, asking the respondents to rate how important they felt about the motivators and barriers reported by Study 1 and 2 participants. Not only did rating these factors help determine which factors are more important in influencing an individual's decision, this rating also allowed us to run a statistical analysis so that we could determine if there was a statistical difference between the three groups of participants. This enabled us to evaluate whether the factors are perceived differently by the three groups.

Data Collection - Motivators to enter Higher Education

Respondents were asked to rate how important 9 factors are/were in influencing their decision to enter higher education. These factors were motivators mentioned by participants from Study 2 – those who chose to go to university (detailed in Section 4.3 – Code 1: Motivators). To cover all the motivators specified by the previous participants, at least one motivator from each theme was included in the survey. However, the only motivators which were not included were the 'personal reasons' which participants mentioned, such as 'going to university for a graduation picture'. The question asked in the survey was: *'Please rate how important these factors are/were in influencing your decision to go to university.'* The respondent were asked to rate the following nine motivating factors on a 5-point Likert scale, with 1 representing 'Not at all Important' and 5 representing 'Extremely Important':

1. To make parents/family members proud
2. To build a career
3. For self-growth and to further educate myself
4. To become independent
5. To experience university life
6. To enter a profession which requires a degree
7. Because all of my friends were going to university
8. Did not want to regret not going to university
9. Did not know what else to do

Data Collection - Barriers to enter Higher Education

Similarly, respondents were asked to rate the extent to which they agree or disagree with 10 statements which represented the barriers reported by Study 1 participants – those who chose not go to university (detailed in Section 3.3 – Code 1: Barriers). A barrier reported from each of the seven themes identified were included in this survey. The question asked in the survey was: *'Please rate the extent to which you agree or disagree with the following statements about choosing to go to university.'* The respondent were asked to rate the following ten barriers on a 5-point Likert scale, with 1 representing 'Strongly disagree' and 5 representing 'Strongly Agree':

-
1. My parents/family were not supportive of me going to university
 2. My friends' influenced me against going to university because they were not going
 3. I was worried about the tuition fees and being in debt
 4. I did not want to travel far to go to university
 5. I was worried that I won't be able to find a job after graduating
 6. The application form was difficult to fill out
 7. I did not have enough information and guidance on courses/universities
 8. I was not sure what course/university to take, so was indecisive whether I should go to university
 9. I did not have enough confidence to go to university
 10. I was not sure what university life would be like

5.2.5 Data Analysis

Analysis of the two open-ended questions (qualitative data) were done in a similar manner as Study 1 and Study 2. Thematic analysis was employed, to determine if the responses were similar to the ones reported by the participants of the previous studies. All the responses were first listed into a word document (there was one document for the motivators and one for the barriers), and then imported into NVivo, a qualitative analysis software. Then a deductive analysis was undertaken, where the responses were read multiple times to apply a set of pre-defined codes. These pre-defined codes were the 7 themes which emerged from Study 1 and 2. The responses were read through, each time focusing on a different theme. Every time a response related to that particular theme, then that theme was applied to that response. For example, if the responses were being read through to apply theme 1 – Family influence, then every response which related to the participant entering or not entering HE because of family was marked under this theme. All responses to all the open ended questions grouped into the relevant themes can be found in Appendix C.5.

In the end, there were 116 responses to the open-ended questions. All the responses were marked under a pre-defined theme, no additional themes were found within the responses. This meant that the respondents agreed with the factors reported by Study 1 and 2 participants. This question was only used to identify any additional themes, and as no additional themes were found, this data was not used in any further analysis. A list of the themes mentioned by the respondents along with a count of the number respondents mentioning that theme is outlined in Table 5.2 below. The positive side (+) mean that the theme was mentioned as a motivating factors, which encourage(d) them to enter HE, while the negative side (-) mean that the theme was mentioned as barrier which discourage(d) them to enter HE. Table 5.1 outlines the definitions of the five themes emerged from the open ended questions.

Theme	Side	Definition
Finance / Money	+	Respondent is motivated to go to university in the hope of earning money
	-	Respondent is concerned about money so has decided to <i>not</i> go to university
Future Career Prospects / Jobs	+	Respondent is motivated to go to university either because they need a qualification for a specific field (e.g. medicine) or to have a better career prospects and progression
	-	Respondent believes that a degree will not help them with career progression, hence has decided or is deciding to <i>not</i> go to university
Influence (Family and Friends)	+	Family or friends' influenced the respondent to go to university
	-	Family or friends' influenced the respondent to <i>not</i> go to university
Self-esteem / Self Growth	+	Respondent has decided to go to university in order to build their self-esteem, or grow and/or further educate themselves
	-	Respondent is either not confident to go university or has decided to <i>not</i> go as they believe it will not help them grow further
Personal Reasons	+	Any personal reasons which led or is leading the respondent to go to university, such as, 'always wanted to go to university'.
	-	Any personal reasons which led or is leading the respondent to <i>not</i> go to university, such as, 'I am not a university person'.

Table 5.1 – Definition of Themes identified from the open ended questions

Theme	Side	Number of Participants		
		Group 1 In university	Group 2 Not in university	Group 3 Still deciding
Finance / Money	+	3	4	3
	-		5	
Future Career Prospects / Jobs	+	26	5	12
	-		6	1
Influence (Family and Friends)	+	7	1	6
	-			
Self-esteem / Self Growth	+	20		
	-		4	1
Personal Reasons	+	4	1	2
	-		4	1

Table 5.2 – Number of responses for the open ended questions

A detailed coding scheme, including the responses are included in Appendix C.4. Here, the sub-codes and relevant themes for all three studies are combined in a table, enabling us to see clearly what the similarities and differences between the participants from the three studies are.

Quantitative Data Analysis

There were two parts to the quantitative data analysis - the first part involved determining which of the barriers and motivators were most important in influencing the respondent's decision, and the second part included measuring whether there was a statistical difference between the responses given by each group. To determine which of the factors were most important for the survey respondents (part one of the analysis),

a mean of the responses for each group was first calculated. The mean was calculated by first multiplying the number of responses by the Likert scale rating, and then calculating the average of the multiplied figure with the sample size for each statement. For example, if the responses from the 133 respondents from group 1 (in university) were the following for statement 1 -

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Statement 1	15	30	14	32	25

Then the mean will be calculated by first multiplying the responses with the Likert scale rating (15 multiplied by 1, 30 multiplied by 2, and so on). This would result in the following –

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Statement 1	30	60	42	128	125

An average of all the responses for the statement is then calculated, which is 2.9 (385/133). The average for all the 9 statements representing the motivators and the 10 statements representing the barriers, was calculated for each of the three groups to determine which motivator and barriers is considered to be most important by this wider audience. This information was then also used to validate the findings from Study and 1, to establish whether the results are similar, answering RQ-3.

The second part of the quantitative analysis involved running a statistical test to determine if there is any statistical difference in the three groups. Results from Study 1 and 2 concluded that there was a difference in the way three factors were perceived by the participants. Study 1 participants (who did not go to university) perceived it as a barrier, whereas Study 2 participants (who entered university) perceived the same factor as a motivator. It was therefore ideal to run a statistical test on each statement, to see whether there is a statistically significant difference between the groups, whether the three groups perceive that statement differently.

A Kruskal Wallis test was used to test the difference between the three groups for *each* statement. A Kruskal Wallis test is a non-parametric test that is used to determine if there is a statistically significant difference in the means of two or more groups (Leard Statistics, 2018). As there were three groups involved (Group 1, 2 and 3), it was ideal to run a Kruskal Wallis test. SPSS, a software used to run statistical tests, was used to conduct the Kruskal-Wallis test. The average calculated for each statement (in the first part) was used to run the test. The Kruskal-Wallis test was conducted in two steps; first we hypothesized the difference in means between all 3 groups, and secondly we hypothesised the difference in means in a pair wise manner. If the results stated that there is no difference between the three groups, then the test was completed. However, if the results stated that there was a difference between the three groups, then the Kruskal Wallis test was run again, but this time with two groups (Group 1/ 2, Group 1/3 and Group 2/3) to determine which two groups have a difference. The hypothesis for both these steps are as follows:

PART A: Difference in means within all 3 groups

$$H_0: \mu_1 = \mu_2 = \mu_3$$

$$H_A: \mu_1 \neq \mu_2 \neq \mu_3$$

PART B: Difference in means pair wise comparison:

1) Hypothesis for Group 1 and Group 2:

$$H_0: \mu_1 = \mu_2$$

$$H_A: \mu_1 \neq \mu_2$$

2) Hypothesis for Group 1 and Group 3:

$$H_0: \mu_1 = \mu_3$$

$$H_A: \mu_1 \neq \mu_3$$

3) Hypothesis for Group 2 and Group 3:

$$H_0: \mu_2 = \mu_3$$

$$H_A: \mu_2 \neq \mu_3$$

The hypothesis stated above were tested by the Kruskal Wallis test and was rejected/ accepted based on the p-value derived by the Kruskal Wallis test. The condition used for rejection/ acceptance was as follows, where α is the significance level. So if the p-value for the Kruskal Wallis test was greater than the significance level, then the null hypothesis was accepted, signifying that there is no difference between the two groups. However, if the p-value was smaller, then the null hypothesis was rejected. A significance level of 5% was used for this study.

$$\text{if } p - \text{value} > \alpha, \text{reject } H_0$$

$$\text{if } p - \text{value} < \alpha, \text{do not reject } H_0$$

5.3 Results

In this section, a detailed analysis of the quantitative data is presented. It begins with analysing the responses for the Likert scale rating statements, with the motivators' statements analysed first, followed by the barriers statements. This section helped validate the findings from the previous two studies; it verified whether a broader audience also encountered the same barriers and motivators and also determined which of these factors played an important role in their decision making (answering RQ-3). Then, a detailed analysis of the Kruskal Wallis test results are reported.

5.3.1 Motivators to enter Higher Education

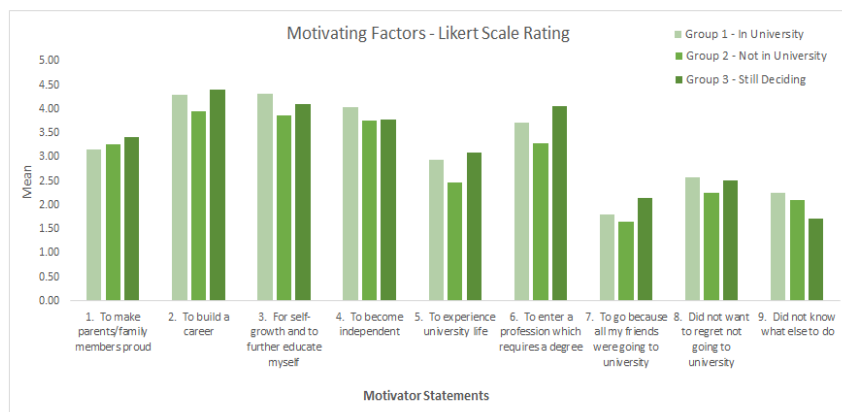


Figure 5.1 – Mean score of the 9 statements representing the motivators (1 = Not at all important and 5 = Extremely Important)

Please note that the sample size for the three groups was different. Group 1 had a sample size of N=133, Group 2 had N=51, whereas Group 3's sample size was N=82. As seen from Figure 5.1 above, the factor which was considered to be most important for those who went to university (Group 1) was to 'build a career (S2)' and 'for self-growth and to further educate myself (S3)', followed by 'to become independent (S4)' and 'to enter a professions which requires a degree (S6)'. Study 2 participants also stated that their reason to enter HE was to build a career and because it was required for their profession, with these reasons being the most frequently mentioned motivations. Although experiencing university life and to further educate were mentioned as motivations to enter HE by the Study 2 participants, it was not one of the most common reasons. Only 4 out of the 20 participants claimed this to be their motivation. However, a wider audience believes this to be an important factors which motivated them to enter HE. In addition it can be seen that those who are not in university (Group 2) also agreed that building a career, becoming independent and self-growth are important factors for them which could motivate them to go to university. Results of the frequency of the responses are included in Appendix C.5.

The next section includes an analysis of the statistical differences between the three groups. Table 5.2 below presents the Kruskal Wallis test results (p-values) for each of the nine statements. The null hypothesis is accepted if the p-value for the Kruskal Wallis test is greater than the significance level (5%). This meant that there is no difference in the means of the three groups. However, if the null hypothesis was rejected, then the test was run against two groups at a time to determine which groups are different. In Table 5.2, all the rejected null hypothesis, stating that there is a difference are shaded in red. Whereas the accepted null hypothesis are shaded in green. These results are also reflected against the qualitative results, to justify and analyse the findings further. Results from SPSS can be found in Appendix 4.

Motivators Statements	Group 1, 2 and 3	Group 1 and 3	Group 1 and 2	Group 2 and 3

		In uni / Still Deciding	In uni / Not in uni	Not in uni / Still Deciding
1. To make parents/family members proud	0.404 (Accept H_0)	---	---	---
2. To build a career	0.014 (Reject H_0)	0.777 (Accept H_0)	0.009 (Reject H_0)	0.007 (Reject H_0)
3. For self-growth and to further educate myself	0.001 (Reject H_0)	0.556 (Accept H_0)	0.000 (Reject H_0)	0.02 (Reject H_0)
4. To become independent	0.183 (Accept H_0)	---	---	---
5. To experience university life	0.03 (Reject H_0)	0.388 (Accept H_0)	0.031 (Reject H_0)	0.011 (Reject H_0)
6. To enter a profession which requires a degree	0.005 (Reject H_0)	0.046 (Reject H_0)	0.081 (Accept H_0)	0.001 (Reject H_0)
7. Because all my friends were going to university	0.004 (Reject H_0)	0.008 (Reject H_0)	0.404 (Accept H_0)	0.003 (Reject H_0)
8. Did not want to regret not going to university	0.268 (Accept H_0)	---	---	---
9. Did not know what else to do	0.005 (Reject H_0)	0.002 (Reject H_0)	0.563 (Accept H_0)	0.013 (Reject H_0)

Table 5.3 – Kruskal Wallis Test Results (p-values) for

There was no statistical difference in the means of S1, S4 and S8 - all three groups felt the same way about how important these factors are in influencing their decision to go to university. However, a similar pattern is seen in the Kruskal Wallis results for 'S2, S3, and S5', and in 'S6, S7 and S9'.

Statement 2, 3 and 5 – No difference in results of Group 1 (In university) and 3 (Still Deciding)

For these three statements, it could be seen that there is no statistical difference in the means of Group 1 (in uni) and Group 3 (still deciding) as they both feel the same way about these motivations to enter HE. Those who are still deciding seem to have the motivations to enter as those who are already in university. However, a statistical difference can be seen in 'Group 1 and 2' and 'Group 2 and 3'. Those who did not go to university (Group 2) do not agree with the motivations to enter HE, which is, going to university to build a career (S2), for self-growth (S3) or to experience university life (S5).

In the open ended questions, building a career was the most common answer given by respondents who had chosen to enter higher education, with 23 of the 60 mentioning it. Also, 10 of the 33 participants who were thinking of going to university but were still in the phase of deciding what they would want to do mentioned that going to university to build a career was what was motivating them to enter higher education. For example, P42 stated, "*I want a good career, a good job, earn good money [P42]*". It can clearly be seen from the responses that both the groups 1 (in university) and 3 (still deciding), those who are in university and those who are still deciding believe that by going to university will increase their chances of having better career, giving them better jobs where they earn more money. On the other hand, there were only 5

out of the 27 respondents mentioned that they would go to university if they knew that there was a definite job for them at the end of their course.

The qualitative analysis ties in with the quantitative analysis of the Kruskal Wallis test. There is no difference between those who are in university (Group 1) and those still deciding (Group 3) towards the factor of building a career. Both these groups, those who are in university and those still deciding believe that going to university will help build their career. However, Group 2, those who are not in university, feel differently about this factor. They are not confident that going to university will help build a career. Moreover, they mentioned that if they are confident that university will help them then they will go to university. As the Kruskal Wallis test results stated, Group 2 is different to Group 1 and 3 for this factor. Only Group 1 (in university) and 3 (still deciding) are similar.

Similarly, only Group 1 respondents, those who were in university, mentioned something related to self-growth and further educate themselves as being a motivation to go to university in the open ended question. This participant said, *"I suppose a desire to improve and better myself, it was an opportunity to make the most out of my life [P13]"*. There is however no difference between Group 1 and 3 towards the factor. Both these groups, those who are in university and those still deciding believe that going to university will help with self-growth and will further educate them. However, Group 2, those who are not in university, feel differently about this factor.

In addition, a Group 1 respondent also mentioned in the open-ended question that their motivation to go to university was to experience university life, stating, *"...for the general uni experience [P50]"*. Although there is no mention of going to university to experience the university life by Group 3 respondents, the statistical test determined that this group felt the same way about this motivator as Group 1, as there was no statistical difference in their means. However, Group 2, those who did not go to university, revealed that they felt differently, and that going to university for the experience would not be their motivation.

Statement 6, 7 and 9 - No difference in results of Group 1 (In University) and 2 (Not in University)

For these three statements, it could be seen that there is no statistical difference in the means of Group 1 (in uni) and Group 2 (not in uni) as they both feel the same way about these motivations to enter HE. The results revealed that those who are still deciding felt differently to these motivations, as compared to Group 1 and 2; a statistical difference can be seen in 'Group 1 and 3' and 'Group 2 and 3'. Those who are in university (Group 1) and those who are not in university (Group 2) agreed with the motivations to enter HE, which is, going to university because the profession requires a degree (S6), going because all the friends are going (S7), or going because they do not know what else to do (S9).

These results agree with the finding from the previous two studies (Chapter 3 and 4). Those studies also revealed that individuals are end up entering HE either because they are indecisive (as they do are not sure what to do), or because all their friends were going and they felt pressured to go to too, or because a degree was a recruitment for a profession they wanted to go into. Those who did not enter HE (study 1 participants), stated that a motivation for them to enter would be if the degree is the needed for a better job, or if they are influenced by their friends. However, those who are still deciding about HE have rated these motivators differently in affecting their decision to go to university. It can be assumed that those who are in

university and those who have decided not to go to university are aware of what profession they want to go into, which is why they can easily say that they needed a degree to enter that profession. They have the knowledge and are aware of the requirements for entering that profession. The ones who are still deciding however may not be sure of what they would like to do. As they are still deciding whether or not to enter university, they may still be deciding of what profession they want to get into, which career pathway to take. As they are still deciding they might not know what the requirements are, and may not be aware of the fact that for some professions you need to have a university degree. This could make them different from the other two groups in regards to this factor.

5.3.2 Barriers to enter Higher Education

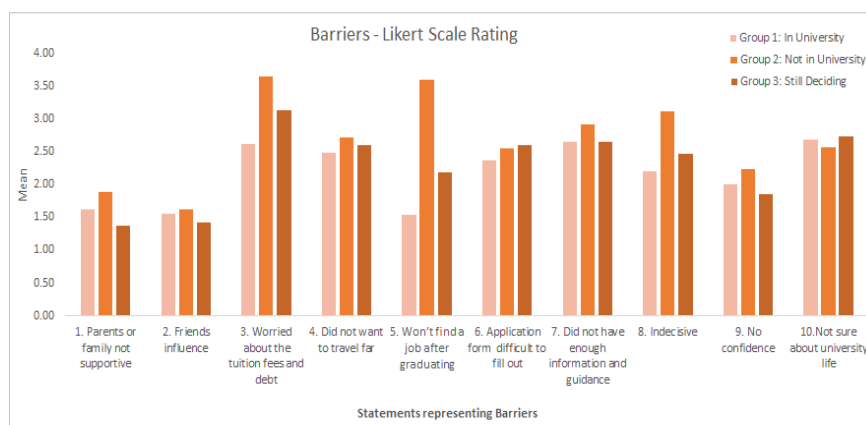


Figure 5.2 – Mean score of the 10 statements representing the barriers (1 = Strongly Disagree and 5 = Strongly Agree)

As seen from Figure 5.2 above, being concerned about the tuition fees and debt, and having the belief of not being able to find a job after graduating were the two factors considered to be the most important for individuals who did not enter HE (Group 2). These results validate the findings from Study 1 (covered in Section 3.3 - Code 1: Barriers), where half of the participants (5 out of 10), stated that being concerned about finance was their barriers to enter HE. The next most recurring barriers encountered by these participants was their attitude towards HE; they believed that a degree will not help them get a job as they have seen other graduates who cannot find a job. However, those who were in university (Group 1), did not think this was an important factor. The same trend is seen amongst Study 1 and 2 participants, whereas those who entered HE (Study 2) believe that a degree will help them get a job, whereas those who did not enter (Study 1) believed that university will not help in getting a job. As a wider audience across England also revealed the same, we can say that this helped in validating our findings. The next most important factor which impacted their decision was 'being indecisive' (statement 8). Although only one participant from Study 1 stated this reason to be a barrier, it can be seen that a wider audience agreed that this factor

was important in influencing their decision. They did not know what to do, therefore did not decide to enter HE. Results of the frequency of the responses are included in Appendix C.6.

The next section includes an analysis of the statistical differences between the three groups. Table 5.3 below presents the Kruskal Wallis test results (p-values) for each of the ten statements representing the barriers.

Barriers Statements	Group 1, 2 and 3	Group 1 and 3 In uni / Still Deciding	Group 1 and 2 In uni / Not in uni	Group 2 and 3 Not in uni / Still Deciding
1. My parents/family were not supportive of me going to university	0.001 (Reject H_0)	0.634 (Accept H_0)	0.003 (Reject H_0)	0.003 (Reject H_0)
2. My friends' influenced me against going to university because they were not going	0.000 (Reject H_0)	0.802 (Accept H_0)	0.000 (Reject H_0)	0.001 (Reject H_0)
3. I was worried about the tuition fees and being in debt	0.002 (Reject H_0)	0.095 (Accept H_0)	0.000 (Reject H_0)	0.085 (Accept H_0)
4. I did not want to travel far to go to university	0.778 (Accept H_0)	---	---	---
5. I was worried that I won't be able to find a job after graduating	0.000 (Reject H_0)	0.000 (Reject H_0)	0.000 (Reject H_0)	0.000 (Reject H_0)
6. The application form was difficult to fill out	0.379 (Accept H_0)	---	---	---
7. I did not have enough information and guidance on courses/universities	0.548 (Accept H_0)	---	---	---
8. I was not sure what course/university to take, so was indecisive whether I should go to university	0.000 (Reject H_0)	0.631 (Accept H_0)	0.000 (Reject H_0)	0.001 (Reject H_0)
9. I did not have enough confidence to go to university	0.122 (Accept H_0)	---	---	---
10. I was not sure what university life would be like	0.428 (Accept H_0)	---	---	---

Table 5.4 – Kruskal Wallis Test Results (p-values) for barriers

There was no statistical difference in the means of S4, S6, S7, S9 and S10 - all three groups felt the same way about how important these factors are in influencing their decision to not go to university. However, a pattern can be seen in the Kruskal Wallis results for S1, S2, S3 and S8, where there is no statistical difference in Group 1 and 3, but there is a statistics difference between Group 1 and 2. In addition, we also see that the means for all the groups were different for S5.

Statement 1, 2, 3 and 8 - No difference in results of Group 1 (In university) and 3 (Still Deciding)

The Kruskal Wallis test results revealed that individuals who are in university (Group 1) and those who are still deciding (Group 3) have no statistical difference for four statements; parents/family not being supportive (S1), friends influencing them to not go (S2), being worried about finance and debt (S3), and being indecisive (S8). Both these groups felt the same about these factors. However, those who did not go to university (Group 2), felt differently. We can assume that these are the barriers (or some barriers) which influenced the decision of Group 2 respondents to not enter HE.

From the mean scores (figure 5.2 above), we can determine that Group 1 and 3 respondents all four statements to be less important, as compared to Group 2's responses. For all four statements, Group 2 respondents had a higher mean score, reinstating that they agreed these factors played a role in their decision to enter higher education. For the first statement, S1, those were in university and those still deciding disagreed 'family not supportive'. It may be the case that they had family support, however those who did not go to university agreed with this statement. Similarly, S2, 'My friends' influenced me against going to university because they were not going' was not rated as an important factor in influencing an individual's decision to go to university for Group 1 and 3, whereas those who did not go to university agreed with this statement more. It can therefore be presumed that those who did not go to university (Group 2) could have been influenced by their friends, however those who are in university were not influenced. Which is what makes both these groups different. And those who are still deciding (Group 3) may be thinking that they do not have any friends negative influence either, which is why they are similar to those who are in university (Group 1).

Likewise, S3, 'I was worried about the tuition fees and being in debt' was agreed as being an important factor for those who did not go to university. 4 of the respondents from Group 2 even stated in the open-ended question that finance and money was a barrier which prevented them from going to university. Some of the responses included, *"it wouldn't be worth the debt [P102 – Not in uni]"* and *"fees and finance, being in debt [P96 – Not in uni]"*. None of the Group 1 and 3 respondents mentioned anything related with being worrying about finance or debt. However, , their open ended responses revealed that they had positive things to say when it came to money or finance, as it was their motivation to go to university. Both these groups mentioned that they can earn more money and have a good job after completing a degree. One of the Group 1 respondent said that want to go university to *"earn more money and get a respected job [P55 – in university]"*, and another Group 2 respondent said, *"I want a good career, a good job, earn good money [P92 - Still deciding]"*.

Lastly, being indecisive (S8) was another factor which individuals who were not in university rated to be important. One of the even mentioned in the open ended question that they will go to university if they know what course to do. As this factor was not rated as being that important by Group 1 and 3, it can be assumed that they are aware of what course they want to do, while individuals who do not enter (Group 2), are uncertain of what to do, therefore end up not going to university.

5.4 Moving Forward: Identifying the Problem to Address in this Research

From the analysis of this studies results, we were able to validate that a broader audience rated the same barriers and motivators to have an influence in their decision making as reported by Study 1 and 2 participants. This gave us more confidence in determining which factors are encountered by the individuals across England, preventing them from entering HE, and which factors play the role of a motivator, motivating these individuals to enter HE. Analysis of the online survey results for this study also enabled us to identify a trend between different individuals. By running a statistical test, Kruskal Wallis test, we were able to evaluate whether there was any statistically significant difference between individuals who entered HE (Group 1) and those who did not (Group 2). Conducting the test enabled us to identify whether there were any factors which were perceived differently by these groups Qualitative results from the previous two studies identified three factors which were perceived differently by the two groups, (i) attitude towards HE, (ii) influence from family and friends, and (iii) indecisiveness. Running the statistical test on this wider populations data not only verified that there is a statistical difference for these three factors, but also revealed five additional factors which had a statistically significant difference between those who went to university (Group 1) and those who did not go to university (Group 2). These factors could be the reason, or the tipping point, which lead a person to either end up in university or not. The 8 factors identified are outlined below, along with the theme they fall under (covered in Section 3.3 (barriers) and 4.3 (motivators)) presented in the brackets:

- **Motivators**

1. *Factor 2 - To build a career (Future career prospects/Jobs)*
2. *Factor 3 - For self-growth and to further educate myself (Self-growth)*
3. *Factor 5 - To experience university life (University Life)*

- **Barriers**

4. *Factor 1 - My parents/ family were not supportive of me going to university (Influence and Peer Pressure)*
5. *Factor 2 - My friends' influenced me against going to university because they were not going (Influence and Peer Pressure)*
6. *Factor 3 - I was worried about the tuition fees and being in debt (Finance/Money)*
7. *Factor 5 - I was worried that I won't be able to find a job after graduating (Future career prospects/Jobs)*
8. *Factor 8 - I was not sure what course/ university to take so was indecisive whether I should go to university (Indecisive)*

Each factor number represents their corresponding statement number in the survey. So, factor 2 for a motivator represents statement number 2 for the *motivators* statements.

The next step was to examine these factors further to see what projects/studies already exist to address these barriers and motivators. The three factors stated under motivators, factor 2, 3 and 5, were the motivations of some individuals to enter HE. As there was a difference in the attitudes and how they were

perceived by those who did not enter HE (revealed in the Kruskal Wallis test), these factors were not considered to be important for those who did not enter HE. We can therefore assume that these three factors act as barriers for those who do not enter HE.

The aim of this research was to use technology to facilitate individuals in overcoming the barriers to enter higher education. It was therefore ideal to do a literature review at this stage to search for the different kinds of technologies already present which help overcome these *barriers* identified or *reinforce* the three motivators, allowing other individuals to also be encouraged HE. This would help identify an opportunity where technology can be used to help individuals overcome the barriers to enter higher education, contributing in identifying and filling a gap in this area. The next section presents this literature review.

5.5 Technologies used to overcome the Barriers Reported

A literature review was done for each of the 8 factors identified which have a statistically significant difference, to see what technologies are already being used to address them. 'Technologies' refer to any kind of computing such as software, applications, smartphone apps, websites, social media, virtual/augmented reality etc. Details of the kinds of technologies searched for are outlined in this section below. To conduct the literature review, a search was done on the ACM Digital Library, IEEE Xplore, Google Scholar, Springer Link (to search for papers published in the Persuasive Technology conference from 2006 to 2018) and Google. For each of the factors, a number of searches were carried out with different search criteria's and keywords related to the factor to gather as much information as possible. Specific sites aimed to help students from around the world research degree courses, universities, career prospects and higher education related advice and guidance were also looked at to see how they address these factors. These sites include: UCAS, Which?University, TheCompleteUniversityGuide, and Whatuni. Various outreach activities run by the Widening Participation teams were also looked at.

The search results for the factors returned several projects and researches focusing on a variety of technologies (ranging from app, websites to social media posts) and persuasion techniques. From the search results returned, the papers/projects which had keywords related to any kind of technology (e.g. app, toolkit, website) were looked at. The abstract or summary for these papers/projects were read to determine whether they address the factor that is being looked at, whether it helps reinforce the motivator (if the factor is a motivator), or whether it helps overcome the barriers (if the factor is a barrier). Furthermore, there were specific searches done in regard to the kind of technologies that were being used. For each factor, a search was done to see if there are any projects/researches which use any one of the following kinds of technologies outlined in the Table 5.4 below:

Technology Type	Description	Examples
1. <i>Smart or Interactive Devices</i>	An electronic device that provides multimedia information and is generally connected to other devices or networks via	SMART interactive Whiteboard (<i>Rapid, 2017</i>)

	different wireless protocols such as Bluetooth, 3G, Wi-Fi etc.	
2. Mobile Technology	Is the technology used for cellular communication. A standard mobile phone now has been embedded with web browsers, instant messaging and also used as a GPS navigation device.	Apple smartphone
3. Tangible Technology	These are tangible objects that are interfaced with computers.	Wireless Blood pressure Monitor (Topbloodpressuremonitor, 2017).
4. Display Technology	Is an output device for presentation of information in visual or tactile form.	Interactive outdoor Kiosk
5. Ambient Technology	Refer to electronic environments that are sensitive and responsive to the presence of people.	Home appliances which can be controlled remotely by a cell phone
6. Wearable Technology	These are clothing and accessories incorporating computer and advanced electronic technologies. They are also known as fashion technology, wearable devices or fashion electronics.	Apple Watch
7. Social Media	Are computer-mediated tools that allow people to create, share, or exchange information, ideas and pictures/videos in virtual communities and networks.	Facebook, Twitter, Snapchat etc.
8. Web Technology	Are means by which computers communicate with each other using markup languages and multimedia packages. It allows us to interact with host information – like websites.	Any website which uses HTML (hypertext markup language) and CSS (Cascading Style Sheets). E.g. www.google.co.uk
9. Virtual Reality (VR) Headsets/Glasses	Virtual reality are computer generated environments which can be explored and interacted with by a user. This user becomes part of this 'virtual' world and is able to manipulate objects or perform various actions. A headset or glasses are worn by the user to see this immersive virtual world and interact with it.	Samsung Gear (Controller, 2017)
10. Augmented Reality (AR)	An interactive experience of a real-world environment whose elements are 'augmented' by computer generated perceptual information.	Snapchat allowing users to create virtual selfie masks

Table 5.5 – Kinds of technologies identified in the literature

In addition to the technology types listed in the table above, it was also searched if there was any use of 'social actors' or 'avatars' to help reinforce or overcome the factors. A social actor is one of the functional triads of persuasive technology. BJ Fogg's seminal works describes that computers can behave as tools,

mediums, or social actors to persuade users. Therefore it was mandatory to cover in this literature review whether social actors have been used by any of the projects/researches. This is included as an additional technology type. The remaining two functional triads, tools and medium, are already covered in the technology types outlined in the table above; Virtual Reality and Social Media are a form of medium, whereas web, mobile, smart, display and wearable can all be a form of a tool as they increase the capability of a user to perform a task.

The last step to complete the literature review was analyse whether the technologies used within the various projects/technologies returned in the search results were persuasive or not. If it was not stated that they were a 'persuasive technology', then these technologies were evaluated to see if they were designed using the persuasive design principles. The technologies were evaluated against, (i) PSD (Persuasive System Design) (Oinas-Kukkonen, 2010), (ii) persuasive strategies reported by Ran Cheng (Cheng, 2013), BJ Fogg (Fogg, 2002) and Robert Cialdini's Seven Principles of Influence (Cialdini & Goldstein, 2002). If the technologies did have any elements from the persuasive principles and strategies, then they can be called a *persuasive technology*.

For the purpose of this literature review, factors 1 and 7 were grouped together as they both relate to the theme 'Future career prospects/Jobs'. In the next section, each factor is analysed in detail. The section for each factor begins with a table giving an overview of what technology type is being used for the existing projects/researches returned. Then, an analysis of the most popular technology types and design principles used for that factor are detailed. In the end, a conclusion of whether there are any new opportunities rising which can be taken advantage or a gap identified, is presented.

Details of the project/researches returned for each factor along with an analysis of the persuasive design principles incorporated with each project (if present) are included in Appendix C.7. A summary of the type of technologies used for each of the 8 factors is presented in the Table 5.5 below. As seen from the table, use of social media and websites (including online forums) was most popular to address these factors.

		Technology Type														
		Smart	Email	Mobile (Apps/Texts)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality/ 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor	Total Reviewed
Future Career Prospects/Jobs	1. To build a career															
	7. I was worried that I won't be able to find a job after graduating		•	•					•	•	•			•	•	10

Self-Growth	2. For self-growth and to further educate myself								•	•	•						4
University Life	3. To experience university life			•					•	•	•	•	•				20
Influence and Peer Pressure	4. My parents/ family were not supportive of me going to university 5. My friends' influenced me against going to university because they were not going		•						•	•	•						8
Finance/Money	6. I was worried about the tuition fees and being in debt		•						•	•	•						5
Indecisive	8. I was not sure what course/ university to take so was indecisive whether I should go to university		•	•					•	•	•	•		•	•		19
Total			4	3					6	6	6	2	1	2	2		

Table 5.6 – Overview of the Technologies used to Overcome the Barriers

The next section covers a detailed review of the technologies used to address each of the factors.

Theme: Future Career Prospects/Jobs

Technologies used to help reinforce how HE can help with careers and finding jobs

Factor 1: 'To build a career' and Factor 7: 'I was worried that I won't be able to find a job after graduating'

		Technology Type													
		Smart	Email	Mobile (Apps/Texts)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality	Augmented Reality (AR)	Game	Virtual Social Actor
Project/Study No.	1			•											
	2								•	•					
	3									•					
	4									•				•	•
	5									•	•				
	6	•							•	•					

[illegible]

To search for technologies already present which help individuals see how higher education can help them grow as a person, become independent and confident, a search was done using combinations of keywords ranging from higher education, self-growth, independent, further study, widening participation, university, confidence, technology, persuasive technology, technology in Widening Participation, websites, links, mobile apps, social actor, e-mentor, social agent, e-mentor avatar, persuasive avatar, virtual assistant, virtual mentor, anthropomorphic mentor, social media, virtual reality, augmented reality.

Theme: *University Life* - Technologies Used to help reinforce/show 'University Life'

		Technology Type													
		Smart	Email	Mobile (Apps/Texts)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality/ 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor
Project/ Study No.	1			•								•			
	2			•									•		
	3			•									•		
	4								•						
	5			•								•	•		
	6								•						
	7								•						
	8									•		•			
	9								•						

theme to show users how current university students are doing and how they are enjoying their university life. Details of the projects, along with a description of the design principles incorporated can be found in Appendix C.7.

Theme: Influence and Peer Pressure (Family and Friends)

Technologies used to help overcome ‘negative influence from family and friends’

Factor 4: ‘My parents/ family were not supportive of me going to university’ and Factor 5: ‘My friends’ influenced me against going to university because they were not going’

Project/ Study No	Technology Type													
	Smart	Email	Mobile (Apps/Texts)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality / 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor
	1	•						•	•	•				
	2								•					
	3	•						•	•					
	4							•	•					
	5								•					
	6								•					
	7	•							•					
	8									•				
Total	3							3	7	2				

Table 5.10 – Overview of the technologies used to address theme – Influence (family)

This theme focuses on the negative influence of family and friends in regards to HE. Family, friends and peer pressure plays a vital role when it comes to making decisions, thus some individuals choose not to enter HE because of the influence, they are forced to think that HE is not a good option for them. A search was done on the different online libraries to look for any technologies present which help overcome this negative influence, or which help change an individual’s family and friends negative attitude towards HE; so that they see that HE can be a good option. The search criteria used combinations of keywords ranging from: influence, peer pressure, normative influence, parental pressure, family influence, friends’ influence, positive peer support, negative peer influence, social influence, norm, discourage, attitude, technology, higher education, university, persuasive technology, technology in Widening Participation, websites, links, mobile apps, social actor, e-mentor, social agent, e-mentor avatar, persuasive avatar, virtual assistant,

virtual mentor, anthropomorphic mentor, social media, virtual reality, and augmented reality. From the search results returned, the papers or projects which had keywords related to any kind of technology, (e.g. app, toolkit, website) and any words related to 'influence', 'peer pressure', or 'norm' were looked at. None of the search results returned stated that they used any kind of 'persuasive technology'.

The search results returned a limited number of projects and websites which were targeted towards an individual's families to help them see the benefits of HE so that they change their attitude. After analysis of the results, it was evident that all the technologies were focusing on mitigating parental influence. Only one of project, number 8, was used to address the influence from friends. The Student Room, an online forum helped prospective students to contact other students to seek advice. Speaking to other students or peers who are similar aided in overcoming the negative influence of friends. The most common design principle incorporated in these technologies was *Social Proof*, to show parents how university has benefited others, and *Reduction* and *Tunnelling*, to make the usability of the site better, showing parents specific information related to HE.

Theme: Finance/Money -Technologies Used to help overcome the fear of 'tuition fees and being in debt'

Factor 6: 'I was worried about tuition fees and being in debt'

		Technology Type													
		Smart	Email	Mobile (Apps/Texts)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality / 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor
Project/ Study/ Website	1										•				
	2		•						•	•					
	3		•						•	•	•				
	4		•						•	•					
	5									•					
	Total		3						3	4	2				

Table 5.11 – Overview of the technologies used to address theme – Finance/Money

This theme relates to individuals thinking about the finance and money if they go to university. They are worried about the tuition fees, and being in debt once they complete their degree. Some individuals end up deciding not to enter higher education because they do not want to end up being in debt. They would rather start working to earn money and make their way up rather than go to university. They do not have enough information and guidance on how the existing student finance system and repaying of the loan works, which is why they think that they will be not be able to afford it. They need to be told that they do not need to pay the loan if they are not earning a certain amount, and if they are then how much will they be paying back per year.

To search for technologies already present which help give individuals information on how the student can pay their tuition fees and how the student finance works, a search was done on various libraries. The outreach projects carried out by the Widening Participation teams and the specific higher education related sites (UCAS, Which?University, WhatUni) were also looked at to see what they are doing currently to give individuals finance related help and guidance. The search criteria used combinations of keywords ranging from: finance, student loan, worried about being in debt, higher education, university, tuition fees, repay fees, technology, university, persuasive technology, technology in Widening Participation, websites, links, mobile apps, social actor, e-mentor, social agent, e-mentor avatar, persuasive avatar, virtual assistant, virtual mentor, anthropomorphic mentor, social media, virtual reality, and augmented reality.

The search results returned several outreach projects and websites which give individuals or prospective students information about everything they need to know about student finance and paying their tuition fees. From the search results returned, the papers or projects which had keywords related to any kind of technology, (e.g. app, toolkit, website) were looked at. Majority of the results returned the use of 'websites' to give information and advice on student finance related topics. None of the search results returned stated that they used any kind of 'persuasive technology'. Although after assessing the technologies used in the projects, most of the projects used persuasive technology to address the students and parents. The most popular persuasive design principle used was '*Tunnelling*', where users are guided through a process of applying for student loan.

Theme: *Indecisive* - Technologies Used to help overcome the barrier of 'being indecisive'

Factor 8: 'I was not sure what course/university to take so was indecisive whether I should go to university'

		Technology Type													
		Smart	Email	Mobile (Apps)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality / 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor
Project/ Study/ Website	1			•											•
	2									•					•
	3			•											
	4			•											
	5										•				
	6									•					
	7		•							•					
	8								•	•					
	9									•					
	10		•												
Total		2	3					1	5	1					2

Table 5.12 – Overview of the technologies used to address theme – Indecisive (about

This theme relates to not having enough information to be able to decide what the right course or career pathway for them is, hence ending up not going into higher education because of their indecisiveness. They are unable to make an informed decision about their future because of lack of knowledge, advice and guidance. For this literature review, this factor was broken down into two categories; indecisive about course/university, and indecisive about future career.

To search for existing technologies which help individuals see what course and university options are available for them to choose from (based on their current qualifications etc.), a search was done on the digital libraries, outreach projects carried out by the Widening Participation teams and the specific higher education related sites (UCAS, Which?University, WhatUni), to see what they are doing currently to give individuals enough information so that they are able to make an informed decision about their university choice. The search criteria used combinations of keywords ranging from: university, course, indecisive, not sure what course to do, not sure what university to go to, course awareness, higher education, technology, persuasive technology, technology in Widening Participation, websites, links, mobile apps, social actor, e-mentor, social agent, e-mentor avatar, persuasive avatar, virtual assistant, virtual mentor, anthropomorphic mentor, social media, virtual reality, games and augmented reality.

As seen in table 5.11 above, the search results returned 10 outreach projects, which used websites and apps to give individuals or prospective students information about everything they need to know about deciding what course they should go for. One of the apps even has a 'virtual assistant' where the user can chat with a virtual robot about the different course options available to them (Project 1, explained in detail in Appendix 5). For the second category, to search for technologies already present which help individuals see what career pathways they can go for based on their interests and skills, and what job prospects they have if they take a certain path, a search was done on the same libraries and higher education related sites (mentioned above in the first category). The search criteria used combinations of keywords ranging from: career pathway, indecisive, not sure what to do, career building, career decision making, career awareness, career learning, higher education, vocational interests, university, technology, persuasive technology, technology in Widening Participation, websites, links, mobile apps, social actor, e-mentor, social agent, e-mentor avatar, persuasive avatar, virtual assistant, virtual mentor, anthropomorphic mentor, social media, virtual reality, games and augmented reality.

The search results returned 16 projects, outline in Table 5.12 below. Several of them included career and personality quizzes which individuals could take online. Based on their answers, the quiz analyses their personality type, interests, and skill set, and recommends the users with career options that will suit their personality type. None of the search results returned stated that they used any kind of 'persuasive technology', however, a number of design principles including *Reduction*, *Tunnelling*, *Personalising* and *Tailoring* were incorporated to help give users enough information.

Technology Type

Table 5.13 – Overview of the technologies used to address theme – Indecisive (about future career)

Project/ Study/ Website	Smart	Email	Mobile (Apps)	Tangible	Display	Ambient	Wearable	Social Media	Web	Online Forum	Virtual Reality / 360 Video	Augmented Reality (AR)	Game	Virtual Social Actor
1									•					
2									•				•	•
3								•	•					
4		•						•	•	•				
5								•	•					
6								•	•					
7									•					
8									•				•	•
9									•					
10								•	•					
11			•											
12													•	
13									•					
14									•					
15									•	•				
16									•					
Total		1	1					5	14	2			3	2

5.6 Discussion and Conclusion – Research Gap

After completing the literature review of the factors in regards to the technologies that have been used to overcome barriers and reinforce motivators, it was evident that not much work has been done (with the use of technology) for *Factor 5 - My friends' influenced me against going to university because they were not going' - Theme: Influence and Peer Pressure* - to remove the negative role friends' play in influencing an individual's decision to enter higher education. The previous literature and technologies found were focused on removing the negative influence of '*family*' but not '*friends*'. A lot of the websites have a separate section for parents which is tailored to give them insights about their child's future prospects and university related material. For example, UCAS offers a range of resources and information for parents/guardians, giving them information so that they support the students applying to university. Similarly, Which?University sends parents email reminders and notifications to help support their child to enter HE. Social media is also used by some of the universities allowing an individual's parents/guardians to be able to contact an advisor regarding any queries regarding HE. A survey of Student Attitudes, Experiences and Expectations (Round, 2005) as well as a study conducted by DfEE (Connor, Tyers, Modood and Hillage, 2004) concluded that 'family influence' plays a vital role when making a decision to enter higher education. This may be the reason why UCAS, universities and other HE bodies aim to target parents, giving them higher education related information, so that they are able to influence their child to consider HE as an option for them. No such attempt has been made to focus on or study how friends can influence each other in term of deciding about HE. This study, however, found that friends can be more influential than family when making the decision to enter HE.

In terms of helping overcome friend's negative influence for entering HE, the only technology found was an online forum (The Student Room) where individuals could contact other students and post queries and concerns related to HE. Since they are interacting with students amongst their peer group, individuals feel more encouraged and trust their judgement. Peer feedback has been used in apps and social media to help reduce negative influence and pressure so that individuals can achieve their specified targets, however these are applied in different domains (such as health and fitness). For example, PeerPressure for Goals app helps an individual achieve their goals with a little help from their peers. It will allow individuals to get motivation from the people who matter most to them (Facebook and Twitter friends). Despite various apps, websites and social media campaigns present to promote positive peer pressure to help achieve your goal, none of them have been used in the education sector (outside a classroom environment) to encourage considering HE.

Therefore, my contribution will be to design a technology which helps overcome the negative influence and peer pressure from friends so that they are able to make an informed decision about higher education. The design of this technology is covered in detail in the next chapter – Chapter 6: Design of the Persuasive Technology.

Chapter 6: Design of the Persuasive Technology: Interactive Storytelling Game

After determining that friends' influence plays a vital role for some individuals when it comes to deciding about higher education, an interactive storytelling game, *My Next Step*, was developed as a persuasive technology to facilitate individuals in changing their behaviour, so that they are able to mitigate their friends' influence and make an informed decision about their future. This chapter presents the design and development of this persuasive game. It begins by defining why Design Thinking was used as an approach to systematically design the persuasive technology. In addition, it covers how a combination of the Behaviour Wizard and PSD model were incorporated to inform the design of the game (which led in making a contribution - C2), how the design principles were applied, and how the game works.

6.1 Motivation and Research Questions

Findings from Studies 1, 2 and 3 undertaken in this research identified that whilst *friends' influence* acted as a barrier to enter higher education for some individuals, it acted as a motivator to enter higher education for others. These individuals were highly influenced by their friends, hence, they ended up following them

and not making an informed decision for their future. A literature review revealed that existing work which addresses this topic of overcoming the influence from friends when making a decision about higher education is limited. Although some existing work does aim to overcome influence with the use of technology, however, it is focused on removing the negative influence of 'family', not 'friends'. A lot of this work covers universities and widening participating teams using websites and social media pages (which are dedicated to parents only) to give parents additional university related information and insights about their child's future prospects. No such attempt however is made to overcome the negative influence of friends.

In this chapter, I aimed to explore this opportunity - where technology could be used to facilitate in mitigating friends' influence, so that individuals could make an informed decision about their future and not just follow friends (peers) blindly. To achieve this goal, the technology was designed to change the behaviour of the individuals, so that they are less susceptible to peer pressure. As persuasion was essential to change these individuals behaviour (as that would imply a voluntary change), it was ideal to design a persuasive technology. This chapter aimed to answer the fifth research question:

RQ-4: How can a persuasive technology be designed to mitigate peer pressure from friends when making the decision to enter higher education?

As this research was more of a high level question, it was broken down into two smaller and more specific ones:

RQ-4.1: Which target behaviours and attitudes need to be addressed when designing a persuasive technology which overcomes the negative influence from friends?

RQ-4.2: Which persuasive model can be implemented to support the design of the persuasive technology?

In this chapter, two contributions are made in the field of HCI. The first involves how a novel approach was used to support individuals in mitigating peer pressure from friends, using an interactive storytelling game as a persuasive technology (C1). Secondly, an artefact contribution made addressed a new method of designing the persuasive technology. This included how two models, the Behaviour Wizard and the PSD model, were combined to inform the design of the persuasive game (C2). In addition, persuasive design principles identified by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013) and Cialdini (Cialdini & Goldstein, 2002) were also looked at to incorporate within the game (if applicable).

In the next section, how the persuasive technology was designed and developed is covered. A human centred design methodology, 'Design Thinking', was used an approach to design the persuasive technology. This framework consists of five steps: Empathy, Define, Ideate, Prototype and Test. The second phase of the Design Thinking process, *Define* (Section 6.2.4), answer research questions RQ-4.1 and RQ-4.2, detailing how the persuasive model and design principles were applied in the persuasive game to address the target behaviours defined. The final stage of this framework, *Test*, is covered in the next

chapter (Chapter 7), as this involved undertaking a study to test the effectiveness of the persuasive game developed.

6.2 Approach to Design the Persuasive Technology – Design Thinking

6.2.1 Overview

“Design Thinking or Service Design Thinking is a human-centred design methodology that uses intuitive problem-solving techniques to match peoples’ needs with what is technologically feasible and organizationally viable” (Brown & Wyatt, 2010). It is typically applied when there is a lack of recognizable requirements and solutions. This methodology tackles this lack of recognizable requirements by understanding the human needs involved, re-framing the problem, creating several ideas in brainstorming and by adopting a hands-on approach in prototyping and testing.

Design thinking has been developed further by The Hasso Plattner Institute of Design at Stanford (Stanford D.School, 2010). The institute offered a framework with five stages of overlapping and inter-related activities of design thinking: Empathise, Define, Ideate, Prototype and Test.

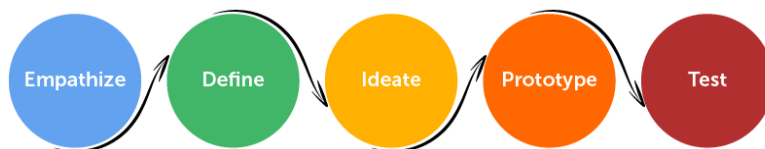


Figure 6.1: Design Thinking Process - Image Source: (Michelle, 2018)

Empathise is learning more about the users for whom you are designing the technology. Insights from empathise stage help *Define* the requirements. Then you *Ideate*, i.e. brainstorm and come up with different and creative design solution ideas. A representation of one or more of these ideas are then built in the *Prototype* stage. And finally you return to your users and *Test* the prototype for feedback. These stages are created to allow the researcher/designer to have a more structured plan for understanding the problem and designing a solution for it (having the users in mind). The five stages are not always sequential. They do not follow any specific order and can often occur in parallel and repeat iteratively. However, for this research, these five stages were followed in a sequential order. Neither did I iterate any stage due to the time and scope of this research.

Each stage of the Design Thinking approach is explained in detail in the next sections.

6.2.2 Why Design Thinking?

Design thinking (Plattner, et al., 2009) has been commonly used in the process of designing a persuasive technology. In a study conducted by Doney and Fabri (Doney & Fabri, 2015), the researchers used a design thinking approach to develop a persuasive technology to support weight management. To empathise with the users, they ran four insight gathering workshops and understood who their users were, and what attitudes/behaviours they were hoping to change with the use of the technology. This helped them define their problem. Next, they ran a brainstorming workshop with professional to generate ideas. Each idea was aimed to use a different design principle from the Persuasive Systems Design (PSD) model (Oinas-Kukkonen & Harjumaa, 2009).

Design thinking was also used in a study which looked at designing a persuasive technology to increase working health conditions by ideating a wearable system to prevent respiratory disease (Venere, Mila & Silvia, 2017). The study empathised with the users by conducting interviews and observing the users at their work place. They worked with three chosen companies, and involved ten workers for both the observation and interviews. Results from the empathise stage helped the researchers frame or define the problem, and outlined four requirements for the persuasive technology. To generate the different ideas for the persuasive technology, the paper investigated how Fogg's Behaviour Model (FBM) can be used to change the behaviour of users. It discussed which element from the FBM, whether it was the Motivator, Trigger or Ability was lacking, causing the target behaviour (of wearing the protective equipment) to not occur. The ideation stage then covered how the element of 'motivation' can be addressed within the proposed technology to get the workers to wear the equipment.

Fogg has also developed an 8-step approach to follow in the early-stage of persuasive technology design (Fogg, 2009). His paper outlines the following steps: 1- Choose a simple target behaviour, 2- Choose a receptive audience, 3- Find what is preventing the behaviour, 4- Choose an appropriate technology channel, 5- Find relevant examples of persuasive technology, 6- Imitate successful examples, 7- Test and iterate quickly, and 8- Expand on success.

Although this approach is easy to follow, it can be argued that it is too simple. His steps give more of a high-level view of the problem that is being tackled and do not allow researchers to go into depth of the target users, design principles and motivational elements needed to design the technology.

Various other studies which involve design of persuasive technologies have not reported the approach they used to design the persuasive technology. Design of the Fit4Life persuasive technology to promote healthy behaviour and ideal weight (Purpura, Schwanda, Williams, Stubler & Sengers, 2011) addressed the design of the persuasive technology by first reading the literature on what weight loss programs are already present and why they lack effectiveness. The researchers then used the Persuasive Systems Design (PSD) framework to justify which design principles will help build their persuasive technology solution. A study conducted by Törning (Törning, 2008), used a new perspective on persuasive technology design. The researcher showed how a rhetorical approach should be used for framing the context of persuasion before actually designing the persuasive technology. Again, this study does not use any approach to design the technology, instead using an approach to understand the context of persuasion prior to the design.

As Design Thinking has already been used to structure the design of a persuasive technology, and seemed to be the most well-suited for structuring the design process (in this context), this research followed the same approach and iterated through the five stages to design a persuasive technology which will help mitigate peer pressure amongst young adults. Firstly, a literature review was done to Empathise with the users. Other studies were looked at to understand what the user's behaviours are in terms of use of technology, how likely they are to be influenced by peer pressure, and how they are different compared to other generations. The literature review results were then used to validate the findings from the three studies conducted for this research, to compare whether the participants from the study also behaved in the same manner as reported in previous studies. By learning more about the target audience helped *Define* the users' needs, their problems and what requirements need to be met by the persuasive technology. Next, ideas for solutions to help address the target behaviour will be discussed in the Ideate phase. One of the idea was then used to create a *Prototype* solution, which was *Tested* with the target users to see if it is effective in mitigating peer pressure from friends.

The next section explains how the Design Thinking approach was used in this research to design the persuasive technology.

6.2.3 Phase 1: Empathise

The first stage of Design Thinking is *Empathise*, to gain an empathic understanding of the problem that is to be solved. This stage allows the researcher to find out more about their target audience, their behaviours and the problem they are facing. This can be done through observations, consulting experts, engaging, empathising and interviewing the target users to better understand their experiences and motivations, as well as running workshops with the users to have a deeper comprehension of everything that is involved with the problem. This allows the designers to set aside their assumptions about the users and understand their needs.

Due to the limited scope and time frame of this research, insight into the users and their behaviours was gathered through a literature review, along with the results from the three studies conducted. The target audience for this research were mid-adolescents, aged 16-18 years, as this is the time when most individuals start thinking about higher education and make a decision. Results from the previous three studies undertaken in this research revealed that some individuals were influenced to enter higher education by their friends (even though they did not want to), however there were some who were influenced to not enter (even though they wanted to). This proved that friends' influence played a major role for some, they ended up following their friends and did not make an informed decisions about their future. It must be noted that although the participants recruited for the three previous studies were aged 18-21, these participants must be around 16-18 years of age when they encountered these factors which influenced their decision. By the time they were recruited for the study, they had already made the decision to fall or not fall for peer pressure from friends.

Analysing prior work conducted on this target group confirmed the findings from these studies – mid-adolescents develop an increased interest in their peers and are highly influenced by them. A summary of the findings of how peer pressure played a role on Study 1, 2 and 3 participants is covered in the next section (6.2.3.1), followed by an analysis of some prior studies which justify these findings (section 6.2.3.2). After this, an analysis of the kinds of technologies this target group uses was covered (section 6.2.3.3), to inform the design of the persuasive technology. This helped identify why a persuasive game was developed (over any other technology) to facilitate in behaviour change.

6.2.3.1 Role of Peer Pressure on Study 1, 2 and 3 Participants

After analysing the results from the three studies, it was evident that peer pressure played a vital role in the decision regarding entering higher education for some of the participants. Some participants went to university because all their friends were going, while some decided not to go because their friends decided to not go. The role that peer pressure played on these participants conforms to the results stated in other studies (detailed in the previous section) – participants were highly influenced by their peers.

Three of the Study 1 participants (those who did not go to university) stated that they were negatively influenced by their friends. 2 of them actually took an initiative, either to drop out or to take a gap year because their friends were doing the same. When asked if their friends' influenced their decision, they said, *"Yes definitely! So like when I was at the end of my A levels I was really considering to drop out, and they were the reason...They all just wanted to start earning money straightaway [P3]"*, and *"I had to take a gap year because all my friends told me uni is a waste of time...I wasted the whole year [P8]"*.

This trait of following friends in order to feel accepted within the group, and giving their opinions more importance is common in the mid adolescent stage. There have been numerous studies which confirm this as well, as explained in section 6.2.1.2 above. Although the participants were 18 -21 years old when they took part in the study, they were however in their mid-adolescent age when they made this decision. They made decisions about their future with their friends, mostly following what their friends were doing, either to go to university or not to.

Some of the participants also claimed to have a negative attitude towards higher education as they did not see any point in entering it, however, a few of the things they mentioned in their interview revealed a different insight. One of the participant stated that she feels insecure when she meets her friends because majority of her friends were going to university. She mentioned that she does not want to feel left out, so is considering higher education. She said, *"Because every time we get together now for dinner, they are always talking about university and I do feel left out sometimes...I can see the amazing opportunities they have now which I don't [P4]"*. This clearly indicates that they can easily be influenced and will make decisions just so they do not feel left out. For Study 2 participants (those who went to university), 'friends' influence' was second most frequently spoken about by the participants when asked about any constraints faced when making the decision to enter higher education. 2 of the 20 participants mentioned that their friends had a very negative attitude towards higher education, they said there is no point going to university.

This influence did have a negative impact on the participant too and discouraged them from making the decision of entering higher education.

On the other hand, 6 out of the 20 Study 2 participants were influenced to go to university because their friends were going. If their friends had not influenced/forced them to go to university, then they would not have gone. Examples of the comments a few of them made included, "...if they hadn't gone to uni I wouldn't have seen it as a you have to go kind of thing [P2a]", "I don't think I would have gone on my own. If you have your friends then it motivates you more [P10a]", "...my friends were an influence because they were going to uni. Every single one of them went to uni [P7a]", and "We all weren't sure of what to do, so we decided to give uni a go... my friends said that we can dropout if we didn't like it [P16b]".

6.2.3.2 Peer pressure (Previous Studies)

All the studies and research articles read for this literature review, indicated that mid-teens develop an increased interest in their peers and are highly influenced by them. As concluded in Steinberg and Monahan's research, there is a lower resistance to peer influence among adolescents than adults (Steinberg & Monahan, 2007). The decisions and opinions of their friends matter a lot, and they even give them more importance than their family (especially parents). Kimberly stated in her study (Kimberly, 2002) middle adolescents prefer their friends to family. There is also an increase in risk taking. This was further proven in a study conducted (Albert, Chein, & Steinberg, 2013), where the researchers found that adolescents are motivated to take part in a risky behaviour in the presence of their peers. If they were alone then they are less likely to take part in that behaviour.

According to the Peer Pressure Survey by Survelum Public Bank (Survelum, 2010), only 10% of those surveyed about peer pressure say that they have never been influenced by peer pressure, and 40% of these young people said that peer pressure distracts a person from reaching his/her goals. 28% of them also said that giving into peer pressure helps them move up the social ladder. These young people stated that their peers have influenced them both positively and negatively.

In addition, Oregon government published the stages of healthy adolescent development (Oregon, 2009), where they broke down the adolescent stages into early (10-14 years), mid (15-17 years) and late (18-21 years). Each stage has its own set of development characteristics. Here they stated that a middle adolescent will develop strong peer allegiances, whereas the late adolescent decisions and values will be less influenced by peers. Middle adolescents will also conflict with more with family. Two more studies, (World Health Organisation, 2010) and (need to add) that the mid-adolescents have intense peer group involvement and as they have such strong peer friendships, peer groups are most important and determine their behaviour. Peer groups and interaction with peers are a fundamental part of young peoples' lives and are important for their cognitive, social and emotional development (Bagwell, Coie, Terry, & Lochman, 2000). Furthermore, adolescents' social development is significantly influenced by peers' relations (Tsitsika, et al., 2014), which today are often mediated through social networking sites.

Findings from the three studies conducted for this research conforms to the results of previous studies reported. As Monahan's research reported, there is a lower resistance to peer influence among adolescents

than adults (Steinberg & Monahan, 2007). The decisions and opinions of their friends matter a lot, and they even give them more importance than their family (Kimberly, 2002). We saw the same traits in some of the participants recruited for the three studies. Social influence by peers plays a vital role in an individual's lives; they sometimes tend to make decisions to be socially accepted.

6.2.3.3 Use of technology

Deloitte Mobile Consumer Survey (Deloitte Survey, 2018) data revealed that smartphone ownership in the UK continues to increase, with 87% of respondents claiming to own or have access to one. This includes 66% of UK adults and a vast majority (90%) of 16-24 years old. The users see their smartphone as 'the most important device for going online' and on average are using it for nearly two hours or more every day. Ownership of tablets and e-readers have fallen by 4% (Deloitte Survey, 2018). The Telegraph (2018) reported that younger generation (those aged 15-24) on average check their phones every 8.6 minutes, more frequently than any other age group. There was a growing trend in using social networking sites for these young individuals. They stated their motivations for using social networking sites to stay in touch with friends, make plans and get to know people better (Shapiro & Margolin, 2014).

Another trend seen within the adolescents was their growing reliance on smartphones to play games and watch films and TV programmes. 42% of people young people in UK say they watch short videos from services including YouTube and Instagram videos on their phone (EPI, 2017), whereas statistics of gaming in UK (Statista 2017) revealed that in 2017, 41% of young individuals (aged 16-24) used their smartphones to play games. A report by the Go Globe (2018), revealed that 62% of smartphone owners install a game within a week of getting their phones, and this accounts for more than 43% of total time spent on a smartphone for some individuals.

Analysis of this background information about the kinds of technologies used by mid-adolescents, gave some key insights about this users group. It was evident that, they majority of them owned a smart phone and were obsessed with checking their phone (Telegraph, 2018) continuously. Using social media, online shopping, watching videos and playing games were some of the major activities carried out by mid-adolescents on their smart phone. This determined that the persuasive technology could be incorporated in the form a social media, video or game, as individuals are more likely to access and use it. The idea was to not create something completely new, which could discourage them from using the technology, it had to be something they were already comfortable with. The previous chapters in this research revealed that social media was already being in multiple occasions to promote universities and higher education related information. Most of the universities had a social media page, and various schools and widening participating teams encouraged students to follow these university pages. However, Study 1 participants (who did not enter HE) showed no interest in following the universities pages, as they were not interested in entering HE. Further to this, the work by Shapiro and Margolin (2014) confirmed that these individuals are motivated to use the socials to stay in touch with friends, make plans and get to know people better. It would have therefore been a challenge to use social media in a way which facilitated in mitigating peer pressure from friends, as they used social media to connect with their friends and because they would not be interested in reading any higher education related material on social media (if they are not interested in

HE). It was therefore decided to design and develop a game which users could play on their smartphone, and on their own – so that no one else influenced the way they played. The aim of the game would be to persuade these users to change their behaviour so that they are able to mitigate peer pressure from friends and make an informed decision about their future.

The next phase defines the behaviour and attitudes the game aimed to change.

6.2.4 Phase 2: Define – Target Behaviours and Attitudes

The second phase of the design thinking framework is 'Define'. In this phase, the goal was to narrow down and *define* a specific problem which is trying to be solved. Details about the target users identified in the previous stage (Ideate) were used to define what problems these users face, and what target behaviour do we want the user to achieve (with the use of the persuasive technology).

In addition, two persuasive models were used primarily to inform the design of the persuasive technology – Behaviour Wizard (Fogg, 2017) and PSD model (Oinas-Kukkonen, 2010). Details of both these models are covered in the literature review (Chapter 2). Using these models are not part of the Design Thinking process, however, for this research, it has been integrated within this stage of the Design Thinking process to facilitate in the design of the persuasive technology. Once the target behaviours and attitudes were defined, The Behaviour Wizard helped identify what *type* of target behaviours we were addressing so that the guidelines suggested by the Stanford persuasive lab team (Behaviour Wizard, 2019) to achieve those target behaviours could be incorporated with the persuasive technology. Fogg has defined 7 design strategies which could be harnessed to achieve a certain type of behaviour, however it was at this stage that I realised that they were limited, there was not much variety. The PSD model, however, identifies 28 different design principles. It was therefore decided to use the PSD model as the main framework to identify which design principles needed to be harnessed within the game. Fogg's strategies, and a few other researchers persuasion strategies were then used as an add on, to check they cover any additional strategies which could also be harnessed. This is explained in more detail in section 6.2.6.5. Using a combination of the Behaviour Wizard and PSD model made an artefact contribution in HCI (C2).

6.2.4.1 Type of Users in Target Group

Form the ideate stage, it recognised that there were three type of users within our target group:

- Type 1 - The individuals wants to go to university but is influenced by friends to not go.
- Type 2 - The individual does not want to go to university but is influenced by friends to go.
- Type 3 – The individual is not sure of what to do, but is being influenced by some friends to go and other friends to not go.

Identifying the problems each user was facing allowed us to ascertain how persuasive technology should be designed, so that it addressed all types of users and facilitated in changing the behaviour for all. Understanding all the user types made it easier to define what the problem are that these users are facing (which we are trying to solve). It was evident that all three types of users were falling for negative *peer*

pressure from friends, and due to this they were unable to follow their instincts and make informed decisions. All three users were making a decision to go or not to university because of their friends, without doing any research themselves, and without basing their decision on the facts and information about what their future options are. It could have also been the case that these user were not aware of the consequences of peer pressure, or how it could affect them, which was why they were falling for it. We can therefore narrow down and define the specific problem we are addressing – individuals are not able to able to make an informed decision about higher education because of their friends' influence.

6.2.4.2 Target Behaviour

As we now had a clearer idea of what the problem we were trying to solve for our users, we were able to determine what target behaviours our persuasive technology should intend to achieve. These were: (i) Mitigate peer pressure from friends when making the decision about higher education, (ii) Understand the consequences of negative peer pressure from friends (increased awareness). Both these target behaviours are not mutually exclusive, there tends to be an overlap and are usually linked; in order to overcome peer pressure from friends you should have enough awareness about the consequences of peer pressure.

After defining the target behaviours in the Design Thinking process (phase 2 - Define), the next step would normally be to start Phase 3 - Ideate. However, for this research we added a further step within phase 2 which would facilitate in designing the persuasive technology. We will used a persuasive model, Behaviour Wizard (Fogg, 2009 (Behaviour Wizard)), to help identify what type of target behaviour we have defined and what techniques need to be implemented within the technology to address this type of behaviour. It should be noted that using this model is not part of the Design Thinking process, it had been integrated within the Design Thinking process for this research to get a better understanding of the defined target behaviours we were working with. The next section covers how the Behaviour Wizard was used to identify the type of the target behaviour, and the strategies that should be incorporated within the design of the persuasive technology to achieve that type of target behaviour.

6.2.4.2 Behaviour Model for Persuasive Design – Behaviour Wizard

For this research, we followed the Behaviour Wizard (explained in Chapter 2 - Section 2.3.1.3), in order to determine which behaviour type we were addressing, so that we could design the technology accordingly. The three steps to follow the behaviour wizard include: (i) Identify the behaviour type, (ii) identify the missing elements, and (iii) follow the guidelines to address that behaviour type.

Following the model determined that we were addressing a Green Span Behaviour, as our target behaviour (of mitigating peer pressure when making the decision to enter higher education) needed to committed for a certain period of time. This model then guided us to understand that the technology should harness the element of boosting the *motivator* and then delivering the *trigger*, should be harnessed within the technology so that we are able to successfully achieve our target behaviour. This is explained in more detail below. Once we knew which of the elements we needed to *focus on (Motivator and Trigger)*, it made the next

phase of the Design Thinking process, *Ideate*, much simpler, as we only brainstormed ideas which addressed these specific elements within our technology solution. So, ideas of how a technology can boost motivations and then deliver a trigger at the end were brainstormed. Further to this, the next step once an idea was finalised, was to employ the PSD model (explained in Chapter 2 – Section 2.3.2.2) to identify which persuasive design principles should be applied within the technology to leverage the elements of boosting motivation and delivering the trigger.

Step 1: Identify the Behaviour Type: Behaviour Grid

The target behaviour (B) we want our users to achieve after using the persuasive technology was: (i) Mitigate peer pressure from friend when making the decision about higher education, *and* (ii) Understand the consequences of negative peer pressure (increased awareness).

The Behaviour Wizard web-based tool (<http://www.behaviorwizard.org/wp/>) was used to identify which behaviour type both these target behaviours were. To use the tool we have to answer three questions. For each question we can select only *one* answer. The questions are:

Q1. I want to: Start or Increase Behaviour / Stop or Decrease Behaviour

Q2. I want to: Start a new behaviour / Restart a familiar behaviour / Increase an existing behaviour

Q3. This behaviour should be done: One Time / For a period of time / From now on

Answers selected for both the target behaviour were: 'Start or Increase Behaviour' (Q1), 'Start a new behaviour' (Q2), and would be done 'For a period of time' (Q3). By answering the questions in this manner, the Behaviour Wizard tool identified both our target behaviours to be a '*Green Span*' behaviour type – 'If you want someone to **commit to a behaviour** for a **period of time**, you are seeking a Green Span Behaviour'. (Stanford Behaviour Wizard Team, 2019).

Step 2: Identify which element is missing: Fogg Behaviour Model (FBM)

'The Fogg Behaviour Model states that three elements must converge at the same moment for a behaviour to occur: Motivation, Ability, and Trigger. When a behaviour does not occur, at least one of those three elements is missing.' (Fogg, 2009 (Behaviour Grid)). The Fogg Behaviour Model is covered in full detail in Chapter 2 (Section 2.3.1.1). By analysing from our users, mid-adolescent students, we comprehended that the element of *Motivation* and *Trigger* were missing, which were deterring them from achieving the target behaviours. These users do not have enough *motivation* to be able to mitigate the negative peer pressure from friends, most probably because they might not know that they are falling for peer pressure in the first place, hence they lack the 'Motivation' element. *Ability* is about making a task simple so that users are able to perform it. In this context, we can argue that mitigating peer pressure and raising its awareness is easy and simple for the users to perform, hence this element is not preventing the users to perform the target behaviours, and is not missing; the 'Ability' for the users is high. And finally, the third element *Trigger* is something that tells people to perform a behaviour now. Although people might have the motivation and

the ability they may need a signal telling them to perform it now. One of the three types of triggers is *Spark* as a Trigger. This is for people with low motivation but high ability, hence we can say that the element 'Trigger' is also missing. In conclusion, we identified that the element 'Motivation' and 'Trigger' are missing, which is why the target behaviour was not occurring.

Step 3: Follow BJ Fogg's Guidelines on the Behaviour Type

As Green Span behaviours are used to commit to a behaviour/attitude for a period of time, they are normally addressed to start a positive behaviour. Stanford persuasive lab (Behaviour Wizard, 2019) has created some strategies and guidelines as a starting point to help design a persuasive technology that is aimed to start a behaviour/attitude for a period of time. They recommended that in order to achieve a Green Span behaviour, three elements must converge together; you must *Trigger* the behaviour when the individual is both *Motivated* and *Able* to make the commitment. To be more precise, the guidelines to achieve a Green Span Behaviour include:

- a. Boost *Motivation* - by downplaying factors that de-motivate. If they are motivated, then the behaviour will occur. Three core motivators which exist are: Sensation (Pleasure/Pain), Anticipation (Hope/Fear) and Belonging (Social Acceptance/Rejection).
- b. Increase the *Ability* to start the new behaviour. An individual must have the ability to perform the behaviour when the trigger occurs. If it is simple and easy for them to do, then they are more likely to perform that behaviour.
- c. Deliver the *Trigger* when motivation and ability are high. The trigger should be timed so that it comes at the optimal moment.

As identified in Stage 2, the element *Ability* was already high, but the *Motivation* and *Trigger* were missing. This was why the mid-adolescents are not able to achieve the target behaviours, and falling for peer pressure when making the decision about higher education. From following the strategies to help achieve these Green Span behaviours and attitude, it was apparent that the persuasive technology designed must be able to *boost motivation* first and then *deliver the trigger* (once the motivation and ability was high). As we recognised that the ability was already high, the design of the persuasive technology must be such that focused on increasing the motivation first, and then deliver the trigger.

6.2.5 Phase 3: Ideate

For this stage of the Design Thinking process, information gathered from the previous two stages was collated to brainstorm ideas for technologies which addressed the problem identified, encouraging the users to change their behaviour and perform the target behaviour of mitigating peer pressure from friends. As identified in the Empathise stage (Section 6.2.3.3), it was decided to design and develop a game for this target group, one which they could play on their smartphone. Whilst the use of social media is popular within this target group, the trend of an increase in mobile gaming can also be seen (detailed in section 6.2.3.3). Social media is normally used to contact friends etc., and can therefore be assumed to not be as persuasive in mitigating peer pressure. Gamification on mobile phones has had a significant increase in

the UK over the past years. A report by Statista released in April 2018, stated that in 2017, 41% of 16-24 year olds in UK play games on their mobile phones (Statista, 2019). We are already aware of the increase in the smartphone ownership in UK, with a vast majority (90%) of 16-24 year olds having access to one (Deloitte Survey, 2018). On average, these users use it for nearly two hours or more every day (Deloitte Survey, 2018). Therefore, it was important to design a persuasive technology which is easily accessible for mid-adolescents to use, and which they are already familiar with so that they are not hesitant to use/interact with it. Therefore it was decided to design and build a game which facilitated in changing the users behaviour.

To get inspiration for design ideas, current strategies which were being used to mitigate peer pressure in different settings (detailed in Chapter 2 – Peer Pressure) were looked at to brainstorm how these current strategies could be incorporated within a persuasive technology. Two ideas emerged in this stage: an interactive storytelling game, and a scenario cards game. The first idea was selected to be prototype and tested as it had more potential for boosting motivation and delivering the trigger. In addition, it was recognised that there is an existing app available on the iOS and Google Play store, called Episode, which uses the concept of interactive storytelling. It is extremely popular with over 12 million registered creator and 82,000 stories (<https://www.episodeinteractive.com/>). Majority of the players of this game are young individuals, hence creating a persuasive story within this same app would be more effective in changing the users behaviour as they would be more likely and more comfortable to play it. This app could also be used to create a prototype of the interactive storytelling game for this research. Details of both the ideas are resented below.

Idea #1 – Peer Pressure Interactive Storytelling Game

Inspirations for this idea included:

- ❖ One of the strategies used to overcome peer pressure is to raise awareness about how pressure peer and how it can affect individuals.
- ❖ Visual storytelling has been used to give a personal account of how women were affected by the Vietnam war (Blanch, Filson, Penney & Cave, 2012) to raise awareness about the traumas faced.

This game could use the concept of interactive storytelling and role playing to raise awareness about peer pressure. A full animated interactive story would be created, and the user will have to complete the story. They will be assigned an avatar, and their avatar will have to deal with various peer pressure related situations. The user will have to make choices for their avatar, and the stories outcome and their avatars fate changes depending on the choices they make. Each scenario will be based on true events and will only include events related to peer pressure in education. The story will simulate the effects of falling for peer pressure, or resisting it (depending on the choices these users make). By doing so, the users will be able to see the cause and effect of making certain decisions. Once the user completes the story, they will be able to go back and make another choice to see what the outcomes are. In addition, at the end of the story, the user will be presented with the true story – detailing the incident of where the simulations were based from. By presenting users with simulations of how their avatar was affected by peer pressure, they

will be made aware of the impact and consequences of peer pressure. This could then lead the user to change their behaviour and start mitigating peer pressure. To boost motivation, the core motivators 'Anticipation (Fear/Hope)' and 'Sentiment (Pleasure/Pain)' can be depicted via the game. And to deliver the trigger, the true stories presented at the end of the game could be used as a 'Spark' as trigger. This spark as a trigger could aid in inspiring hope (when they read true stories of others who resisted peer pressure and how content they are with the decision they made) and highlight fear as well (when they read true stories of others who feel for peer pressure and were not able to make an informed decision about their future).

Idea #2 – Peer Pressure Scenario Cards Game

Inspirations for this idea included a KS1 Peer Pressure Thinking Cards created by Twinkl School in England - <https://www.twinkl.co.uk/resource/t-p-53-ks1-peer-pressure-thinking-cards> - Scenarios cards can be used in an interactive way of raising awareness about a particular topic. Users can be shown the consequences of what happen in a scenario if you act in a certain way. It is a good way to show the cause and effect of a situation to the user.

This idea uses the concept of using thinking cards to raise awareness. The users could be presented with a card (on an app), which has an animated story (or scenario) displayed. Each scenario will represent a situation in which someone is being influenced by peer pressure. The user could then be asked what they think is the right thing to do in that situation is, by getting them to select an answer from a list of selections. If they select the right answer, then they would be given points. Each scenario would be based on true events and will only include events related to peer pressure in education. The user could also be asked to choose a card (from a deck of cards) and play that scenario. Or, the user can be given a card to play from a random selection of the cards. By making individuals aware of the impact and consequences of peer pressure, the technology can get these individuals to start a new behaviour so that they are able to identify peer pressure and not be influenced by it. In order to boost motivation, the core motivator 'Anticipation (Fear and Hope)' would be addressed in the game. The triggered will be deliver once they receive the points by choosing the right answer.

The next section, covers a comprehensive design of the persuasive interactive storytelling game.

6.2.6 Phase 4: Prototype

In this section, a detailed description of designing the persuasive technology is covered. It includes how the persuasive technology was designed and developed (section 6.2.6.1 and 6.2.6.2), which of the core motivational elements from the Fogg Behaviour Model it addresses (section 6.2.6.3), and what persuasive design principles were incorporated within the game to leverage the elements from the Fogg Behaviour Model, which make the technology persuasive (section 6.2.6.4).

6.2.6.1 The Persuasive Game: 'My Next Step'

Interactive Storytelling

'My Next Step' is an interactive storytelling game designed to motivate mid-adolescents to make an informed decision about higher education. Interactive storytelling is a form of telling stories in which the storyline is not pre-determined. The concept arises from the Choose Your Own Adventure books, such as the Goosebumps children's series (Cariota, C. 2018). These stories were interactive and choice driven as the reader could make decisions that impacted the story and shaped the narrative. At the bottom of the page, the reader were given at least two choices and once the reader chose a choice, they would be directed to turn to a corresponding page to continue reading the story (Cariota, C. 2018). Today, the same concept is being used in gaming; the author creates the setting, characters and situation, but the user is in control of how the story progresses. They make decisions for their character (as is it role based), and depending on the decisions they make, the user can change the fate of their character. When playing an interactive storytelling game, each user experiences a unique story based on their interactions/decisions in the story. Digital storytelling, which describes the practice of using digital tools, such as audios and videos, to tell a story or present an idea, has already been identified as being a powerful tool for supporting teaching, learning and assessment in HE (Mayes, Morrison, Mellar, Bullen, & Oliver, 2009). The authors reported that Its ease of access and simplicity makes this technique inclusive to a wide range of students currently studying in HE. A similar concept of 'storytelling' is therefore used in this context, to evaluate whether it is powerful in mitigating peer pressure from friends.

Aim of the game

The aim of 'My Next Step' is to help individuals mitigate the negative peer pressure and influence from friends when making a decision about higher education. By doing so, they will be able to make an informed decision about their future, whether they want to go into higher education or not. As discussed in Section 2.2.1 (Strategies and Technologies Used to Overcome Peer Pressure), one of the strategies currently being implemented to combat peer pressure is 'Raising Awareness' about peer pressure (strategy number 4). By raising awareness individuals understand the consequences of peer pressure so that they learn to say 'no' when they are influenced into doing something they are not comfortable with (Lee, 2018). This strategy has been strongly emphasised on by blogger Quran Riddick (Riddick, 2015) as well. She herself was a victim of teen peer pressure, therefore decided to raise awareness on this issue via her blogs so that people across the world can understand this problem better and have ways to overcome it. Individuals can read true stories of other teenagers who were a victim of peer pressure and how it affected their life. They also give advice to the individuals on what they should do when they are faced with a similar situation. Quran Riddick (Riddick, 2015) believes that by reading true stories of other teenagers will help individuals understand the consequences better as they can relate to these teens. In addition, receiving advice from other teenagers who have been through a peer pressure related situation will be more effective than receiving advice from an adult. The game therefore aims to mitigate peer pressure from friends by raising awareness about the consequences of negative peer pressure from friends when making a decision about higher education (implementing strategy number 4). Awareness will be raised by presenting the users with

true stories and events of other sixth form students who were influenced by their friends in making a decision about higher education, and what the consequences of their decision was. The users will see simulations of these consequences, which are inspired by these true stories, and at the end be able to read the true story. This is explained in more detail in the next section – Game Design (Section 6.2.6.2).

6.2.6.2 Game Design

The game is an interactive story which involves role based play. The user role plays their avatar and step into their life in the game. The story revolves around the user making a higher education related choice for their avatar. The story progresses as they make the choices. Each choice leads a different outcome, and their avatar ends up in different situations based on the choices made. The game was created on Episodes Interactive (<https://www.episodeinteractive.com/>), which is the web based portal for Episode writers to create and publish stories.

In 'My Next Step' story, the user starts off with customising their avatar, which includes selecting the gender, personalising the hair, skin tones, features etc. and giving the avatar a name. Next, they select whether they are planning to go to university, not planning to go, or whether they are still deciding. The story then progresses accordingly. Within the story, the user goes to school, interacts with friends and then has to sit in a university introduction class where they decide to tell the teacher if they wish to go to university or not. They are then shown their avatars' future (1 or 2 years later) of where they end up (depending on the decision they make). This simulation is generated from true stories of individuals who experienced the same thing. Their experience is used as an inspiration to create these simulations of where the avatar can end up, as these individuals ended up in the same place. After seeing the avatars' future, the user is then presented with the true story to read, and then asked if they would like to go back and re-consider the decisions for their avatar.

Users have to make various choices within the story in which they either resist or fall for peer pressure from friends. Depending on the choices they make, the narrative of the story changes. The user can then see how their characters fate changes, how the choices impacted the characters future, and what consequences they have to face because of the choices made. All the characters in the story do the opposite of what the user wants to do (in terms of deciding to go to university), hence, they influence the user to make the same decision as them and not make an informed decision for themselves. In the end, if the user ends up following their friends, then a future of the user's avatar will be simulated in the story which shows the consequences the avatar has to face because of not making an informed decision. The avatar will regret the decision of following friends. However, if in the end, the user ends up following his/her own instincts then the simulation of the avatars' future will be positive, where the avatar is shown to be content with the decision they made.

In summary, the storyline of the game is divided into five scenes (after the customisation of their avatar): *Scene 1* – Before going to school, *Scene 2* – In school, before going the university introduction class, *Scene 3* – In the university introduction class, *Scene 4* – Avatars' future and *Scene 5* – True Story. Altogether, there were three decision points in the game, where the user was asked to make a choice, which will shape

the narrative of the game and impact the avatars fate; one choice is in scene 2, and the other two choices are in scene 3. In the end, after scene 5, they are presented with a choice of whether they wish to go back and change their decisions. If they say yes they want to change their choices, then the game restarts from scene 3.

The narrative of the story was inspired by true events of Study 1 and 2 participants. Some participants within the first two studies for this research either wanted to go to university, not want to go to university, or were still deciding (as identified in the user types, section 6.2.4.1), but were influenced by their friends into making the same decision as them (and not make an informed decision for themselves). They then later realised that they fell for peer pressure from friends and were not happy where they had ended up in life. The consequences of being influenced by their friends had a big impact on some of the participants and they did regret not following their own instinct and not making an informed decision for their future. However, there were also participants who resisted the peer pressure from friends and were content with their decision. These stories told by the participants within the study interviews were used as inspiration to derive the narrative of the interactive story. These are covered in more detail in the section 6.2.6.4.

In order to ensure that all user types were able to play the game and experience its gameplay, the users start off by customising their avatar (Figure 6.2 below), and then selecting whether they are intending to go to university (Figure 6.8 below). The question they are asked is - 'Are you planning to go to university?' To which the user answers 'Yes', 'No' or 'Maybe, I'm not sure yet'. Based on the answer the user selects, the storyline of the game is shaped accordingly.



Figure 6.2: Customisation of Avatar

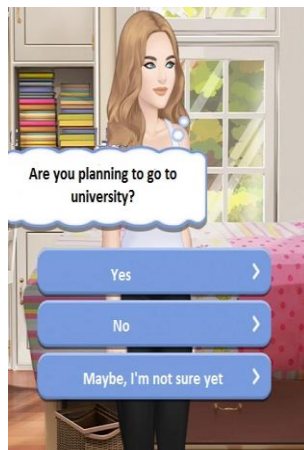


Figure 6.3: First question – which branches out the game

As the users starts to play the story, they will be presented with choices about either resisting peer pressure or falling for it. They will be asked to make this choice three times (in various parts of the story). Depending on the choice they make, the story will branch out, and the users' avatar will end up in the same situation as the participant; either content with the decision of resisting peer pressure or regretting the decision of

falling for peer pressure. By doing so, they will be able to see the direct link between the cause and effect of the choices they make, how their decisions can impact their characters future. At the end of the game users are presented with the true story of the individual who has experienced the same situation in real life. The identity of the participant is hidden in the true story by changing their name and generalising their home postcode into an area. After reading the true story, the users are then given the option to go back and make a different choice if they wish to explore the different ending of the game.

6.2.6.3 Persuasive Models Applied

After identifying which behaviour type we are addressing from the Fogg Behaviour Grid (Section 6.2.4.2), i.e., the Green Span Behaviour, it was comprehended that the element of *Motivation* and *Trigger* were missing, which was deterring mid-adolescents from achieving the target behaviours of combating peer pressure from friends when making the decision to enter higher education and also having enough awareness about it. The strategies and guidelines that BJ Fogg has created in order to help design the persuasive technology which address in achieving a Green Span behaviour are to boost *Motivation*, increase the *Ability* and deliver the *Trigger* (once the motivation is high), as explained in section 6.2.4.2.

During the ideation phase, we also determined that the core motivator #1 (Pleasure/Pain) and #2 (Hope/Fear) will be addressed to boost motivation, and 'Spark' as a trigger will be delivered in after the core motivations. To address how these two core motivators and triggers will be transformed into the game design, the PSD model was employed. This model has a range of 28 persuasive design principles which could be incorporated within the system. Using this approach of combining the PSD model with the Behaviour Wizard to inform the design of the persuasive game, allowed us to make an artifact contribution. Each of the design principles from the PSD model were examined to determine which were suitable and practical in leveraging the motivators (pleasure/pain and hope/fear) and trigger (spark). Some principles were not relevant for this research, such as the design principle *Competition*, therefore those were not considered. However, as a supplement, the persuasion strategies defined by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013) and Cialdini (Cialdini & Goldstein, 2002) were also looked at to see if an additional design principles needed to be incorporated (which were not part of the PSD model). In the end, a total of 10 design principles were incorporated within the game. 9 of them were applied to boost motivation, including: *Personalisation*, *Similarity*, *Tailoring*, *Simulation*, *Conditioning*, *Suggestion*, *Authority*, *Trustworthiness* and *Liking*, and 1 was applied to deliver the trigger: *Social Learning*. Design principle *Simulation* was used to harness the core motivation Anticipation (Hope/Fear).

All the principles applied were from the PSD model, except *Conditioning*, which was identified as a persuasion strategy by Fogg (2002). In addition, there were some other principles which were overlapping and they are identified by either Fogg, Cheng or Cialdini as well. These design principles fitted in an obvious way as they would help to not only leverage the motivators (pleasure/pain and hope/fear) and trigger (spark), but would also be easily incorporated within the persuasive game, making the game simpler and straight to the point, enabling us to reach the target audience and changing their behaviour/attitudes as intended. For example, the design principle, *Personalisation*, would be introduced in the beginning of the game where the user is able to personalise their character in the game. Incorporating this design principle

would help grab the user's attention, making them want to play further. Similarly, the design principle, *Conditioning*, would be ideal to implement in this situation as it would help reinforce the target behaviour to the users within the game. For example, telling them that they have done a good job or made the right decision.

Each of the design principles incorporated within the game is targeted towards leveraging a specific 'motivation' or 'trigger', which was identified by the PSD model (Fogg, 2017). A visual representation of when the core motivators and persuasive design principles were applied in the game is presented in Figure 6.9 below. It shows how the guidelines of the Behaviour Wizard were followed by *boosting motivation* first, as soon as the user started playing the game, and then delivering the *trigger* towards the end. The 9 design principles which were ideal to boost motivation, and which part of the game they were brought out can be seen in this figure. So, when the user starts the game, the aim is to first boost their motivation by incorporating *Personalisation* first, followed by *Similarity* design principle, and so on. As they move further on in the game, *Simulation* is applied, showing them a simulation of their avatar's future, highlighting 'Hope' or 'Fear'. Next, the trigger is delivered through *Social Learning*, as the users' motivation would be highest at this point of the game (after seeing the simulation of their avatars future). In the end, the users are suggested to restart the game so that they can explore other options and paths and see how the outcome of their avatar's future changes.

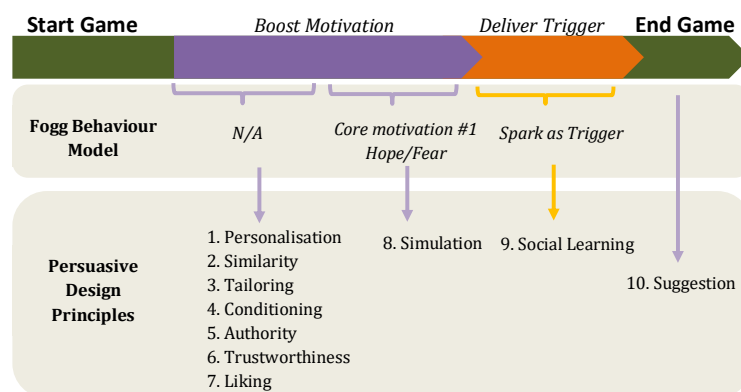


Figure 6.4: Visual representation of when the Fogg Behaviour Model elements and persuasive design principles were applied in the game

A vital point to consider when incorporating the design principles was the degree and quality to which these principles would fit in the game, rather than simply being present or absent. All ten design principles were equally important in persuading the users to perform the target behaviour; mitigate peer pressure from friends. If the game only had one design principle for example, then the degree to which it had been implemented would have been higher. Therefore, for this persuasive game, the extent of how strong these design principle elements were incorporated was relatively low, as the focus was on all the elements rather than just one. For example, the *Simulation* and *Social Learning* element were not focused on as strongly as some of the other examples from the literature, such as the blogs, websites and videos developed by

Riddick (Riddick, 2015). As Riddick's work focuses solely on overcoming peer and social pressure, the degree of the social element incorporated is quite strong. Hence, when designing the game, it was crucial to consider the extent and degree to which the design principles are fit into the game, rather than just being present or absent.

A detailed explanation of how each of the Fogg Behaviour elements were leveraged in the game are covered in the next section, followed by a detailed description of the 10 design principles incorporated.

Fogg Behaviour Model - Boost Motivation

The core motivator Anticipation (Hope/Fear), was focused on in the game. This motivator in the FBM is a dimension that has two sides: hope and fear. It is characterised by the anticipation of an outcome. Hope is the anticipation of something good happening and fear is the anticipation of something bad, often a loss. Both hope and fear highlighted in the game are aimed to boost the user's motivation, so that they are encouraged to perform the target Green Span behaviour, and mitigate peer pressure from friends when deciding about higher education.

In this game, users are shown a simulation of their avatars' future depending on the choices they make. As the target behaviour is for them to be able make an informed decision about higher education and not follow friends blindly, if the user makes the decision to resist peer pressure and not follow friends, then the simulation of their avatars' future is positive. The users will be able to see how content the avatar is with their decision of not following friends and being able to shape their future like how they wanted it to be. Comments from the avatar such as 'I am so glad I followed my instincts and did not jump into making a decision' and 'I have no regrets at all', along with a positive body language are used to impose that the avatar is happy with how their life has turned out. By showing the users that the future can be positive if they do not fall for peer pressure from friends, the users are motivated by *hope*. If the user anticipates that their future can be good by making such a decision, then he/she is more likely to perform the target behaviour of combatting peer pressure. Screenshots of a scene from the game where the avatars' future highlights hope (because they resisted peer pressure) are displayed in figure 6.10 below. The screenshots are displayed in the sequence of how the scene appears in the game.



(a) Scene 1



(b) Scene 2



(c) Scene 3

Figure 6.5: Resisted Peer pressure – Presented in the sequence of the scene In the game - (a), (b), (c)

On the other hand, the dimension 'fear' is also incorporated within the game. If the user decides to fall for peer pressure and not make an informed decision for themselves, then the simulation of their avatars' future will not be pleasing as it will show the consequences of falling for peer pressure. They will see how unhappy and insecure their avatar is with their future and how the avatar regrets their decision. Comments from the avatar such as 'I do really regret my decision of not following my instincts', 'I'm just really annoyed that I wasted a whole year', and 'What was I thinking? I will have to drop out of uni soon as this is not what I wanted to do!' along with an irritated, angry and negative body language are used to impose that the avatar is not happy. By doing so, users are motivated by *fear*. They will consider their decisions because they will not want to be in the same position as their avatar a year down the line. Hence, they will be motivated by fear to performing the target behaviour of combating peer pressure from friends when considering higher education. Screenshots of a scene from the game where the avatars' future highlights fear (because they ended up following their friends) are displayed in Figure 6.11 below.



Figure 6.6: Fell for Peer pressure – Presented in the sequence of the scene in the game - (a), (b), (c), (d), and (e)

Fogg Behaviour Model - Deliver the Trigger

Spark as a Trigger is embodied within the game. Sparks are used when the users lacks the Motivation but has the Ability to perform a behaviour. This is the case with our users; as identified earlier, their Motivation is low but their Ability is high. Sparks are used to leverage motivational elements and can range from texts which highlight fear to videos that inspire hope. They can come in various forms as long as they are being recognized by the users. They should be timed in a way so that they are presented at the optimal moment when a user can take action and perform the target behaviour.

For this interactive storytelling game, 'True Stories' in the form of texts are presented to the users to highlight fear and inspire hope. Once the user has completed the game, and have seen what their avatars fate was (depending on their choices), the next scene of the game will present the *Spark* as trigger. A true story will be revealed which the users can read. If the user has decided to resist peer pressure in the game, then they will be able to read a true story of an individual who has combated peer pressure in real life, how they did it, and what the outcome was. This story will inspire hope, so that the users can learn and know that they can do the same.

However, if the user decided to fall for peer pressure in the game, then they will be presented with a true story of an individual who also feel for peer pressure, and what the consequences were on his/her life due to making that decision. This story will highlight fear, so that users can learn about the consequences of their decisions if they fall for peer pressure from friends. Figure 6.8 and 6.9 below is a screenshot of the True Story from the game, one inspires hope and the other highlights fear.

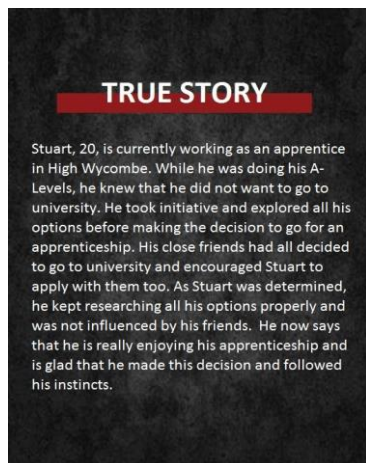


Figure 6.7 – Screenshot of True Story – Resisted Peer Pressure (Inspire hope)

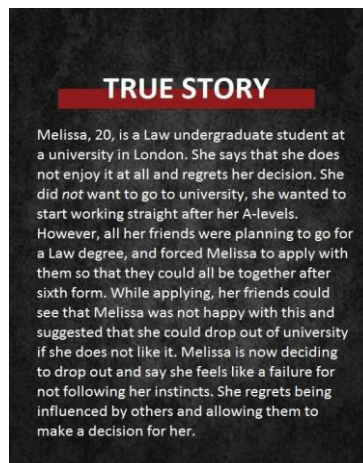


Figure 6.8 – Screenshot of True Story – Fell for Peer Pressure (Highlight fear)

As Sparks are used to leverage motivation, they should be designed in tandem with a motivational element. In this game, the motivational dimension of *hope* and *fear* is harnessed first (through simulations of the avatars' future) to increase the levels of motivations, hence it was decided to have the design as such so

that the Spark as a trigger is incorporated after (once the motivation is high). Therefore the true story was presented at the end, straight after the user sees what their avatars' future is like - as this would be the optimal moment to deliver this trigger. It is timed and presented in this part of the game so that user can take the action and perform the target behaviour.

6.2.6.4 Persuasive Design Principles Applied

In this section, a detailed description of the persuasive design principles incorporated within the game is covered. Altogether, there were 10 persuasive design principles applied in the game to make it persuasive. The 28 principles defined by Harri Oinas in his PSD model (Oinas-Kukkonen, 2010) were used as a starting point to select which ones can be implemented in the game which can aid in increasing the *Motivation* and delivering the *Trigger* (as identified in the previous section). Each design principle was assessed to see if it was suitable to be applied in the context of the game, to boost motivation and deliver the trigger. Only those which could be incorporated within this interactive storytelling game and its narrative were incorporated. There were some which were not appropriate and so were let out, for example, *Competition*, as there was no competition encouraged in this game, it was not applied. The persuasion strategies defined by Fogg (Fogg, 2002) and Ran Cheng (Cheng, 2013) were then used as a supplement, to see if there are any additional or different design principles needed, which are not covered within the PSD model. 9 of design principles applied in the game came from the PSD model, and one was from Fogg's strategies. Also, there were 3 design principles which were overlapping between the three researchers, as they were very similar. An overview of the 10 design principles incorporated within the game, where it is referenced from (PSD Model, Fogg or Ran Cheng Persuasion Strategies), along with a description of the design principle are cited in Table 6.1 below.

The design principle *Simulation* was used to specifically harness the core motivational element of hope/fear. Where the design principle *Social Learning* was harnessed to deliver the spark as a trigger. The remaining 8 design principles served a purpose of generally making the game more persuasive in changing the users behaviour, so that the users are able to mitigate the peer pressure from friends when making the decision about higher education.

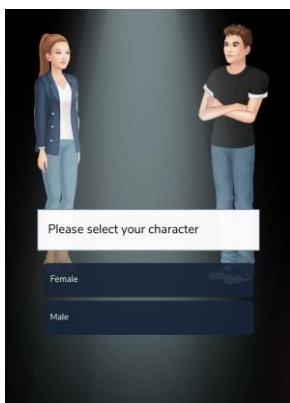
Design Principle	Reference From	Description
1. Personalisation	PSD Model	A system that offers personalised content, information or services targeted towards the user directly. For example, a website welcoming the user with their name. ***This design principle is similar to 'Personalizing' by Ran Cheng and 'Customisation' by Fogg
2. Similarity	PSD Model	A system that imitates its users in some way so that it reminds them of themselves. For example, using slang names to motivate teenagers to exercise.

3. Tailoring	PSD Model	A system that provides tailored information for its user groups depending on their interests, potential needs, personality etc. For example, a website provides different workout related content for different groups such as beginners and professionals.
4. Conditioning	Fogg Persuasion Strategies	A system that reinforces a target behaviour when it occurs. It is often in the form of a positive reinforcement. To be most effective, conditioning must occur immediately after the performance of the target behaviour. For example, a praise message for users after they eat healthy, reinforcing the point of telling users that they are healthy. ***This design principle is similar to 'Personalizing' by Ran Cheng and 'Customisation' by Fogg
5. Authority	PSD Model	A system that refers to people in the role of authority to get their point across. For example, a website quoting an authority such as the government health office. ***This design principle is similar to 'Personalizing' by Ran Cheng and 'Customisation' by Fogg
6. Trustworthiness	PSD Model	A system that provides information that is truthful, fair and unbiased. For example, a website that provides users with information related to their products rather than simply providing advertising and marketing information.
7. Liking	PSD Model	A system that is visually appealing and attractive for its users. For example, a children's application that is colourful and easy to use for children.
8. Simulation	PSD Model	A system that allows users to observe the link between the cause and effect of their behaviour immediately. For example, before and after photos of people who lost weight on a website. Table 6.1 – The 10 Design Principles incorporated within the Game by Ran
9. Social Learning	PSD Model	A system which provides means of observing others who perform the same target behaviour and see what the outcome of their behaviour was. For example, people can share their experience about quitting smoking via messages.
10. Suggestion	PSD Model	A system suggesting users to carry out a behaviour. For example, an application for healthier eating habits suggests user to eat a fruit instead of a chocolate. ***This design principle is similar to 'Suggestion' by Fogg and 'Recommendation' by Ran Cheng

The next section illustrates how each of the 10 design principles were incorporated within My Next Step game.

Persuasive Design Principle #1 - Personalisation

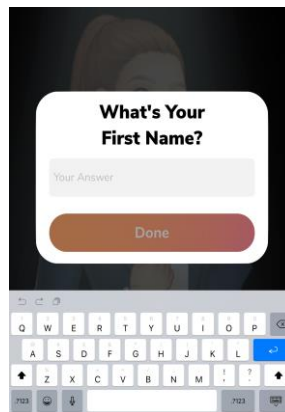
The user is able to customise their character/avatar and give it a name. They can select the gender (male or female character), and then customise their characters features (eyes, nose, mouth, and face shape), hair, hair colour, eye brows and skin tone. The users avatar is also addressed with their name in the game to make the game more personalised so that the user feels part of the game. Screenshots from My Next Step game for personalising the character are displayed in Figure 6.14 below.



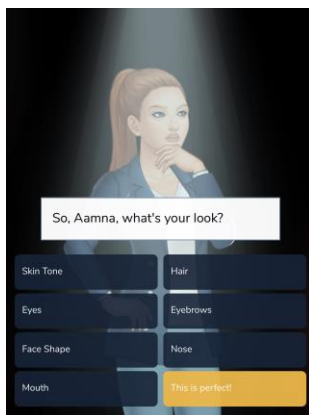
(i) Personalisation – Select



(ii) Personalisation – Asking for the users avatars name



(iii) Personalisation – Screenshot for entering name



(iv) Customisation of the avatars



(v) Addressing the avatar by their name - Aamna

Figure 6.9 – Screenshots for implementation of Personalisation Design Principle

Persuasive Design Principle #2 - Similarity

The game was designed to imitate the user so that it reminds them of themselves. This was done by making the characters young, having a school and classroom environment in the scenes, having friends who the character meets in schools, having a teacher who calls them to class etc. The general dialogue and words

that the friends and the user's avatar use is also informal. Use of words such as 'uni', 'LOL', 'useless' and symbols like ':)' (happy face) are used to make the users believe that the scenario in the game is similar to their real life, so that they are able to relate to it. A few screenshots from the game which imitate the user in real life are displayed in Figure 6.15 below.



(i) Outside a classroom in school meeting



(ii) Use of the word 'LOL'



(iii) Having a teacher call the students



(iv) Classroom environment and use of the word 'uni'

Figure 6.10 – Screenshots for implementation of Similarity Design Principle

Persuasive Design Principle #3 - Tailoring

The story is tailored depending on whether the user is planning to go to university, not planning to go, or if they are still deciding. Each user will play a story which is tailored to what their preference about going to university is.

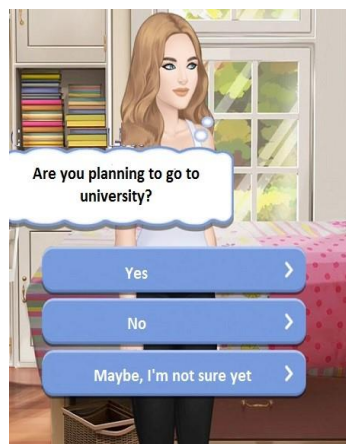


Figure 6.11: Screenshot for implementation of Tailoring Design Principle

Persuasive Design Principle #4 - Conditioning

A positive and negative reinforcement is displayed in the form of a message when the user performs the behaviour of falling for or resisting peer pressure. In the final decision making scene, if the user falls for peer pressure, then a negative reinforcement is displayed as a message telling the users that they feel for friends' influence. However, if they resist peer pressure in the end, then a positive reinforcement is displayed which praises the user for not falling for friends' influence. The negative reinforcement is highlighted in red, giving it the effect of a warning sign stating that something is not right. The avatars expression also changes depending on the kind of reinforcement they are receiving. Screenshots of the positive and negative reinforcements from My Next Step game are displayed in Figure 6.17 below.

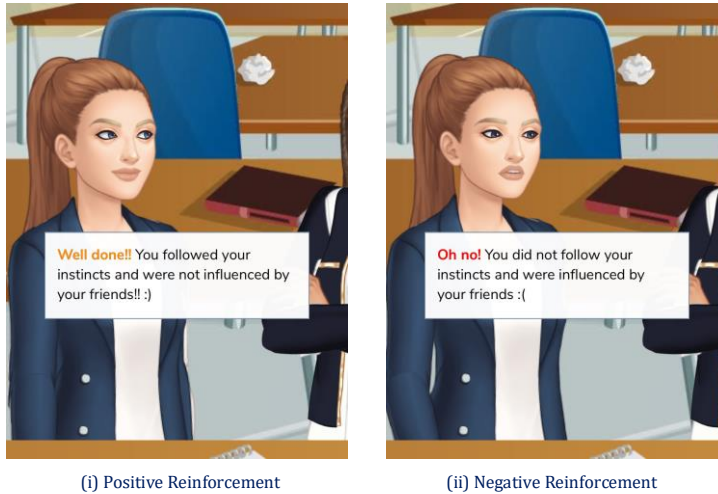


Figure 6.12 – Screenshots for implementation of Conditioning Design Principle

Persuasive Design Principle #5 - Authority

In My Next Step game, the teacher gives out higher education related statistics in the classroom. Teachers are considered to have authority within a school, therefore it was decided to have the teacher's character say the statistics (to get the point across) rather than any other character. A screenshot illustrating the implementation of Authority design principle is displayed in Figure 6.18 below.

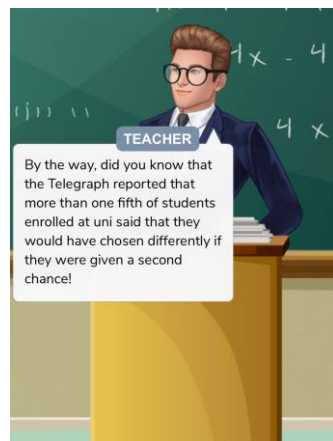


Figure 6.13: Implementation of Authority Design Principle

Persuasive Design Principle #6 - Trustworthiness

When the teacher's character is saying the higher education related statistics, he also states where they are referenced from. For example, he will say, "*the Telegraph reported....*" By stating the source of where the statistics are referenced from, users are assured that the statistics are coming from a credible source. A screenshot of the source reference by the teacher is shown in Figure 6.19 below.

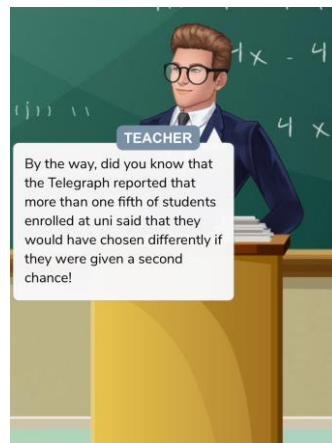


Figure 6.14: Implementation of Trustworthiness Design Principle

Persuasive Design Principle #7 - Liking

My Next Step game was created on Episode, which is a popular app on the iOS and Google Play Store. As it is quite popular, it was decided to create the game on this platform as many of the users (sixth form students) will already know how to play an interactive story on Episode. This made the game easy to use and play. In addition, the graphics and general look and feel of the game was designed so that it is colourful, has lots of animations, pan and zoom effects and lighting effects within game play to make it more likable and interesting. In addition, background music and sound effects were also added in the game to enhance the users game play experience.

Persuasive Design Principle #8 - Simulation

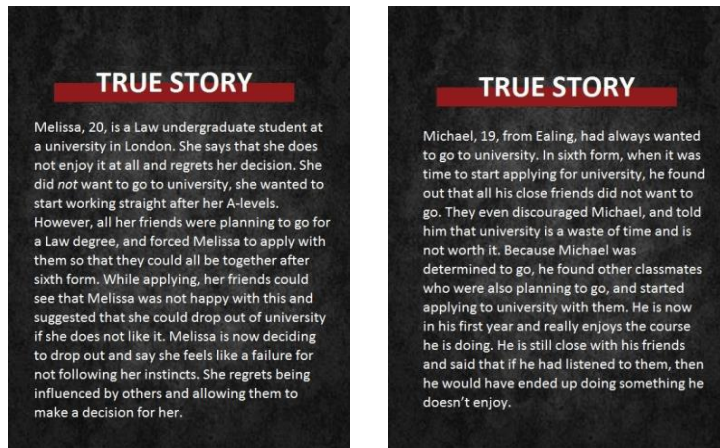
The user is able to see the direct link between how their avatars' future is affected depending on the choices they make. If they choose to follow their friends then their avatars' future will not be pleasant, as the avatar will face the consequences of falling for peer pressure. The avatar will be unhappy, regretting the choice they made. However, if the user decides to resist peer pressure, then their avatars' future is good, showing how content their avatar is with the decision they made. Screenshots from the game of a *resisting peer pressure* simulation and a *falling for peer pressure* simulation are illustrated in Figure 6.20 below.



Figure 6.15 – Screenshots for implementation of Simulation Design Principle

Persuasive Design Principle #9 - Social Learning

After the users have seen a simulation of their avatars' future, users are able to read a true story of an individual who made the same decision, whether he resisted peer pressure or fell for it, and what the outcome was, how it affected his life. Reading these true stories can help users see/understand how others perform the same behaviour and what their outcome was. These true stories serve the same purpose as users sharing their experience of quitting smoking on an online forum. Screenshots from My Next Step game for personalising the character are displayed in Figure 6.21 below.



(i) True Story – Fell for Peer Pressure

(ii) True Story – Resisted Peer Pressure

Figure 6.16 – Screenshots for implementation of Social Learning Design

Persuasive Design Principle #10 - Suggestion

At the end of the story, a suggestion is made, giving users the option to go back and reconsider their choices if they want. The users are addressed by their name in order to keep them involved in the game. A screenshot of suggestion is shown in Figure 6.22.

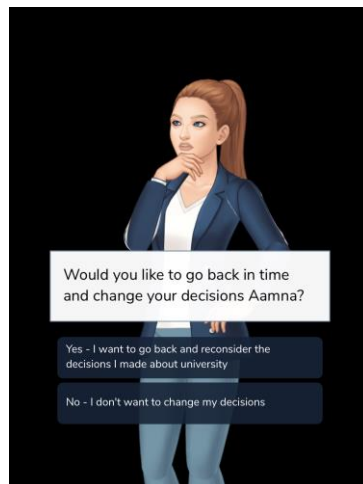


Figure 6.17: Implementation of Suggestion Design Principle

6.2.6.5 Narrative of the Story

The narrative of the story is branched out according to the three user types:

- Type 1 - The student wants to go to university
- Type 2 - The student does not want to go to university
- Type 3 – The student is not sure, they are still deciding about going or not going to university.

For each persona, the users are able to make a choice of whether they want to follow friends and make the same decision as them, or whether they want to stick with their decision and follow their instincts. Therefore, for each persona, the user will be presented with two choices throughout the story which represent either 'resisting peer pressure' or 'falling for peer pressure'. The users will have to make this decision three times throughout the game. The narrative of the story will then be shaped accordingly, so that users are shown the consequences of peer pressure (if they make the choice of following friends) or the implications of following their own decisions (if they make the choice of resisting peer pressure). A detailed description of the narrative for each user type are covered below.

Type 1:

User type 1 represents a student who wants to go to university. If the user selects that they would like to go to university, then the narrative of the story is such that *all* the other characters in the story do the opposite, i.e. the users' friends, are all negative towards university and are planning to *not* go. Throughout the game they keep pressurising the users' avatar to also not go to university. The user is then presented with choices about whether or not they wish to follow their friends and also not go or whether they want to stick with their decision. The user has to make this choice three times within the whole story, and all three times the friend's pressure is high in influencing the user to not go to university. The pressure and influence is reinforced by making the facial expressions, dialogue, and general body language of the friends extremely negative and sarcastic. However, if the avatar agrees with the friends, then the friends are extremely happy and more accepting of the avatar.

The narrative of the game for each scene is outlined below:

Scene 1 - The story starts off with showing the users avatar getting excited to go to school as they will be attending the university introduction class and start to apply for university.

Scene 2 - Once the avatar reaches school, he/she finds out that his/her friends are not planning to go to university and are saying negative things about university. They expect the avatar is not going to university either. This is where the user has to make the first decision – whether to agree with friends and say university is not a good option, or tell them that they are planning to go to university. If they agree with the friends, this means that they fell for peer pressure and the friends get really happy and accepting of the avatar, however, if they didn't then that means they resisted peer pressure. If they resist peer pressure, then the storyline progresses into showing that the friends are really shocked and again keep discouraging

the avatar to go to university. They even give the avatar the option to take a gap year and not go to university.

Scene 3 - Next, the avatar and friends go to the university introduction class which is mandatory for them all to attend. In this classroom, the teacher gives out higher education related statistics and asks the students to raise their hands if they are planning to go to university. Again, the friends are extremely negative and keep giving the avatar looks and passing comments so that the avatar does not raise their hand. Here the user gets a second chance to make a decision, whether they wish to follow their instinct or listen to friends and be influenced by them. In the classroom, the user is asked to make a decision of following their own instincts and raising their hand or following their friends and not raise their hand. They have to make the decision twice in the classroom scene.

Scene 4 - Finally, depending on the final decision the avatar makes (in the third choice), the avatar decides to go or not go to university. If at the end they decide to follow their friends and fall for peer pressure, this means that they will also not go to university (although they did want to). The previous scene ends with the avatar being concerned about them making the right decision for themselves. Then the story then progresses into showing a simulation of the avatars' future, 1 year later. Here the user can see that their avatar is working in a dead end office job and is not happy. The avatar really regrets their decision of following friends. The avatar then says that they have now started applying for university as this is what they always wanted to do, but is disappointed that they wasted a whole year because of their friends. At the end, in **Scene 5**, they are presented with a true story of the participant who this narrative was inspired by Participant 8 in Study 1 (P8 – *Falling for Peer Pressure*).

This participant had ended up falling for peer pressure from friends and decided to start a job as well, although he wanted to go to university. In his interview he said, *"I had to take a gap year because all my friends told me uni is a waste of time...I wasted the whole year [P8 – Study 1]"*

At the time of the interview he was still working and had applied to university. He regretted his choice of listening to friends and taking a gap year to work. His experience was used as an inspiration for the narrative of this story, for showing users how falling for peer pressure can affect your future if you want to go to university but are influenced by friends to not go. Users can see what the consequences of not making an informed decision about higher education and just following friends can be. The participant's name was changed in the True Story to maintain anonymity.

However, if they decide to follow their instinct and go to university (resist peer pressure), then the avatar says that they will find other classmates who are also planning to go to university and will start applying to university with them. At the end, in **Scene 5**, they are presented with a true story of the participant who this narrative was inspired by Participant 13 in Study 2 (P13 – *Resisting Peer Pressure*)

This participant had ended up resisting peer pressure from friends and decided to go to university, even though some of his friends decided not to go. To resist peer pressure, he found other friends who were also planning to go to university and started making the university application with them. He said, *"All of us who wanted to go stuck together and decided to apply [P13 – Study 2]"*

His experience was used as an inspiration for showing users that they too can resist peer pressure and be happy with their decision. And if they wish to go to university, then they too can find other classmates who are applying to university and start making the university application with them. The participants name was changed in the True Story to maintain anonymity.

Type 2:

User type 2 represents a student who does not want to go to university. If the user selects that they are not planning to go to university, then the narrative of the story is such that *all* the other characters in the story do the opposite, i.e. the users' friends, are all positive towards university and are planning to go. Throughout the game they keep pressurising the users' avatar to also go to university and do the same course as them so that they can all be together in university. The user is then presented with choices about whether or not they wish to follow their friends and also go to university or whether they want to stick with their decision. The user has to make this choice three times within the whole story, and all three times the friends' pressure is high in influencing the user to go to university as well. The pressure and influence is reinforced by making the facial expressions, dialogue, and general body language of the friends extremely negative and sarcastic. However, if the avatar agrees with the friends, then the friends are extremely happy and more accepting of the avatar.

Scene 1 - The story starts off with showing the users avatar not looking forward to go to school as they will have to attend the university introduction class. The avatar feels like it is a waste of time as he/she is not planning to go to university. The avatar decided to go to school with a mind-set saying that they will just start applying for jobs or apprenticeships with friends.

Scene 2 - Once the avatar reaches school, he/she finds out that his/her friends are actually planning to go to university and are saying positive things about university. They expect the avatar is also going to university. This is where the user has to make the first decision – whether to agree with friends and say university is a good option, or tell them that they are not planning to go to university. If they agree with the friends, this means that they fell for peer pressure and the friends get really excited and accepting of the avatar, however, if they didn't then that means they resisted peer pressure. If they resist peer pressure, then the storyline progresses into showing that the friends are really shocked and keep discouraging the avatar to start working and influence him/her to apply to the same university and course as them. They even give the avatar the option to drop out of university if they do not like university.

Scene 3 - Next, the avatar and friends go to the university introduction class which is mandatory for them all to attend. In this classroom, the teacher gives out higher education related statistics and asks the students to raise their hands if they are planning to go to university. Again, the friends are extremely positive about university and attending the classroom and keep giving the avatar looks and passing comments so that the avatar raises their hand too and decided to go to university. Here the user gets a second chance to make a decision, whether they wish to follow their instinct or listen to friends and be influenced by them. In the classroom, the user is asked to make a decision of following their own instincts and not raising their

hand or following their friends and raise their hand. They have to make the decision twice in the classroom scene.

Scene 4 - Finally, depending on the final decision the avatar makes (in the third choice), the avatar decides to go or not go to university. If they decide to follow their instinct and not go to university (resist peer pressure), then scene 4 is a simulation of the avatars' future showing that the avatar has found a job and is extremely happy with the decision they have made. At the end, in **Scene 5**, they are presented with a true story of the participant who this narrative was inspired by Participant 7 in Study 1 (P7 – *Resisting Peer Pressure*).

This participant had ended up resisting peer pressure from friends and decided to not go to university, even though majority of her friends were going to university. To resist peer pressure and stick with her decision, the participant found a job which she liked. She mentioned in her interview, *"Majority of my friends did go to university, but the decision of not going to university was mine... I found this job and obviously working in a bank is quite good [P7 – Study 1]"*

Her experience was used as an inspiration in the narrative of the story for showing users that they too can resist peer pressure and be happy with their decision. If they are not planning to go to university, then they too can start looking for jobs or apprenticeships, rather than being influenced by friends and making the decision to go to university even though they do not want to. The participants name was changed in the True Story to maintain anonymity.

However, if at the end they decide to follow their friends and fall for peer pressure, this means that they will end up going to university with their friends (although they did not want to). The scene ends with the avatar being concerned about making the right decision for themselves. Scene 4 then starts showing a simulation of the avatars' future, 1 year later. Here the user can see that the avatar is in university but is not happy at all. The avatar ends up doing a Law course with his/her friends and is now planning to drop out. The avatar really regrets their decision of following friends and says that he/she should have made an informed decision for themselves and not followed friends. At the end, in **Scene 5**, they are presented with a true story of the participant who this narrative was inspired by Participant 16 in Study 2 (P16 – *Falling for Peer Pressure*).

This participant had ended up falling for peer pressure from friends and decided to go to university as well, although she was not sure whether she wanted to go or not. At the time of her interview she was in her first year of university, enrolled as a Law undergrad student. She said that in sixth form, all her friends were not sure of what to do, so that all decided to go to university and dropout if they wanted to. All her friends now have dropped out and the participant was also considering dropping out. She said, *"we all weren't sure of what to do, so we decided to give uni a go...my friends said that we can dropout if we didn't like it [P16]"*. She was not happy with her decision to go to university, especially when she was not even sure if she wanted to go in the first place. This participants experience is used as an inspiration, for showing users how falling for peer pressure (and following friends decisions) can affect your future if you do not want to go to university but are influenced by friends to go. Users can see what the consequences of not making

an informed decision about higher education and just following friends can be. The participants name was changed in the True Story to maintain anonymity.

Type 3:

User type 3 represents a student who has still not decided about going or not going to university. If the user selects that they are still deciding, then the narrative of the story is such that there is balance between the decision of the characters in the story, i.e., one of the users friend wants to go to university and pressurises the users to also go to university, whereas the other friends does not want to go to university and pressurises the user to also not go to university. Throughout the game, both friends keep pressurising the user's avatar to make the same decision as them. The user is then presented with choices about what they would like to do, go to university or not. The user has to make this choice three times within the whole story, and all three times the friends pressure is high in influencing the user to not go to university. The pressure and influence is reinforced by making the facial expressions, dialogue, and general body language of the friend who he/she disagrees with extremely negative and sarcastic. However, the friends the avatar agrees with is extremely happy, positive and more accepting of the avatar. The narrative of the game for each scene is outlined below:

Scene 1 - The story starts off with showing the users avatar really confused about what to do. They discuss both the positive and negative side of going to university. The avatar plans on going to school to see what his/her friends are doing and discuss the options with them.

Scene 2 - Once the avatar reaches school, he/she finds out that one of the friend is planning to go to university (Friend 1 (female)), while the other is planning not to go (Friend 2 (male)). They both start encouraging and pressurising the avatar to follow them and not the other friend, and both give pro and cons about university. This is where the user has to make the first decision and agree with one of the friend – whether university is a good option or not. Whichever friend they agree with becomes really happy and positive towards the avatar. The facial expressions are very positive and pleasing. However, the other friend (who the avatar disagrees with) becomes extremely negative and sarcastic. This friend becomes even more adamant in pressurising the avatar into agreeing with him/her. Both the friends' influence increases and they want the avatar to agree with them.

If the user says that he/she might plan go to university (agreeing with Friend 1), then friend 2 becomes very negative and tries to talk the user out of making this decision. He even gives the user the idea of take a gap year and not go to university, in other words, he tries his best to change the users avatars decision. And if the user says that he/she does not want to go to university (agreeing with Friend 2), then Friend 1 retaliates and tries to talk the avatar out from making this decision. Friend 1 gives the avatar the idea of enrolling into university for now and then dropping out if he/she does not like it.

Scene 3 - Next, the avatar and friends go to the university introduction class which is mandatory for them all to attend. In this classroom, the teacher gives out higher education related statistics and asks the students to raise their hands if they are planning to go to university. Again, the friend who the avatar did not conform with is extremely negative, giving the avatar looks and passing comments so that they make

the same decision as them. The friend the avatar agrees with is also pressurising to not change their mind. Here the user gets a second chance to make a decision, whether they wish to stick to their decision (the first decision they made) or to change their mind and follow the other friend. They have to make the decision twice in the classroom scene.

Scene 4 - Finally, depending on the final decision the avatar makes (in the third choice), the avatar decides to go or not go to university. If at the end they decide to change their decision and follow their other friend (fall for peer pressure), they will then be shown the consequence of making that decision. So, if they decided to give university a try, but ended up falling for peer pressure from their friend and not go to university, then they will be shown the consequence of ending up in a dead end job and wasting a year. This is the same narrative as Persona 1, inspired by Participant 8 – *Falling for Peer Pressure*. And if the avatar does not want to give university a try and ends up following friends and going to university, then the avatars' future will show them not happy in university and deciding to drop out. This is the same narrative as Persona 2, inspired by Participant 16 – *Falling for Peer Pressure*. If the avatar resists peer pressure, then the narrative will again be the same as Persona 1 and 2, *Resisting Peer Pressure* (depending on whether they wanted to give university a try).

Scene 5 – At the end, they user is presented with a true story of the participant who this narrative was inspired by. After reading the true story, users are given the option to go back in time to change their decision.

6.2.7 Step 5: Test

After designing and developing 'My Next Step' game, a study was conducted to test whether it was effective in changing the behaviours of mid-adolescents, so that they are less susceptible to peer pressure from friends when making the decision to enter higher education. The next chapter covers this study in detail; how the study was conducted, and analysis of the results.

6.3 Summary

A persuasive technology, in the form of a persuasive interactive storytelling game was designed and developed in this chapter using a Design Thinking approach. To appeal to the target group, i.e. sixth form students, it was decided to develop an interactive game which could be played on a smartphone or table. The game, called, 'My Next Step', incorporates 10 persuasive design principles and was designed to enable the users to perform the target behaviour of mitigating peer pressure from friends when making the decision about higher education. The game addressed the Behaviour Wizard (Fogg BJ, 2009 (Behaviour Wizard)) to achieve this target behaviour, by boosting the motivation first and then delivering the trigger. The next chapter reports the study conducted to test the effectiveness of the game.

Chapter 7

Study 4 - Using a Persuasive Interactive Storytelling Game to Mitigate Peer Pressure

This chapter reports the fourth and final study undertaken for this research. This study involved an empirical study to test and evaluate whether using interactive storytelling as a persuasive technology can facilitate mid-adolescents to mitigate peer pressure from friends. This chapter first covers the motivation to conduct this study, along with the research questions it aims to answer. Then, the method and study design, including the procedure, data collection, data analysis and results are addressed. Finally, a discussion of the results and the key design considerations that need to be made to support mid-adolescents to mitigate peer pressure are detailed.

7.1 Motivation and Research Questions

Results from the first three studies made it evident that peer pressure played a vital role when it comes to making a decision about entering higher education. Individuals did not make an informed decision (when it came to deciding about higher education), instead they were influenced by their friends and followed their decisions.

Three out of the ten Study 1 participants (those who did not go to university) stated that they were negatively influenced by their friends, which is why they decided not go to university. For Study 2 participants (those who went to university), $n=20$, 'friends' influence' was the second most common constraint faced when making the decision to enter higher education. On the other hand, 5 out of the 20 participants from this same study, stated that they were positively influenced by peers and went to university because their friends were going. If their friends had not influenced them to go to university, then they would not have gone. In addition, the Kruskal Wallis test conducted in Study 3 validated the findings from Study 1 and 2 – friends' influence and peer pressure can play a vital role for mid-adolescents when it comes to deciding whether or not to go to university.

The effectiveness of the persuasive interactive storytelling game designed in the previous chapter (Chapter 6) was tested and evaluated in this study. Therefore the aim of this study was to investigate whether this persuasive technology helps mitigate peer pressure amongst mid-adolescents when it comes to considering higher education as an option for them. It addresses research question 7 (reported in section 1.2) -

RQ-5: Can an interactive storytelling game be used as a persuasive technology to facilitate in making an informed decision about the future?

This research question was broken down into four smaller and more specific ones as it is a high level question. Hence, this study contributed in answering the following research questions:

- **RQ-5.1:** Does persuasive technology mitigate negative influence of friends when considering higher education?
- **RQ-5.2:** Does persuasive technology raise awareness about impact of negative peer pressure from friends when considering higher education?
- **RQ-5.3:** Which of the persuasive design principles implemented are more effective in mitigating negative influence when considering higher education?
- **RQ-5.4:** Which of the persuasive design principles implemented are more effective in raising awareness about the impact of negative peer pressure when considering higher education?

7.2 Method and Study Design

7.2.1 Procedure

This study was aimed to be run with mid-adolescents (18 years). As studies indicate that mid teen develop an increased interest in their peers and are highly influenced by them (Steinberg & Monahan, 2007), the decisions and opinions of their friends matter a lot. Therefore, it was decided to work with this target group and investigate whether persuasive technology can be used to mitigate peer pressure when it comes to making the decision of entering higher education.

The participants for this study were sixth form students, aged 18 years. The study was conducted in two sessions, and for both sessions the researcher met the participant face to face. The study was run in the participants school (in a classroom), within normal school hours. In the first session, the participant was given a consent form to sign. Once they signed the consent form, they were given a Session 1 pre-study questionnaire to complete. This session took 10 minutes to complete. The second session was a bit longer as the participants had to complete three tasks; (i) Play the interactive storytelling game on the researcher's iPad, (ii) complete Session 2 post-study questionnaire, and (iii) take part in a short semi-structured interview. This session took about 45 minutes to complete. The second session was scheduled exactly one week after the first session. The consent form, Participant Information Sheet, pre and post study questionnaire and interview questions can be found in Appendix D.

7.2.2 Participant Recruitment and Ethical Considerations

To undertake this study, ethics approval was essential. The ethics form submitted (Appendix D.1) indicated that participants recruited for this study were not disadvantaged in any manner, and that their participation was voluntary. The only identifiable data collected from the participants was their name and email address,

which was used to keep track of the pre and post test scores and to send a thank you email to. This information was de-identified by assigning the participants an anonymous participant number (P1, P2, P3 and so on) when reporting the results. Before taking part in the study, the participants were given an Information Sheet, which briefed them about the study and how their data will be kept confidential and de-identified when reporting the results. The information Sheet clearly stated that there is no harm to the participants for taking part in this study, and that their participation is voluntary. An informed consent was obtained from the participants before they took part in the study.

The inclusion criteria for this study was that the participant has to be 18 years of age, and be a current sixth form student. The reason for this inclusion criteria is because these are the individuals who are deciding about higher education, and it would be best to test the effective of the persuasive technology with them. It would have been challenging to recruit participants who were in their first year of A-level because of their age (as they would be under 18), it was decided to recruit 18 year old who are still in sixth form.

Participants were recruited directly from schools. Convenience sampling was used to contact schools around West London, near Berkshire county. The schools contacted were given a summary of the study to be conducted, the scope and what role they can play in contributing to this research. Once agreed, the school gave a 'Letter of Support' in return highlighting how they can support in running the study and what they will do to help the researcher. The teacher in charge was given the recruitment flyer and Participant Information Sheet, which they forwarded to potential participants within the school; sixth form students who were 18 years of age. The recruitment flyers were also displayed in the schools bulletin board. Students who decided to take part in the study let their teacher know, and the teacher then sent the researcher a list of the students who were interested to take part in the study and what day/time they are available to meet for the first session.

7.2.3 Data Collection

A mixture of qualitative and quantitative data was collected from the participants; pre-test and post-test questionnaires (quantitative) along with a semi-structured interview (qualitative) were used. The questionnaires were used to collect data about the participant's susceptibility to peer pressure from friends when making a decision about higher education. The first questionnaire was given to the participants to complete in Session 1 (pre-study test), whereas the second questionnaire was given in Session 2, after they had played the game (post- study test). All participants were given both the questionnaires.

The first part of both the pre and post study questionnaire included an adapted version of the Peer Pressure Inventory (PPI) scale. The original scale was developed by Bradford Brown (Clasen & Brown, 1985) and is used to measure susceptibility to peer pressure. The PPI consists of pairs of statements (one on the left hand side and one on the right) describing peer pressure. For each pair, the participant has to read both the statements and decide whether their friends mostly encourage them to do the statements on the left or the one on the right. They then mark how much their friends encourage them, 'A little', 'Somewhat', 'A lot', or 'No Pressure' for each pair of statements. Each pair of statements is scored from a -3 to 3, with 'No

Pressure' scored as a zero. Subscale scores are derived by taking the mean of the statement scores. The PPI scaled developed by Brown included statements related to family influence, social influence, conformity in various aspects, such as in the home environment. As this study only involved measuring the friends' influence when deciding about higher education, none of the statements within the PPI measured or addressed this. Therefore, it was decided to use the same format and scale of the PPI, but instead develop a set of statements which are aimed at measuring the influence of friends in school when making the decision about higher education. The following statements (displayed in Table 7.1) were used in the PPI (pre and post questionnaire) to measure the susceptibility of the participant to peer pressure (before and after playing the game):

HOW STRONG is the influence from your FRIENDS to:	LOT	SOMEWHAT	LITTLE	NO INFLUENCE	LITTLE	SOMEWHAT	LOT	Or to:
Speak to the career advisor in school about future options	3	2	1		-1	-2	-3	NOT speak to the career advisor in school about future options
Take the UCAS introduction classes	3	2	1		-1	-2	-3	NOT take the UCAS introduction classes
Finish sixth form	3	2	1		-1	-2	-3	Drop out of sixth form
NOT think and research about your future options after sixth form	-3	-2	-1		1	2	3	Think and research about your future options after sixth form
Research the different courses you can do at university	3	2	1		-1	-2	-3	NOT research the different courses you can do at university
NOT make the same decision as them about higher education	3	2	1		-1	-2	-3	Make the same decision as them about higher education
Consult friends to see what choices they are making about higher education	3	2	1		-1	-2	-3	NOT consult friends to see what choices they are making about higher education
NOT be confident in your decision about higher education	-3	-2	-1		1	2	3	Be confident in your decision about higher education

Table 7.1– Adapted version of the Peer Pressure Inventory Scale

As the second questionnaire was completed in Session 2, it was used to measure whether the participants susceptibility to peer pressure increased, decreased, or had no change, after playing the persuasive game. It also included Part 2, which was an additional Likert scale based rating question with nine statements. Participants had to rate the statements from a scale of 1-7 (where 1 is 'Not Important' and 7 is 'Extremely Important'). This was used to evaluate how effective the persuasive features and design principles incorporated in the game were in influencing the participant's behaviour or attitude. Statements included in

Part 2 of the questionnaire are detailed below, and the design principles which these statements refer to are included in the brackets (the design principles were not mentioned in the questionnaire statements):

- **Statement 1:** I took more interest in the game because I could customise my character and give it a name (*Personalisation*)
- **Statement 2:** I wanted to complete the game to see how my decisions affected my avatars' future (*Simulation*)
- **Statement 3:** I could relate to the choices my avatar had to make as I have to make similar choices in school (*Similarity*)
- **Statement 4:** The 'Well Done' or 'Oh no' message encouraged me to make better choices for my avatar (*Conditioning*)
- **Statement 5:** The prompt suggesting me to go back in time and change my decision was useful as it helped me see how my avatars fate changes with the decisions I make (*Suggestion*)
- **Statement 6:** I believed the statistics because the *teacher* was mentioning them (*Authority*)
- **Statement 7:** The true stories were useful in helping me understand the consequences of friends' influence (*Social Learning*)
- **Statement 8:** It was important for me to verify where the statistics and true stories were referenced from (*Trustworthiness*)
- **Statement 9:** I wanted to play the game because 'Episodes' is popular amongst my friends and in school (*Liking*)

7.2.4 Data Analysis

Quantitative Analysis – Pre and Post Study Questionnaires

The pre and post study questionnaires include a Peer Pressure Measuring Scale, which measures how much of an influence friends have on the participant in regards to making a decision about higher education. The same scale is used in the pre and post study questionnaire in order to compare the results and statistically measure the change after the study (if any). Results of this Peer Pressure Measuring Scale was used to answer research question 5.1 -

RQ-5.1: Does persuasive technology mitigate negative influence from friends when considering higher education?

The Peer Pressure Measuring Scale is an adaptation of the original Peer Pressure Inventory Scale (Brown, & Clasen, 1985). Although the statements within the scale have been redesigned and altered to fit the aim of this research study, the original method for scoring this scale is employed. Each statement in the scale is scored from -3 to +3, with the 'No Pressure' option scored as zero. The absolute scores (1, 2 and 3) indicate a positive influence from friends, whereas a negative score (-1, -2 and -3) indicate a negative influence. In the end, the subscale score is derived by taking the mean of the statement scores. In the original scale, there are five subscales, each having about eight statements. However, in our adapted version of the scale (which was used in this study), we only had one subscale, i.e. friends' influence, with

eight statements. Therefore, to measure the results for this scale, the average for all the eight statements score was derived for each participant. An average for each participant was derived for their pre and post study responses.

Once the pre and post average score for each of the participant was determined, the next step was to analyse whether there was a statistical difference in the pre and post study scores. To see whether the participant's behaviour changed after the study (after playing the persuasive game), making him/her less susceptible to friends' influence when making the decision about higher education. To test the statistical difference in the pre and post study responses, a two-tailed Wilcoxon signed ranked test was used. The Wilcoxon signed-rank test is a non-parametric statistical test that is used to compare two related samples, matched samples, or repeated measurements from the same sample, to assess whether their population mean ranks differ (Leard Statistics, 2018). Our study consisted of a 'related sample' as the same participant was present in both parts of the study (pre and post study). This test will determine whether there is a statistical difference in the responses of the participants before and after playing the game.

Besides having a related sample, another assumption which is required for a Wilcoxon signed-rank test to give a valid result, is that the variables should be measured at the ordinal or continuous level. As the statements within our Peer Pressure Scale are scored from -3 to +3, it was the case that the mean scores derived for some of the participants were a negative value. The Wilcoxon test would not give a valid result if it has any negative variables being measured. Therefore, to overcome this, it was decided to convert any negative mean scores into an absolute number by just removing the negative sign. So for example, a mean score of -2.2 would be converted into 2.2, so that it meets the assumptions of the Wilcoxon test and ensures validity of the results. The negative score in the Peer Pressure Measuring Scale (-3, -2 and -1) meant that influence from friends was negative for the statement. For example, 'My friends' influence me to NOT take the UCAS introduction classes'. We could argue that in our study we are not focusing on whether the influence from friends is positive or negative, we are trying to measure whether the influence has been mitigated, decreased, regardless of whether it is positive or negative. Therefore, converting the mean scores into an absolute score will not have any impact on the overall results as we are not interested in measuring a difference in the positive or the negative influence, but are interested in measuring whether there has been any change at all in regards to mitigating friends' influence. The original scale incorporates the positive and negative scale it measures various aspects of peer pressure, such as family involvement, peer involvement, and it measures whether the pressure is positive or negative. SPSS, a software platform that offers advanced statistical analysis, was used to run the Wilcoxon signed rank test and analyse the results. The null hypothesis for this test is – *There is no statistical significant change in the behaviour of participants after playing the game.* We will test to see whether there is any change in the participants behaviour, whether the game helped in mitigating peer pressure from friends or not.

In addition to the Peer Pressure Measuring Scale, the post study questionnaire included a Likert scale question where participants were asked to rate 9 statements from a scale of 1-7 (where 1 is 'Not Important' and 7 is 'Extremely Important'). Each statement addressed one of the design principles incorporated within the game. Responses for these statements were collected, and a descriptive statistics including the average and standard deviation for each of the statements were calculated for analysis. The mean for each

statements (design principle) will help assess which design principles have been were effective or not. The interviews will then help interpret why.

Qualitative Analysis – Interviews

The interviews were audio recorded and transcribed for analysis. The audio recordings were transcribed fully, so that pauses (transcribed as '...') and utterances (transcribed as 'umm', 'uh' etc.) were all included. No notes were taken during the interview. There was no mention of the participant's school name in the interview, and any identifiable information such as the participants name was anonymised by substituting it with the participant number. For example, "*Hi Aamna*" would be de-identified and transcribed as "*Hi [P1]*".

NVivo, a qualitative data analysis software, was used to analyse the interview data. All the transcripts were imported into NVivo to do the qualitative analysis. Thematic analysis using a combination of inductive and deductive approach was used to analyse the data. Thematic analysis is the process of identifying patterns or themes with qualitative data (Braun & Clarke, 2006).

The first step in starting the analysis was to use the deductive approach. In this approach, a set of pre-defined codes were initially used to analyse the transcribed data. The codes were defined as such so that they answer the research questions (RQ-5.1 and RQ-5.2); (i) Mitigate Peer Pressure and, (ii) Raise awareness about peer pressure. Although RQ-5.1, is already answered in the quantitative analysis (through the Peer Pressure Measuring Scale), the qualitative analysis will help answer the research question further, giving an insight about how persuasive technology supported or not supported the behaviour change and why. If the participants mentioned anything about the game helped them in mitigating peer pressure, then they were asked to explain further about which part of the game made them feel this way. This information would then be used to help answer research question RQ-5.3:

RQ-5.3: Which persuasive design principles implemented are more effective in mitigating negative influence when considering higher education?

The second code, raising awareness about peer pressure, will be used to answer research question 5.2:

RQ-5.2: Does persuasive technology raise awareness about the consequences of friends' influence when considering higher education?

The quantitative data (questionnaires) do not answer this research question, hence, the interview was used to answer this. The definitions of the two pre-defined codes are shown in Table 7.2, the definition explains what kind of statements were looked for when coding the data.

Code	Definition
1. Mitigating Peer Pressure	Statements regarding the participant mentioning that he/she will not listen to friends now, or not follow friends, and/or make their own decisions after playing the game
2. Raise Awareness about Peer Pressure	Statements regarding the participant mentioning anything related to increased knowledge, learning something new, or that they are now thinking about friends' influence after playing the game

Table 7.2– Pre defined codes for the Qualitative Analysis

Employing a deductive approach and having a pre-defined set of codes, is useful to start the analysis with because we are then able identify the main themes within the data straight away, and code data which answers the research question. By doing so, we do not get distracted or confused with coding other data, we are only focused on these particular codes. The transcripts were first read to only code data which related to these pre-defined codes.

Next, sub-themes or sub-codes within the pre-defined codes were identified. Within both these pre-defined codes, there were themes and patterns emerging. So for example, there were various factors which accumulated in helping participants 'mitigate peer pressure', and it was the same case with 'raising awareness about peer pressure'. All the codes within the two pre-defined codes were read, analysed, and grouped together (for those which were similar) in order to create sub-codes or sub-themes. These sub-themes help answering the research question further as it helps in assessing which factor played a role in mitigating or not mitigating peer pressure, and in raising awareness. It also helped determine which design principle helped achieving it (if any). If the participant mentioned anything related to a design principle incorporated which affected them and helped them mitigate peer pressure or raise awareness in particular, then the sub-theme is for that design principle. This helped in answering research question 5.3 and 5.4, to see which design principles aided in mitigating peer pressure and raise awareness about peer pressure and which were most and least effective -

RQ-5.3: Which persuasive design principles implemented are more effective in mitigating negative influence when considering higher education?

RQ-5.4: Which persuasive design principles implemented are more effective in raising awareness about the consequences of friends' influence when considering higher education?

Once the analysis of the research question codes and sub-codes was completed, the second part of the analysis involved a deductive approach again, but this time for a set of pre-defined codes for the nine design principles. A code was defined for each of the design principle incorporated within the game; (i) *Personalisation*, (ii) *Suggestion*, (iii) *Similarity*, (iv) *Simulation*, (v) *Social Learning*, (vi) *Authority*, (vii) *Trustworthiness* (viii) *Conditioning*, and (ix) *Liking*. The transcripts were read through and any whenever a participant mentioned anything relating to a design principle, that was coded under that particular design principles code. It must be noted here that if the design principle mentioned addresses the research questions (mitigate peer pressure or raise awareness), then the design principle would have been coded under the research questions codes. However, if the participant makes a general comment about the design principle, then that it coded under the design principles code. For example, if the participant says "*The true stories in the game has raised my awareness*", then this will be coded under 'Raise awareness about peer pressure' code. However, if the participant makes a general comment saying "*The true stories were good*", then this will be coded under the design principle 'Social Learning' code. If a participant mentions anything related to a specific design principle twice in their interview, both comments would be coded, but counted as one instance, as it came from the same source. Each of the codes within the design principles were then read through to check for emerging patterns and themes within the design principles.

The similar codes would be grouped together to form sub-themes within the design principles codes. This would help further interpret which design principles were more effective and why.

Lastly, an inductive thematic approach was undertaken. The interview transcripts were re-read to explore additional patterns and themes which would help contribute to understanding the data further and give an insight on aspects such as the participant making a HE related decision and/or how they were impacted by playing the persuasive game. This would include data that has *not* already been coded under one of the design principles or research questions codes. These codes were once again analysed to check for similarities and differences. Similar answers were grouped together to form additional codes/sub-codes.

7.2.5 Final Codes

After completing the coding of the transcribed interviews, the final coding scheme had the following 5 *main* codes – (i) Mitigating Peer Pressure, (ii) Awareness about Peer Pressure, (iii) Other Perceived Behaviour Change, (iv) Implementation of Design Principles, and (v) Comments and Suggestions. Each code had various themes and patterns, these themes were grouped together to form sub-codes. Definitions of the five main codes and their sub-codes are outlined in Table 7.3.

Code	Sub-codes	Definition
1. Mitigate Peer Pressure	1a. Mitigated Peer Pressure	Participants mentioning the part of the game which helped them change their behaviour, so that they are less likely to be influenced by friends
	1b. Did not mitigate Peer Pressure	Participants mentioning the part of the game which instigated (or could have instigated) them to be influenced by friends
2. Awareness about Peer Pressure	2a. Raised Awareness	Participants revealing which parts of the game helped raise their awareness about the consequences of peer pressure from friends
	2b. Did not raise Awareness	Participants revealing that the game did not increase their awareness
3. Other Perceived Behaviour Change	Research	Statements revealing that the participant will now research his/her future options (after playing the game)
	Rethink Friends Choice	Statements revealing that the participant will now rethink their friends choice (after playing the game)
	Be prepared for negative people	Statements revealing that the game has helped the participant to be better prepared on how to deal with negative people
4. Implementation of Design Principles	4a. Had impact	Statements revealing that the design principles incorporated within the game had an impact on the participant
	4b. Did not have impact	Statements revealing that the design principles incorporated within the game did not have any impact on the participant
5. Comments and Suggestions	5a. Liked about the game	Statements revealing what the participants liked about the game
	5b. Did not like about the game	Statements revealing what the participants did not like about the game

Table 7.3– Definition of Codes – Qualitative Analysis

Codes 1, 2, 4 and 5 have two sides; one positive and one negative. The two sides enable us to answer the research questions systematically as the code is analysed from both perspectives. For example, for Code 1 (Mitigating Peer Pressure), the positive side is 'Mitigate Peer Pressure' (sub-code 1a), whereas the negative side is 'Did not Mitigate Peer Pressure' (sub-code 1b). Having the two sides allowed us to analyse both the good and bad in the game, those parts which facilitated in mitigating peer pressure as well as those which did not. RQ-5.2 is asking whether the game helped in raising awareness, and RQ-5.4 asks which of the design principles helped in raising awareness (if any). In the interview, if the participant specifically mentioned that a particular part in the game helped raise their awareness, then that was coded under Code 2. Therefore, this code will help answer if the game raised awareness, and the sub-codes, Code 2a and 2b, will support in establishing which design principle helped and which did not. This code is covered in detail in section 7.3.5 – Code 2 – Raised Awareness about Peer Pressure.

The same case applies to Code 1a and 1b. These two sides of the codes will help identify which of the design principles in the game facilitated users in mitigating peer pressure from friends, answering RQ-5.3. This code includes the participants' responses if they directly mentioned that a particular part in the game helped in changing their behaviour, so that they will now follow their friends anymore. Any direct references made by the participant in terms of mitigating peer pressure and which part helped them in doing so, was coded under Code 1. This code is explained further in section 7.3.4 – Code 1: Mitigated Peer Pressure.

In addition, the participants were asked to comment on some of the features of the game, which were the design principles incorporated. There were times when the participants mentioned that specific features had some kind of impact on them and the way they played the game, but there was no direct reference made to whether it had an influence on them changing their behaviour so that they mitigate peer pressure. It was a general comment made where they said it did or did not impact them. Any indirect references made about the design principles which the participants thought had or did not have any kind of influence were coded under Code 4 – Design Principles. This code will help identify the design considerations for supporting middle to late adolescent users in mitigating peer pressure. We will be able to conclude how the design principles are perceived by this target group and which principles prove to be more persuasive and why. Analysis of this code is covered in section 7.3.7 – Code 4: Design Principles.

The remaining categories served the purpose of collection of additional information that helped enlighten new areas and/or helped interpret the research questions further. An overview of the final codes is presented below:

1. Mitigate Peer Pressure
 - 1a. Mitigated Peer Pressure
 - 1.1a. Negative Attitude of Friends
 - 1.1b. Avatar Struggling
 - 1.1c. Design Principle
 - 1b. Did not Mitigate Peer Pressure
 - 1.1b. Negative Friends

-
2. Awareness about Peer Pressure
 - 2a. Raised awareness
 - 2.1a. Design Principles
 - 2.2b. Negative Attitude of Friends
 - 2b. Did not raise awareness
 - 2.1b. Already aware
 3. Other Perceived Behaviour Change
 - 3.1 Research
 - 3.2 Rethink friends choice
 - 3.3 Be prepared for negative people
 4. Implementation of Design Principles
 - 4a. Had impact
 - 4b. Did not have impact
 5. Comments and Suggestions
 - 5a. Liked about the game
 - 5b. Did not like about the game

In the next section, the results of the quantitative and qualitative analysis are covered in detail.

7.3 Results

The results of this study are detailed in the following order. First, the results of the quantitative data analysis, Wilcoxon signed rank test are covered, which answers RQ-5.1. This is followed by a comprehensive analysis of the qualitative data, giving us an insight about how the persuasive game influenced in changing the behaviours/attitudes of the participants, and which parts of the game (which design principles) helped bring this change. This analysis will help answer RQ-5.2, RQ-5.3 and RQ-5.4. Results of the reliability check for the application of the coding scheme on the interview transcripts, as well as the participant's comments/suggestions about the persuasive game are also included in the qualitative data analysis section. In the end, a discussion of the analysis and the design considerations for supporting middle to late adolescent users in mitigating peer pressure are covered.

Quantitative Analysis

There were two parts to the quantitative analysis results - the Wilcoxon signed rank test for the Peer Pressure Measuring Scale to measure if there was a change in a participant's behaviour/attitude after playing the game (which answers RQ-5.1), and a descriptive statistics of the responses to the design principle statements which were in a 7 point Likert scale based format.

7.3.1 Did the Persuasive Game Help Mitigate Peer Pressure from Friends when Considering Higher Education?

SPSS software was used to generate two different outputs for the Wilcoxon signed rank test; *Test Statistics Table* and *Ranks Test Table*. In addition, a *Descriptive Statistics Table* was also selected to be part of the output. Each output helps analyse and interpret the results in detail. See Appendix D.10 and D.11 for the pre and post study scores of the susceptibility to peer pressure, and D.12 for a screenshot of the Wilcoxon test results on SPSS, showing the three output tables. Table 7.4 displays a summary of the Wilcoxon Signed Rank Test result.

Pre-Test Score Average	Post-Test Score Average	p-value	z-value
1.3	0.92	0.002	-3.126

Table 7.4 – Pre and Post Study Scores Averages of Friends' influence for the 21 Participants including the p-value and z-value for Wilcoxon Signed Rank Test

By examining the results of the test, we can determine that overall the post-test score average of friends' influence for the 21 participants is lower than the pre-test score. As a score of 0 (zero) means that there is 'No Influence, we can say that after playing the game, the influence of friends has decreased in the participants overall. Moreover, the p-value for the test is 0.002. As the p-value is less than the significance level of 0.05, we can reject the null hypothesis. Therefore, we conclude with the following to answer research question 7.1:

A Wilcoxon signed-rank test showed that playing a persuasive interactive storytelling game elicits a statistically significant change in lowering the negative peer pressure from friends when considering higher education ($Z = -3.126$, $p = 0.002$). The mean scores of friends' influence after playing the game (post-test results) were lower than the scores before playing the game (pre-test results). *The persuasive game therefore did help in mitigating the influence of friends when deciding about higher education.*

In addition, we used the Rank Test table to drill through the data, and see a breakdown of the pre and post test scores for each participant. From this table, we can determine that 16 participants had a lower post-test average score, meaning that their influence from friends decreased after playing the game. However, 4 participants had a higher post average score, stating that their influence increased after playing the game and 1 participant had no change in their friends' influence score. Figure 7.1 below illustrates the pre and post study average scores of friends' influence for the 21 participants.

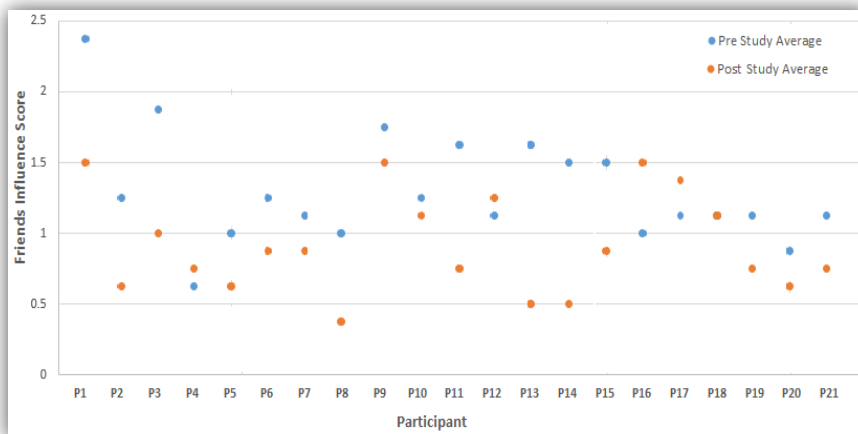


Figure 7.1 – Pre and Post Study Scores Averages for Friends' influence

However, the average for all the participants scores along with the Wilcoxon test p-value determine that there is a statistically significant difference in the participants score after playing the game, hence, the persuasive game does help in mitigating peer pressure from friends when considering higher education. The susceptibility of peer pressure scores can be found in Appendix D.10 and D.11.

7.3.2 Design Principles Rating

For the second part of the quantitative analysis, participants were asked to rate the design principles from a scale of 1-7 (where 1 is 'Not Important' and 7 is 'Extremely Important'). A summary of the results are presented in Table 7.5 below, the table is ordered in ascending order of the most important design principle (with the highest average):

Design Principle	Average	SD
Authority	5.9	0.94
Personalisation	5.71	1.15
Liking	5.67	1.2
Similarity	5.57	0.87
Conditioning	5.43	1.03
Social Learning	5.38	1.47
Simulation	5.1	1.22
Trustworthiness	4.95	1.28
Suggestion	3.48	1.66

Table 7.5 – Descriptive Statistics of the Persuasive Design Principles

As seen from the table above, on average the participants rated for 'Authority' design principle to be most effective and important within the game and then 'Personalisation'. However, 'Suggestion' was given a low

score, either because the participant did not like it in general or did not see its use in the game. The qualitative analysis of the interviews will help give answers to why the participants scored how they did. Analysis of the design principles is covered in section 7.3.6. The next section covers a detailed analysis of the qualitative analysis.

Qualitative Analysis

This section includes a comprehensive analysis of the interview data and aims to answer RQ-7.2, RQ-7.3 and RQ-7.4.

7.3.4 Code 1 – Mitigate Peer Pressure

From the Wilcoxon signed rank test (section 7.3.1), we already determined that the persuasive game helped in mitigating peer pressure, as there was a statistically significant difference in the influence from friends before and after playing the game. This code however, is then used as an add on, to help interpret which part of the game aided in changing the participants behaviour. This will give us an insight into what design principles embedded in the game supported in achieving these results, allowing us to answer research question 7.3:

RQ-7.3: Which persuasive design principles implemented are more effective in mitigating negative influence when considering higher education?

In the interview, if the participant mentioned specifically that a particular part in the game has influenced them to change their behaviour, so that they will now resist peer pressure, then this response was coded. The coded responses were then grouped (if they were similar) to form a sub-theme within the positive side of this code 1a – 'Mitigated Peer Pressure'. There were 10 participants who specifically mentioned that they will now not be influenced by friends and which part of the game in particular helped change their behaviour. They used terms like, *"I wouldn't listen to my friends from now [P4]"*, *"I will listen to myself rather than listen to my friends...after playing the game I think I will think twice before listening to anybody else [P9]"*. These kind of comments indicate that the game has facilitated in changing the participants behaviour so that they are not influenced by friends. Alternatively, two participants mentioned that particular features of the game could have persuaded them to fall for peer pressure instead, influencing them to change their behaviour so that they are *not* able to resist it. These were coded and grouped as a sub-theme under the negative side of this code 1b – 'Did not Mitigate Peer Pressure'.

In the end, there were four evident parts in the game which the ten participants claimed had influenced in changing their behaviour (sub-themes for 1a Positive). All the participants mentioned only one part of the game which facilitated in changing their behaviour. Although there were specific design principles incorporated within the game with the purpose of persuading users to change their behaviour, only three participants mentioned those design principles. The rest found other parts of the game (which were not intended to incorporate any particular design principle) to be persuasive in changing their behaviour. This result was unanticipated. It proves that different persuasion strategies work on the different target groups, there is no standard set that can be used for all target groups. In this study, the target group (adolescents)

found other parts of the game persuasive which were not intended to be persuasive and were not designed in that manner. The parts of the game which had the persuasive design principles implemented took less precedence. Table 7.6 below outlines the sub-themes which emerged and the number of participants who mentioned that response. The definitions of all the sub-themes for this code can be found in Appendix 6.

1a. Positive Mitigated Peer Pressure		1b. Negative Did not Mitigate Peer Pressure	
Sub-Theme	No. of Participants	Sub-Theme	No. of Participants
1.1a Negative Attitude of Friends	5	1.1b Negative Friends	2
1.2a Avatar Struggling	2		
1.3a Design Principle			
• Statistics (Authority)	2		
• Simulation	1		
• Social Learning	1		

Table 7.6 – Sub-themes for Code 1 – Mitigated Peer Pressure

1.1a Negative Attitude of Friends

Five participants (P6, P8, P10, P11, and P12) mentioned that after playing the game, they will not be influenced by friends anymore; the game helped in changing their behaviour. They stated that the *negative friends* in the game contributed in changing their behaviour. This response of theirs was unexpected. In the narrative of the game, once the user selects whether they want their avatar to go to university or not, the story progresses so that all the characters in the game (friends and classmates) start pressurising the avatar to change their mind and do the opposite. So for example, if the user selected that they want their avatar to go to university, then all the friends in the game pressurise the avatar to not go to university as they themselves are not going. The friend's characters have an extremely negative attitude towards the users' avatar if the user does not follow or agree with them. However, there were two participants (P14 and P20) who commented that if the game was longer and the negative friends had been more consistent in putting their pressure, then they would have ended up falling for their pressure (sub-code 1.1b). P20 said, *"if they kept pressurising you, if the questions kept coming again and again I might have changed my mind, but I still stuck to it"*.

The aim of including this negative pressure from friends in the game was to see whether the participants end up listening to their friends or not, and to progress the story to show what the consequences can be if they end up following their friends. It was not intended to be persuasive or to change the participants behaviour as there were other parts in the game which were intended to do so). Therefore, there was no persuasive design principle incorporated within this part of the game (the negative pressure of friends), it was just there as part of the story. The list of design principles incorporated within the game are covered in

Chapter 6 – Design of the Persuasive Game. However, how the participants perceived this part of the game was unanticipated. This negativity from the friends pressurising the participant to make an opposite choice proved to be persuasive enough to change the behaviours of five participants. The friends telling them to do the opposite persuaded the participant to stick with their decision and not listen to their friends. What we saw here is similar to the concept of *reverse psychology*, where you motivate someone to do a behaviour by telling him to do the exact opposite.

One of the participant mentioned “...it has made me feel like I need to be a bit more stern with my choice...the friends were just mad annoying. They were really persistent and I was like get lost [P10]”. In another part of the interview he mentioned his friends again saying “All the friends were selfish and put themselves number one. When you say no once then respect my choice, but I had to keep repeating myself. It just made me retaliate [P10]”. Another participant mentioned that the game has changed their approach, and their approach is now to follow your instincts. The part of the game they mentioned which changed their approach was, “The part where the friends say that uni is a waste of time and you shouldn’t be going. I mean they could have asked me in return what I like about the course, things like that you know, why I am studying it, instead of just going to the negative [P8]”. P11 stated “The friends helped me to see, because I thought that you know what I’m going to carry out my decision regardless of what my friends would think of me [P11]”.

Reverse psychology is proven to be more effective with people who are resistant by nature and hate being told what to do, hence people who are over-confident are more susceptible to reverse psychology (Macdonald, Nail & Harper, 2011). P10 portrayed signs of having a resistant and confident nature, which could be why these negative friends persuaded him to follow his own instincts and not listen to them (mitigate peer pressure). P10 said, “I am the leader of my friends, that’s how it works”.

After analysing this sub-code, we can conclude that ‘Reverse Psychology’ can be used as a persuasive strategy to motivate mid adolescents to perform a target behaviour, as it helped five participants be less susceptible to peer pressure from friends. It should however not be too persistent, or too much, as it could influence some users to fall for the pressure (as the two participants suggested that if pressure from the friends continued then they would have fallen for it). In addition, a study conducted by the University of Texas (Bryan, et al, 2016) has already proven that this approach works well with adolescents. In their study they used reverse psychology to motivate adolescents to eat healthy and were successful in achieving the desired results. Looking back at the persuasive design principle/strategies identified by Fogg (Fogg, 2002), Cheng (Cheng, 2013), Harri Oinas’s PSD model (Oinas-Kukkonen, 2010) and Cialdini’s seven persuasion strategies (Cialdini & Goldstein, 2002), none of them include having reverse psychology or anything similar. Hence, on the basis of this study and results analysis we can suggest a new persuasive design principle which can help users reach their target behaviour – *Reverse Psychology*.

1.2a Avatar Struggling

Another unexpected response given by two of the participants (P4 and P21) which helped change their behaviour was seeing how their avatar is struggling to make a decision and raise their hand. P21 said,

“...when the characters friends are saying to not go to uni it's a waste of time, and he [character] is struggling to raise his hand or not”. The avatars expressions were designed to look indecisive and tense every time they had to make a decision about following friends or not. The expressions were designed in a way so that it replicated how some people would react in real life. A screenshot of the game showing the avatar struggling to make a decision is displayed below.



Figure 7.2 – Screenshot of game showing the avatar struggling to make a decision

The avatars expression were not designed to facilitate users in changing their behaviour, as this part of the game did not incorporate any specific persuasive design principles. However, these two participants revealed that seeing their avatar struggling was not a good sensation, and that alone persuaded them to perform the target behaviour of mitigating peer pressure. This element of highlighting sensation is BJ Fogg's core motivator #1 – Pleasure/Pain. The element of pain has already been incorporated within the game, but in a different part when users see a simulation of their avatars' future. If the user decides to follow his/her friends then they see their avatar unhappy and regretting their decision, highlighting the core motivator - *pain* (detailed in Chapter 6 – Design of the Persuasive Technology). However, these two participants reveal that the avatars present (when he/she is in the classroom) was highlighting pain for them. The worried and tense emotions depicted by the avatar helped these participants feel the core motivator #1 - Pain (sensation), persuading them to perform the target behaviour and mitigating peer pressure. Therefore, incorporating pain as an emotion, expression or simulation can have an effect on the users and motivate them to perform a behaviour.

1.3a Design Principle

Statistics (Authority)

Only two of the participants (P13 and P16) mentioned that the statistics presented in the game gave them the confidence to stick to their decision, enabling them to not be influence by others. P13 said, “*I think the*

game has just reaffirmed, it has given me confidence in what I want to do is right", and P16 said, *"the figures which are based on pure facts...I think that will make my decision even stronger"*.

The game was designed in a manner so that a teacher in the classroom spoke about the statistics. The main objective to design it in this manner was to implement the design principle 'Authority' (detailed in Section 6.2.6.5 - Persuasive Design Principles Applied). As the teacher represents authority in the classroom, they have a higher persuasion power, because the users are likely to believe what he/she says. The two participants did confirm that the statistics presented have given them more confidence, however, only one of them mentioned believing the statistics because it was a teacher who gave them out. She said, *"I think that if its coming from a teacher its probably got some background to it. Whereas if it came from a friend I think I'd have to research myself [P13]"*. The other participant was not concerned whether it was a teacher giving them out or not.

This code indicates that we can support mid adolescents in making informed decision about their future by giving them real facts and statistics about the related topic. Knowing these facts will raise their awareness, and will equip them to be confident in their decision so that they do not get influenced by others.

Simulation

Surprisingly only one participant (P9) mentioned that seeing a simulation of their avatars' future made them realise that they need to follow their own instincts and not follow friends. When designing the game, the design principle 'Simulation' was implemented with the intent that it will be one of the most important design principle which will play a major role in persuading the users to change their behaviour. Allowing the users to observe the link between the cause and effect, of how their decisions impact their avatars' future, was one of the key aspect of the game. The aim was to show users how their future can be effected if they follow friends, and by showing them this direct link it would persuade them to not follow friends. Instead, only one participant stated that their avatars' future simulation facilitated in changing his behaviour. He said, *"Me not having played the game, I would not think again and would just do what everybody is doing...but now after playing the game I think I will think twice before listening to anybody else. The part that made me realise was when I was working in the office and I was regretting it, it gave me a second chance [P9]"*.

However, it must be taken into account that out of the 21 participants, only 3 of them actually followed their friends in the game and saw the consequences of how their avatars fate changes because of this decision. All three participants who saw this consequence were effected in some way, some said it will help them research their options further (covered in section 7.3.5), whilst others said that seeing their avatar in such a state has given them awareness about what can happen in the future (covered in section 7.3.4). So, the simulation did have an influence in changing the users behaviour, but only one participants performed the expected target behaviour of mitigating peer pressure after seeing the simulation. A design consideration we should take into account after analysis this code is that as part of the game, the consequence of following friends should have been shown to all the users. At the end of the game the users could have been shown the alternative, a simulation of what could have happened if they had not made the decisions.

Social Learning

Only one participant (P9) mentioned that the true stories presented in the game has encouraged him to follow his instincts. He said, *“it definitely impacted me, and it prompted me to you know listen to myself”*. This participant also mentioned that seeing their avatars' future (simulation) also persuaded him to not follow his friends.

7.3.4 Code 2 – Raise Awareness about Peer Pressure

In the interview, if a participant mentioned directly that a particular part in the game helped raise their awareness about the consequences of peer pressure, then that was coded under 2a – ‘Raised Awareness’. There were 11 participants who stated that the game has raised their awareness in some way, and also specified which part of the game made them feel this way. They used terms like *“the game sort of opened my mind up[P9]”, “it showed me things outside the box[P2]”, “they make you think further[P8]”, “the game gets you thinking a little bit [P20]”* and *“it gave me an insight [P21]”* which indicate that the game did help raise awareness. However, there were two participants who stated that the persuasive game did *not* increase their knowledge, as they were already aware of the consequences of peer pressure. Though they did confirm that certain parts of the game helped in highlighting the consequences. These were coded under 2b – ‘Did not Raise Awareness’. This code will help answer research questions RQ-7.2 and RQ-7.4.

Table 7.7 below outlines the sub-themes that emerged after interpreting the participant's responses, enabling us to identify which aspects in the game helped raise awareness about peer pressure. Three of the design principles incorporated within the game helped raise awareness, and three participants commented on how the negative attitude of their friends facilitated in raising their awareness. Definitions of all the codes can be found in Appendix 6.

2a. Positive Raised Awareness		2b. Negative Did not Raise Awareness	
Sub-Theme	No. of Participants	Sub-Theme	No. of Participants
2.1a Design Principle		2.1b Already aware	
• Social Learning		• Social Learning	1
○ Confidence	5	• Statistics	1
○ Learn from others	4		
○ Rethink decision	3		
• Simulation	3		
• Statistics (Authority)	2		

Table 7.7 – Sub-themes for Code 2 – Raise Awareness about Peer Pressure

2.1a Design Principle

Social Learning

When designing the game, the purpose to include the true stories at the end of the game was to increase the users awareness of how following friends has impacted people in real life, and how they can resist it. The true stories were displayed so that users learn from others and do not make the same mistake. This was incorporated under the design principle 'Social Learning', so that the users are able to see what the outcomes were when others performed the same behaviour (of following or not following friends). 12 of the participants (P2, P3, P4, P5, P8, P10, P11, P13, P14, P16, P18 and P21) revealed that the true stories presented helped in increasing their awareness. Some participants specifically mentioned that the true stories were good in giving them an insight and highlighting how peer pressure has affected others in real life, and this has led them to think about their actions/decisions more carefully and learn from other mistakes, to rethink their decision. P4 said, *"looking at the real stories it made me realise that some people wasted the whole year from listening to their friends, so its quite a big deal"*, and P5 mentioned *"reading other people's stories it just opened my mind up a bit and gave me second thoughts about my decisions"*.

Whereas for some participants, reading the true stories gave them confidence or reassurance in the decision they were making. They mentioned that as they are now aware of the fact that there are others who went through the same situation and ended up having a positive outcome, it assured them that they could have a positive future too. P14 said, *"That's like reminding me or assuring me that I was making the right decision because there are other people out there as well who are in the same boat as me"*. P3 stated, *"So what I learnt is that me myself personally I was really worried about going to uni. I was worried that I might not have a social life, my friends they may not talk to me because they weren't going, but it's made me realise that you know what its okay. Especially the true story in the end where it says that you know the gentleman Michael he had friends as well whilst going to uni so that quite good"*. P2 mentioned, *"it showed me things outside the box which show that I can have other options as well...the true story described a guy who didn't go to uni and he done his apprenticeship. So it made more positive impact because uni is not always the option, so I'm happy with my choice"*.

Social learning was the most prevalent design principles when it came to raising awareness about the consequences and impact of peer pressure. It helped shed light on the topic of peer pressure from friends and how it can influence your future and highlighted how much of a big impact this can have as it has already affected others in real life. Bringing in scenarios from real life makes the users take the topic more seriously, as they know it is happened to someone similar to them. It also allows us to get the users thinking about how they need to reconsider their decisions so that they are not affected in the same way, enabling them to learn from others mistakes. As P10 said, *"I found it quite astonishing that there is someone in a similar situation...but I learnt that people can overcome things like this"*.

Simulation

Three participants (P9, P15 and P18) commented on how seeing their avatars' future helped them learn something new, which raised their awareness about peer pressure. In the game, if the participant followed

their friends then the simulation of their avatars' future was not good as it showed the consequences of peer pressure, whereas, if they did not follow their friends then the simulation of their avatars' future was good, showing a positive outcome for resisting peer pressure. Both simulations of their avatars' future, the good and bad, were effective in raising awareness.

Two of the participants said that they were influenced by their friends in the game and ended up following them. However, as the game progressed they saw how their avatars fate had changed and saw what the consequences were on their avatars' future for following friends. Seeing their avatar unhappy and regretful about being influenced by friends, it triggered them to think that this can happen to them in real life too. This increased their awareness about what the consequences of peer pressure can be. P15 said, *"my friends basically ruined my future...I didn't like seeing my character sad that's why I went back in time, made my own decision, didn't listen to my friend and ended up happy"*. In another instance he also said, *"[the simulation] was an eye opened for me because I could play around with the choices I had without affecting my real life, so it was basically a trial and error type of situation"*.

P18 resisted peer pressure in the game. She revealed that seeing her avatars positive future helped her learn that she herself can have a good future too if she did not listen to her friends, and also gave her an idea of what she can do in the future. She said, *"I have learnt that not always listening to my friends will have consequences. So me not listening to friends will actually have me ended up in a job or apprenticeship where I am happy"*. Simulations help show users what the consequences of their actions can be and can be used as a persuasive technique to raise awareness about a particular topic.

Conversely there was a participant (P19) who stated that he did not learn anything new as he was already aware of the consequences of peer pressure. He said, *"I think a lot of what was mentioned in the game I already sort of knew in the sense where I do have friends, older friends, that have been to university or not gone to university based on their friends decision making or how they feel about their friend going to university. So, not necessarily but I can see where the app is sort of trying to raise awareness"*.

Statistics (Authority)

Higher education related statistics presented in the game was mentioned by two participants (P3 and P21) when asked which part of the game raised their awareness about the consequences of peer pressure. P21 said that reading the statistics helped him realise that peer pressure can have a major impact because going to university is a big step for some people. He said that reading the statistics increased his knowledge about how graduates are more likely to be employed than non-graduates. The same comment was given by P3, she said, *"the statistics were really good especially in particular the one where the teacher says that you know graduates find a job rather than non-graduates. So that really did open my eyes a bit as well that one"*. On the other hand, P13 stated that she was already aware of the statistics presented in the game as she had read it somewhere else too. She said, *"I think I'm already aware of them anyway"*. However, in another instance she mentioned that she can use these statistics and apply it to real life and debate with friends.

7.3.5 Code 3 – Other Perceived Behaviour Change

In addition to the two target behaviours the persuasive technology aimed to achieve, mitigate peer pressure and raise awareness about peer pressure, some of the participants revealed that playing the game has encouraged them to start three other behaviours. These were; (i) Research, (ii) Rethink friends' choice, and (iii) Be prepared for negative people. These behaviours were not intended to be achieved when designing the game. Table 7.8 below outlines the three additional perceived behaviour changes after playing the game, and the number of participants who mentioned that they will start this behaviour.

Other Perceived Behaviour Change	
Sub-Theme	No. of Participants
3.1 Research	3
3.2 Rethink friends choice	2
3.3 Be Prepared for Negative People	1

Table 7.8 – Sub-themes for Code 3 – Other Perceived Behaviour

3.1 Research

The participants (P3, P15 and P20) claimed that playing the game has encouraged them to research more about their future options. All three had different reasons of what triggered them to research more. P3 said that the statistics presented in the game have motivated her to do her research and see how higher education has actually affected others lives. She said, "*I am quite passionate about make up, so say for example if I find a makeup product, I will do customer research to see if that product is popular, how good it is, what's its rating is out of five. So same thing with this is I would go then and do my research to see how lives are affected after uni in terms of graduation*". P15 however mentioned that reading the true story inspired him to do more research as he did not want to end up in the same position as the person in the true story. He said, "*I most certainly will do my research about the unis and the courses I want to pursue after my A-levels...also due to the fact that you gave the true story of people dropping out so that I don't have to drop out and waste another year of my life for studies or whatever that is*". And the third participant, P20, stated that the negative friends in the game have motivated him to research his options before making a decision. He said, "*I need to make good decisions before I do actually carry out that I'm going to go. And do good research as well before I do go...when the questions kept coming up again when your friends kept asking you 'Are you sure you want to go?' like 'You don't have to go to uni its not worth it' and bla bla bla so that made you think about it*". Analysing these results makes it apparent that different parts of the game triggered the start of the same behaviour 'research' in the three participants. Although researching the options for the future does not necessarily mean that the participants will be resisting peer pressure from friends, it does however indicate that there is a higher chance of the participants to make an informed decision about their future as they will be doing their research before making a decision.

3.2 Rethink Friends Choice

In addition to being more confident in their decision, two participants (P10 and P17) revealed that playing the game has made them rethink their choice of friends. P17 said, *"I would rather stick to my friends who are influencing me in a positive way. I know every friend, every society has got, everyone has got both friends who are negative and positive but I would rather you know broaden my friend circle and look for friends who are more positive"*. This shows that playing the game has got them thinking about their friends in real life, and it will definitely impact how likely they are to be influenced by them as well.

3.3 Be Prepared for Negative People

One of the participant (P13) said that playing the game has prepared her on how to deal with negative people. She said, *"I think has just encouraged me to sort of be prepared that people will be against the idea of going uni and just sort of being prepared to say to people that actually it's my decision if I want to go to uni"*. She also stated in another part of the interview that the statistics presented in the game will help her debate with friends and she could use them in real life. Again, this behaviour indicates that the game has helped her to become less susceptible to peer pressure from friends as she will be prepared for the negative comments and will know what to say.

The other behaviours which were initiated by playing the game indicate to some extent that these participants will be making an informed decision about their future. Although these specific behaviours were not intended to be achieved when designing the game, they still do play some kind of role in helping these participants be less susceptible to peer pressure. The same design principles which helped raise awareness about peer pressure for some has encouraged other participants to start researching, such as the design principle of social learning (true stories). Each design principle is therefore perceived differently by each user, and can be used to persuade the user to perform more than one behaviour (as seen from the analysis).

7.3.6 Code 4 – Implementation of Design Principles

The participants were asked to comment on some of the features of the game, which were the design principles incorporated. This was done to establish whether they were persuasive in having any kind of impact on the participant or the way how he/she is playing the game. For some of the design principles, the participants did mention that having that feature affected the way how they played the game or had some kind of impact, however, there was no direct reference made in regards to whether it had an influence on their behaviour towards peer pressure. It was a general comment made where they said that it did or did not impact them and why. References made about the design principles which the participants thought had or did not have any kind of impact on them or how they played the game were coded in this section. This code will help ascertain the design considerations for supporting middle to late adolescent users in mitigating peer pressure, as we will be able to establish which design principles have more impact on this

target group, making the game more persuasive in achieving the target behaviour. Table 7.9 below outlines the positive and negative sub-themes that emerged after interpreting the participant's comments about the design principles which did or did not impact them.

4a. Positive Had Impact		4b. Negative Did not have Impact	
Sub-Theme	No. of Participants	Sub-Theme	No. of Participants
1. Personalisation			
• Changed Perspective	14	• Did not change Perspective	7
2. Authority			
• Believed the teacher	8	• Did not believe teacher	2
• Attractive	3	• Do not remember	3
• Agreed with user	1		
3. Social Learning			
• Raised Awareness	12		2
• Mitigated Peer Pressure	1		
4. Simulation			
• Raised Awareness	3		2
• Mitigated Peer Pressure	1		
5. Conditioning			
	16		1
6. Similarity			
	8		1
7. Suggestion			
	6		15
8. Trustworthiness			
	7	• Teacher gave statistics	3
		• Do not remember	4
9. Liking			
• Visually attractive	1		
• Played on Episode app	5	None	0

Table 7.9 – Sub-themes for Code 4 – Persuasiveness of Game (Design Principles)

Design Principle 1 – Personalisation

All the participants except one (P10) spent time on personalising their avatar, changing the features, hair style, skin colour etc. and giving it their name. Female participants were more eager and excited about changing the looks of their avatar. Only one male participant, P10, did not personalise his avatar at all. When asked in the interview about how they felt about the personalisation feature, 14 of the 21 participants said that it was a good feature and it changed their perspective of the game. If that feature was not there then they would have played the game differently. Personalising their avatar made them feel like the game was more personal as the avatar was a representation of them. For example, P11 said, “*I don’t think I would have taken it so personally if I hadn’t personalised my character*”, P14 said, “*I felt like it was me, so it was*

like I was making all the choices so I had to be truthful". Giving the character a name also had an impact on changing the way how they played the game. P9 commented saying, *"because the game refers to the character as you, you see your reflection through the game"* and P15 said *"it felt like it was me...giving my character my own name or my nick name of what my friends call me made it feel really realistic"*. Whereas, seven participants said that this feature did not have any impact on the way they played the game. Out of these participants, six were male and only one was female. As mentioned earlier, male participants were not too interested in this feature as compared to the female participants. We can therefore conclude that the design principle 'Personalisation' does have an impact and makes the game more persuasive as the users take it more personally. It is more effective with female participants rather than male, and therefore can be used as a persuasive strategy to appeal to this group.

Design Principle 2 - Authority

The teacher spoke about higher education related statistics within the game. As someone who has authority in the classroom, the teacher, was designed to give the statistics out, this incorporated the design principle 'Authority'. According to the PSD model, if someone who has authority gives you information, this will enhance the power of persuasion. The same concept was applied here. Eight participants mentioned that they believe the statistics because it was a teacher who was giving them out. They said that you always believe what teachers tell you. P21 said, *"You can say you are programmed to believe whatever your teacher says"*, P10 commented saying, *"Well to be honest you wouldn't really be a good teacher if you are not honest with your students. A lot of the stuff they teach you has to be honest isn't it"*, and P13 said, *"If it's coming from a teacher it's probably got some background to it"*. These participants even mentioned that if their friends were giving out the same statistics then they wouldn't believe their friends, hence, we can say that authority design principle is effective in impacting the eight participants as they believed what was presented by the teacher. On the other hand, there were two participants who said that they did not believe the teacher. They didn't have any particular reason, they just commented on the actual statistics, stating that they don't think those statistics are correct. There were also three other participants who mentioned that they do not remember the teacher giving out any statistics.

Another interesting theme which emerged from this design principle was 'Attractiveness'. The aim of having the teacher present the statistics was because he has authority in the classroom. There were three female participants (P2, P5 and P14), who claimed that they believed the statistics because the teacher was good looking. It did not have anything to do with the fact that it was a teacher presenting the statistics, they believed it because they found the avatar attractive. They even said that if the teacher's avatar was not attractive, then they would not have believed him. Also, if any other character (friend or classmate) was good looking, then they would believe whatever this friend/classmate would tell them too. Therefore, for these three participants, the persuasion came from the looks or attractiveness, *not* if someone is in authority. P2 said, *"he did influence me because I find him very attractive. He was very good looking"*, P14 said, *"obviously because he is so good looking, so you just can't, you have to just believe him"*, and P5 commented, *"I think the statistics part was good and it made me believe it because the teacher was very good looking"*. By interpreting these comments, it is evident that the looks or attractiveness of a character

can play a big part in persuading users to perform a behaviour. This is one of the six persuasion strategies identified by Cialdini (Cialdini, Petty & Cacioppo, 1991) – Liking. Cialdini referred to this strategy by saying, ‘Physical attractiveness creates a halo effect and typically invokes the principle of liking; we most prefer to say yes to people we like’ (Cialdini & Goldstein, 2002). This principle does have an overlap with the principle of Liking from the PSD model (Oinas-Kukkonen, 2010). The PSD model however addresses this principle as making the system visually attractive for its users to make it more persuasive, whereas Cialdini specifies that making the people attractive and similar to the user will increase their power of persuasion. We saw how this principle worked with these three participants, as they said that they would believe what an attractive would tell them. In addition, P5 also mentioned that the true stories presented at the end of the game did not have an impact on her, but they could have had an impact if the *attractive* teacher read those true stories! She said, *“it [the true stories] did not impact me the statistics did more. If the teacher read out the true stories I think I would believe it more”*.

Moreover, there was a participant (P1) who stated that the teacher influenced her in some way because he was agreeing with what she was saying. She said that she wanted to go to university, but all the characters in the game were too negative. The teacher was the only one who agreed with her and said positive things about higher education. That is why she was influenced by the teacher in the game, not because he was a teacher (representing authority) but because he was agreeing with her. This again shows that users are perceiving the teacher’s persuasive, not because of the authority design principle but because he was cooperating with the participant. Cooperation is a design principle identified by the PSD model, where Harri Oinas (Oinas-Kukkonen, 2010) defines a system to be more persuasive if it cooperates with its users. This is what we saw with this participant.

In conclusion, we can say that the design principle of having the teacher in authority was perceived as persuasive by eight participants only. Three of the participants were persuaded by the good looks of the teacher, and one was persuaded by the co-operating nature of the teacher. When designing a persuasive technology for this target group, we can establish that good looks plays a major role in impacting them. They would also prefer others who are cooperative and agree with what they say. This was also seen previously in section 7.3.4 (Negative Friends) where the users retaliated and became adamant in doing what they wanted to do because their friends were negative and did not agree or cooperate with them.

Design Principle 3 and 4 - Social Learning and Simulation

How social learning and simulation facilitated/impacted the participants in raising awareness and/or mitigating peer pressure is covered in detail in section 7.3.4 and 7.3.5. A few participants even mentioned that these design principles have encouraged them to start researching their future options (section 7.3.6). There were however, two participants who specifically mentioned that social learning had no impact on them at all. P11 said that that reading the true stories did not impact her but it did show that there are people out there who are affected by peer pressure. Whereas, P5 gave a different reason to why social learning was not persuasive for her. She said, *“it [the true stories] did not impact me the statistics did more. If the teacher read out the true stories I think I would believe it more”*. She would have preferred for the teacher or another attractive character to read the true story out, as that would impact her.

There were five other participants who also claimed that the simulation of the avatar future did not impact them in any way. Two of them said that it didn't impact them because they didn't see much of it. P19 said, *"I didn't see too much of it being integrated into the app"*, and P4 said, *"the end was a little bit short, maybe I didn't see the full effects of it"*. The remaining three participants (P8, P10 and P17) however mentioned that they were already confident in their decision, or knew what they wanted to do, so the simulation had no impact on them. All three were male and portrayed to have a confident nature during the interview.

Design Principle 5 - Conditioning

The positive and negative conditioning played an important role in giving the participants confidence in their decision, reassuring them that they have made the right choice. 15 of the participants mentioned that they saw a 'Well Done' message when playing the game, and this message helped boost their confidence. They made comments like, *"I felt good"*, *"I felt like I accomplished something"*, *"it was really nice, it encouraged me to go ahead"*, *"it was a bit of satisfaction, like I have done something good"*, *"felt like a pat on the back"*, and *"that made me feel very confident in my decision"*. One of the participants received an 'Oh no' message, stating that he did not follow his instincts. He said, *"It made me realise that I hadn't made the right choice because my character was sad"*. This design principle shows that it was very effective in persuading users to be confident in their decisions. There was only one participant who mentioned that seeing the 'Oh no' message had no impact on him. He said, *"I didn't feel bad about it"*.

Design Principle 6 - Similarity

People are more readily persuaded through systems that remind them of themselves in some way (Similarity design principle). Therefore, the scenario and narrative in the game, the school, classroom and friends were all designed in a way so that they were similar to the participant's real life. Implementing this design principle in such a manner was done so that the users see themselves in the game and are more persuaded to perform the target behaviour of mitigating peer pressure. 8 participants were impacted by this design principle as anticipated. They mentioned that seeing how similar and realistic the game was influenced the way how they played the game; they played as though they were making the choices in real life. P2 said, *"It felt really real...it actually felt that I was doing it in my real life as in I was in my school"*, P21 commented saying *"very realistic scenarios"*, and P4 stated, *"it represented real life a lot because the conversations in the episode was quite similar to conversations I've had...Because it was similar I made the same decisions as I would in real life, so I think that helped me"*. None of the participants mentioned that the realistic scenarios and game play did not have any influence on them at all. They all agreed that the game was very similar to their real life, but only eight of them mentioned that it influenced the way how they played the game.

Design Principle 7 - Suggestion

At the end of the game, users were given the option to go back in time and change their choices if they wanted to. This suggestion was designed to prompt the users to go back and reconsider their decisions to see what other outcomes there are. However, only four of the participants actually went back and changed their decision. Six of the participants mentioned that having that feature there made them think about their decisions. They said that they knew that they had a second choice if they wanted to change their mind, and this influenced them in a positive way. None of the other participants tried this feature as they said that they were confident in their decision. This feature did not impact them in any way, so it was not persuasive enough in changing the users behaviour. A reason why it was not so popular could be the way how it was worded. The prompt suggesting the users to go back in time read – ‘Would you like to go back and change your decision [name]?’ To which the users replied with a Yes or No. The prompt could have been more persuasive by using words such as, ‘*I would suggest you to go back and explore other outcomes...*’

Design Principle 8 - Trustworthiness

Seven of the participants believed the statistic presented by the teacher because the source of where the statistics was referenced from was mentioned, making the statistic trustworthy. These participants claimed that having a source referenced has an impact on them, as they would then believe the fact referenced. They all said that it is extremely important to have the source of reference there as it make it more authentic. Some of the comments they made were, “*it’s quite important because information should be credible [P15]*”, “*that’s absolutely important because that is an indication of authentication [P17]*”, “*strong referenced make a valid point [P21]*”, and “*it makes it more believable because it’s referenced from somewhere so it makes me feel more comfortable [P5]*”.

Five of the participants stated that the source reference had no impact on them at all, so if it wasn’t there it would not have change their decision, behaviour or how they were playing. From these five participants, three mentioned that the reference did not matter because the teacher was giving out the statistics (authority design principle), and they believed the teacher. P18 said, “*...it really depends on the person who was giving me the information. In the game like if the teacher is giving me the information obviously I would not be going back or paying attention to the source because I will definitely believe what my teacher is telling me*”, and the same thing was mentioned by P16 and P11. P16 said, “*Well when it’s coming from a teacher I usually just think they know what they are talking about, I believe them. So that didn’t matter too much to me*”. This shown that in the game the design principle authority and trustworthiness had a correlation for some participants. As they could see that the teacher was giving out the statistics, they did not feel the need to pay attention the credibility of the statistics, they believed the teacher, the person who is in authority. The other four participants mentioned they did not remember or pay attention to a source being referenced, so that had no impact on them.

Design Principle 9 - Liking

Making a system visually attractive for its users is likely to be more persuasive (Liking design principle - PSD model). Creating the game on Episode was part of incorporating the design principle of Liking. As Episode app is quite popular and appeals to this target audience (adolescents), it was decided to create the game on Episodes. P18 confirmed this by stating, *"I think it's a smart choice to play on Episode because then you reach more young people that are actually into this kind of stuff"*. One of the reason why it is so popular and liked by its users could be that is visually attractive. Therefore, the same kind of avatars, graphics and style of the game play were embedded in the game to make it likable, resulting to being persuasive overall in performing the target behaviour. Only one of the participant (P13) mentioned that the graphics of the game affected the way how she played. She said, *"...the graphics looking the way they were, it came across like a professional game, so it gives you confidence in it and therefore you play honestly. I think if the graphics were poor or if the avatar didn't react like it did I might have put something else in"*. Five other participants however commented on how playing the game on Episode app made their game play easier, because they already knew how to play the game and navigate around; it did not take them any time in understanding or learning how to play. The participants made comments like *"it made it easier"*, and *"it made it really easy and convenient for me"*. As it was simple and easy for them, it helped playing a part in persuading the users to perform the target behaviour of mitigating peer pressure. If the game was complex, it could have put off some of the users from playing, resulting in them not performing the target behaviour.

7.3.7 Code 5 – Comments

5a. Positive Liked about the Game		5b. Negative Did not like about the Game	
Sub-Theme	No. of Participants	Sub-Theme	No. of Participants
5.1a Realistic (Similarity DP)	11	5.1b Too negative	4
5.2a Graphics / Animations / Music	6	5.2b Less options (Personalisation)	2
5.3a Fun	5	5.3b Short	1
5.4a Easy to play	5		
5.5a True Stories (Social Learning DP)	2		
5.6a Prepared both ways (Simulation DP)	2		
5.7a Interesting	2		
5.8a Friends pressure	1		
5.9a Makes you think	1		
5.10a Personalisation (DP)	1		
5.11a Informal	1		

Table 7.10 – Sub-themes for Code 5 – Comments

All the participants were asked to comment on what they liked or disliked about the game in particular. Some participants specified multiple aspects of the game which they liked. In this case, all these aspects were coded separately, within the relevant sub-theme. For example, if a participant said that she like that the game was 'realistic and fun', then this was coded under two subthemes – 'Realistic' (5.1a) and 'Interesting/fun' (5.1b). However, if the participant repeated what they liked about the game more than once in their interview, then this was coded once. For example, if the participant mentioned that they liked how the game was realistic twice in their interview, then this was coded under subtheme 5.1a (Realistic) once. The number of times a participant mentioned or repeated a particular code, also known as instances, are detailed in Appendix 6.

Being 'realistic' was the most popular response (sub-theme 5.1a) given, with half of the participants (11 out of 21) affirming that they liked that aspect of the game best. Some stated that the classroom, school and avatars reminded them of their real life which they really liked, whereas others said that they liked the conversation their avatar had with the friends because they have had similar conversations already in real life. Making the game realistic was one of the design principles incorporated within the game – Similarity. People are persuaded by systems which imitate them or remind them of themselves in some way. Examples of some of the comments mentioned are, *"I like the fact that it has a true reflection of what actually happens when you're around friends, so I liked that about the game[P11]"*, and *"I like the fact that the avatars, and the teacher, and the setup of the game[P3]"*.

Liking the graphics, animation and/or the music of the game (5.2a) was the second most common response given, with almost one third of the participants mentioning they liked the interface and look and feel of the game. They commented on things like, *"I really liked the graphics in the game, I thought they were really cool...I was really impressed by it [P13]"*, and *"very attractive interface and beautiful music in the background...I think the game was perfect [P17]"*, and *"I like the look and feel of it, it was really nice there was lots of colour [P16]"*. It was fun to play (5.3a), and/or it was easy to play (5.4a) was the third most frequent response. 5 participants mentioned that they really liked how the game was 'fun' to play. They all used the word *fun*, and said they enjoyed the game. 3 of these 5 participants claimed that the game was fun and 'easy to play' (5.4a). For example, P4 said, *"...it was quite fun to play and it was easy"*.

'True Stories' (5.5a), 'Prepared both ways' (5.6a), and 'Interesting' (5.7a) were the next most frequent responses. Prepared both ways refer to the design principle Simulation. Two of the participants stated that they liked how the game was prepared to show both sides, of how following and not following friends can affect the avatars' future. And then, two participants mentioned that they liked that the game was *interesting*. Finally, 'Friends Pressure' (5.8a), 'Makes you think' (5.9a), 'Personalisation' (5.10a) and 'Informal' (5.11a) were other responses given by participants of what they liked about the game. P10 stated he liked how the friends put pressure in the game. He said, *"I liked the way they applied pressure. Like you believe in a normal game that maybe after once or twice they would leave you alone, but no, there were quite adamant"*. While P20 said that he liked how the game was straightforward and got him thinking about his decisions and how friends can play a big part in affecting your decisions. P15 said he really like the personalisation feature in the game, saying, *"...the personalisation that was the best thing so far"*. And P12 revealed that

she like how the game was informal and at the same time helps informing the players about what decision they should make or whether they should stick by it.

While there were a lot of positive comments given about the game, there were a few aspects in the game which were not liked by the participants. Four out of the 21 participants thought that the game was too negative (5.1b). They did not like the fact the all the characters in the game (friends and classmates) were not understanding and kept on continuously doubting their avatar and their decisions. P3 said, *“The thing that I disliked is that I think it needed a bit more positivity I'd say, because every time I would say yes I'm going to go to university the friend, the avatars would say no way are you going”*. They suggested that in a school environment, normally there will be someone who agrees with your decision and encourages you. Therefore there should have been a balance between the characters point of view in the game, half of them should have agreed with the users' avatar whereas the other half could have discouraged the user.

Two of the female participants (P3 and P11) did not like how there were not enough options for the customisation of the avatar. P3 said, *“...one aspect I have to say is that I myself have green eyes and there was no option for that”*. In addition, P10 mentioned he didn't like that the game was *‘a bit short’*.

7.3.8 Code 6 – Suggestions

Suggestions	
Sub-Theme	No. of Participants
6.1 Balance of characters	3
6.2 Include course choice	1
6.3 Include family members	1
6.4 Show comparison of future	1

Table 7.11 – Sub-themes for Code 6 – Suggestion

There were four suggestions made about how the game can be improved (identified in Table 7.11 above). Three participants suggested that there should be more positivity in the game, and this is possible if there was a balance between the characters. At the moment all the characters in the game go against the decision of the avatar, pressuring the avatar to make the opposite choice. Some participants did not like this aspect of the game (as explained in the previous section), therefore suggested that there should have been characters who agree and encourage the users too, not just those who discourage. P1 said, *“There could have been like other people that wanted to go as well just to see the balance between”* and P3 said, *“...maybe have an avatar that's positive as well”*. One participant (P14) also thought that it would have useful if there was a choice of course options presented in the beginning of the game, and the game was tailored based on the type of course that the user wanted to do. P1 also suggested that including family members within the game rather than only friends would have had more of an impact. This way the user will get to see more people's point of view. And lastly, P19 suggested *“if you add a story where it continues on and it gives examples of someone that's for example been to university and someone that hasn't been*

to university and compare their lives from there onwards. So I think that there's more of that and you know a little bit more in the game than I would say that it could go far". He said the game should include a comparison of the lives of people who went university and those who did not go to university.

7.4 Discussion

This study explored whether using an *Interactive Storytelling Game* as a persuasive technology is effective in supporting mid-adolescents to change their behaviour, so that they are able to mitigate peer pressure from friends. It also investigated which of the persuasive design principles incorporated within the game facilitated users to change their behaviour, and what design considerations need to be made for supporting mid-adolescents to mitigate peer pressure. This study answers research questions RQ-5.1, RQ-5.2, RQ-5.3 and RQ-5.4. This section answers these research questions, and then highlights the key design considerations that were established from this study which will help support this target group in mitigating peer pressure.

The participant's susceptibility to peer pressure was measured by collecting their pre and post test scores of friends' influence, and then running a statistical test, Wilcoxon signed-rank test, to establish whether the influence from friends decreased after playing the persuasive game. Results from the Wilcoxon signed rank test indicated that post-test scores for friends' influence were statistically significantly lower than the pre-test scores ($Z = -3.126$, $p = 0.002$). Hence, we concluded that overall, the persuasive technology does help in mitigating negative influence from friends when considering higher education. Section 7.3.1 covers a detailed analysis of the results.

Results from the analysis show that three design principles supported in mitigating peer pressure; Statistics (Authority), Simulation and Social Learning. Two participants mentioned the statistics reported in the game helped them decide on what they want to do and gave them the confidence to stick to their decision. Only one participant said that seeing the simulation will help him combat peer pressure as he does not want his future to be like the simulation, and another participant said reading the true story (Social Learning) influenced him to change his behaviour. Whilst there were three design principles reported which helped in mitigating peer pressure, there were two additional aspects of the game which played a greater role in facilitating the participants to mitigate peer pressure; 'Negative Friends' and 'Avatar Struggling'. This result was unanticipated as these aspects were not designed to be persuasive. This indicated that the persuasion strategies reported in the literature by B.J Fogg, Harri Oinas, Cheng and Cialdini, which were incorporated within the game did not work as intended on this target group, i.e. adolescents. It could be the case that these design principles are not effective on this specific age group (18 year olds) as the parts of the game which had the persuasive design principles implemented took less precedence. To validate this reasoning, a thorough search of previous literature was explored (using keywords 'PT', 'adolescents', 'teenagers') to see whether a persuasive technology has been designed for adolescents, specifically 18 year olds, however no such study/ technology was found. The persuasive technologies were designed for adults, or there was one related article where an educational software was designed for children, to motivate them to read and write (Lucero, Zuloaga, Mota & Muñoz, 2006).

Commented [WS11]: Not enough evidence for "proof"

Commented [A12R11]: Rephrased sentence

Commented [WS13]: effective

Commented [A14R13]: changed from affective to effective

Commented [WS15]: How? How does the reader know that you have been thorough here?

Commented [A16R15]: Explained it further

Almost half of the participants who mentioned in their interview that they will not be influenced by friends anymore (5 out of 11), said that the negative attitude of the friends (in the game), telling the users to do the opposite of what they want, motivated them to change their behaviour. This effect seen here is similar to reverse psychology, where the participant ends up doing the opposite of what their friends are telling them to do, and in a way mitigating peer pressure. On the other hand, there were two participants who stated that if the game had been longer, and/or if the friend's pressure had increased, then it could have encouraged them to fall for peer pressure, they would not have been able to resist it.

In addition, there were also two participants who reported that they did not like seeing their avatar sad or struggling when the friends were pressuring him/her in the game. This is what made them realise that they need to start following their own instincts. Again, there was no design principle incorporated in this part of the game. However, we can argue that this also part of simulation design principle, as the users are seeing the direct link between the cause and effect, how their friends pressure and actions effect their avatar. Simulation was only incorporated in the game to show the avatars' future, but by analysing the results, we can see that the simulation can also be incorporated in a way which show the instant effects to a character. These can be in the form of facial expressions, which was the case in the game as the avatar was sad and looked like he/she was struggling. A detailed analysis of this is covered in section 7.3.4 – Avatar Struggling.

This study also contributed in revealing that 81% of the participants (17 out of 21), stated that playing the game has helped in raising their awareness. In their interview, they used terms such as, *"the game sort of opened my mind up"*, *"it showed me things outside the box"*, *"they make you think further"*, and *"it gave me an insight"* which indicate that the game did help raise awareness. Only two participants stated that they did not learn anything new as they were already aware of the consequences of friends. Though they did confirm that the game helped in highlighting or reminding them of the consequences. Three design principles played a role in helping raise awareness; Social Learning, Simulation and Statistics (Authority). The design principle 'Social Learning' was incorporated in the form of true stories in the game. This design principled was eminent in raising awareness about peer pressure, with more than half of the participants mentioning it. They stated that reading others true stories has given them exposure about how peer pressure from friends can have a big impact on your future. Five of the participants mentioned that reading the true stories has given them confidence to stick with their decision, four mentioned that they are able to learn from others who have been affected by peer pressure, while three said that reading the true stories has made them rethink their decision as they do not want to be affected in the same way as the ones in the true story. 'Simulation' was the second design principle which effective in raising awareness, and the statistics presented, 'Authority' design principle, was the third important. No other design principles were reported by the participants which helped in raising their awareness. A detailed analysis of the results are covered in Section 7.3.4.

7.4.1 Key Design Considerations

This section highlights the four key design considerations that were concluded from this study; (i) Reverse Psychology, (ii) Physical attractiveness, (iii) Personalisation, and (iv) Balance between Positive and

Negative Aspects. These were unanticipated when designing the persuasive game and were identified from the analysis of the results.

7.4.1.1 New Design Principle - Reverse Psychology

We established that five out of the 21 participants were inclined to resist peer pressure because their friends (in the game) had a negative attitude, pressurising the participant to do the opposite and follow them. Some found the friends annoying, whilst others said that they did not like how the friends did not respect the participant's avatars decision. Seeing the friends act in such a manner made them retaliate, making them resilient to what the friends were saying, and more adamant in following their own instincts. This effect seen here of the participant doing the opposite of what their friends are telling them to do is similar to reverse psychology, a technique used to encourage a person to perform a behaviour by telling him/her to do the exact opposite. There was no design principle incorporated in this part of the game. The friends pressuring the user to do the opposite of what they want was just a part of the narrative of the game. After going through all the design principles identified by Harri Oinas's PSD model (Oinas-Kukkonen, 2010), BJ Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013), and Robert Cialdini (Cialdini & Goldstein, 2002), it was recognised that no such design principle exists, which persuades the user to perform a target behaviour by telling them to do the exact opposite. This study therefore contributes to the formation of a new persuasive design principle which works for this target group – *Reverse Psychology*.

Reverse psychology has already been explored in the field of psychology and studies have proven for it to be effective with teenagers (Macdonald, Nail & Harper, 2011). It just needs to be explored further in the area of HCI, and how it can be incorporated successfully as a design principle within a persuasive technology. It should however be taken into consideration that for this design principle to be persuasive, it should only be incorporated within the system for a short period of time, and should not be too evident, as it might lead the user to fall for it and not perform the target behaviour. This point was recognised when two of the participants stated that if the game had been longer, and/or if the friend's pressure had increased, then it could have encouraged them to fall for peer pressure, and they would not have been able to resist it.

7.4.1.2 Physical Attractiveness

Another key design consideration that was revealed from this study was that female mid-adolescents find the looks of a characters/avatars important. Three of the female participants stated that they found the teacher very good looking in the game, and that was the reason why they believed what the teacher was telling them. They revealed that it did not matter what level of authority that character has, he/she can be a teacher or a friend, but as long he/she is good looking, they would be persuaded to say yes to what they say and are more likely to believe anything this good looking character tells them.

This related to a design principle identified by Robert Cialdini (Cialdini & Goldstein, 2002) – *Liking*. He said that one of the factors that power the principle of Liking is 'Physical Attractiveness'. Some people are influenced by others based on how attractive that persons looks are. He explained that physical

attractiveness creates a halo effect causing people to like them, and most people find it hard to say no to people they like. The game was not designed with the intention of making the teacher an attractive good looking character, this was an unanticipated result from running the study. It does however prove to us that physical attractiveness is extremely important when designing a persuasive technology for this target group. Having attractive characters is more likely to persuade the users to perform the target behaviour.

7.4.1.3 Personalisation

Being able to customise their avatar is another feature that should be incorporated in the design of a system for this target group. All the participants spent some time customising their avatars, some took more time to customise their character than to actually play the game. Female participants were more interested when it came to customising and even suggested that there should be more customisable options available, such as more options for the eye colours etc. It shows that is how much detail they went into customise their avatar. They even mentioned that the personalisation impacted on the way how they played the game, if this option was not there then they would have played differently. In contrast, the male participants did not go into that much level of detail when customising their avatar. On average, they took less time to customise when compared to the female participants. Six of the male participants even stated that this feature had no impact on the way they played, if this option was not there then they still would have played in the same manner. We can therefore say that this feature is important especially when designing a system for female mid-adolescents, as it can impact how they perceive the system and interact with it.

7.4.1.4 Balance between Positive and Negative Aspects

Finally, another interesting result which emerged from the study was that this user group is more likely to be persuaded by a system if the system also includes others who agree with their thoughts in some way. A few of the participants suggested that the game should have had a balance between the good and bad characters, it should not have all been negative. They said that if they were characters who agreed with them, it would have had more of an impact on them. This suggestion of theirs refers to the design principle from the PSD model - *Similarity*. This design principle was incorporated in the game already but in a different way. The scenario, school environment, classroom and narrative was designed to be similar to the participant so that they are able to relate to the story. However, this design principle was not incorporated to make the characters similar to the participant, so that they agree with what the participant was saying. All the characters in the game were designed to disagree with the participant, to leverage the element of peer pressure. However, some participants felt that it was too negative, and it would have been more effective if there were some characters who agreed with the participant too. We can conclude from these suggestions that this user group will be more influenced if they can see that there are some characters in the game which cooperate and agree with the user. They need to see a balance, so that both sides are incorporated within the system, the positive and negative.

Chapter 8

Discussion and Conclusion

This final chapter presents an overview of this research. It begins with a summary of the work conducted and then revisiting the research questions that were defined in order to answer the overall aim. This is followed by a discussion of the contributions this work has provided. These contributions include a summary of the design implications which arose from conducting this research. Finally, the limitations of the work, and suggestions for future work are outlined.

8.1 Overview

The overall aim of this doctoral research was to investigate a novel approach to facilitate young individuals in making an informed decision about higher education through the use of a persuasive technology. The research was divided into two parts; the first part focused on exploring the barriers and motivators that individuals encounter which influence their decision to enter higher education. It was in this part that I realised that peer pressure from friends played a vital role for some - not only did it influence some individuals to enter higher education (even though they did not want to), it also influenced some individuals to not enter higher education (even though they wanted to). These individuals were not making informed decisions about their future as they were heavily influenced by their peers and friends. Furthermore, many universities and schools focused on building awareness programmes and technologies to minimise *parental* influence, *friends' influence* however was not looked at. Therefore, in the second part of this research I focused on peer pressure from friends and investigated how a persuasive technology could be designed and implemented to support individuals in mitigating peer pressure from friends.

8.2 Summary of Work Conducted

Following the introductory chapter, which outlined the research aim and contributions, the thesis started with a broad literature review (Chapter 2). This literature review targeted two aspects; (i) background and statistics about higher education in the UK, and (ii) a review of persuasive technologies, including the persuasive models, persuasive design principles, and how persuasive technologies are employed in a variety of domains to encourage behaviour change. An attempt was made here to explore how existing technologies are used in the education sector in informing individuals about higher education, and if these technologies were '*persuasive*' in any way in encouraging users to change their behaviour or attitudes about higher education.

Chapter 3 reported the first study conducted for this research. This study was run to investigate and better understand why individuals decide to not enter higher education; what barriers and constraints do

individuals encounter which influence their decision. The role that technology played in their decision making was also addressed. Although previous studies have explored the barriers to enter higher education (covered in the literature review, Chapter 2), these studies did not engage participants from a LPN in particular, neither did these studies investigate the role of technology in the decision making. A semi-structured interview was employed in this study to gather rich empirical data. Analyses of the data gathered in this study led to a second exploratory study, presented in Chapter 4. This second study focused on a similar target group and was undertaken to identify what motivates individuals to enter higher education. A semi-structured interview was employed for this study as well, to gather rich qualitative data, which gave an insight into why these individuals made a different decision, i.e. to enter higher education, what factors influenced their behaviour. In addition, a second part of this study recruited participants who were not from a LPN, to further explore if there was any difference in the motivations or attitudes of those who are not from a LPN. The empirical data gathered from these studies were used to create and implement guidelines for the design of a persuasive technology.

As the number of participants for the first two studies was limited, the findings were validated in a follow up study. Chapter 5 reported an online survey to evaluate whether a broader audience experienced the same barriers and motivators. This study was also used to statistically compare the responses of individuals who were in university and those who were not, to identify which factors (barriers and motivators) make them different. A second literature review was then conducted to identify if any existing technologies help in overcoming the barriers reported. This literature review shaped the next steps and focus of this research. Studying these technologies led to the discovery of an emerging opportunity; there was limited use of technology to address the barrier of peer pressure from friends. Furthermore, this study also helped recognise that those who do not enter higher education are not the only ones who are susceptible to peer pressure, instead, there were some individuals who were pressured into entering higher education by their friends. Hence the focus of this research shifted to design and implements a persuasive technology which helped in overcoming peer pressure from friends.

Chapter 6 reported the design and development of the persuasive technology in detail. The Design Thinking approach was used to build a persuasive interactive storytelling game in a systematic way. BJ Fogg's persuasive system design model along with 8 different persuasive design strategies were incorporated within the game to make it persuasive, encouraging the users to change their behaviour so that they are able to mitigate peer pressure from friends. Chapter 7 detailed the final study undertaken for this research, in order to evaluate whether the persuasive technology was effective in changing the behaviour. This study also helped outline the design implications for supporting individuals to mitigate peer pressure from friends. Finally, in Chapter 8, the research questions laid out for this research are revisited, followed by a conclusion and discussion of the contributions made by undertaking this research.

8.3 Revisiting the Research Questions

This section answers the 5 research questions defined for this thesis. As explained in Chapter 1, this research was divided into two parts. The first part was approached with three broad research questions (RQ-1, RQ-2 and RQ-3), which shaped the focus of this research. The second part focused on one of the

factors which played a vital role in influencing the decision to enter higher education - *peer pressure from friends*. This second part of the research focused on the design and implementation of a persuasive technology to facilitate individuals to mitigate peer pressure (answering RQ-4 and RQ-5). The research questions defined are outlined below:

RQ-1: What factors influence individuals to not enter higher education?

The Higher Education Statistics Agency (HESA Student Enrolment, 2018) reported that in enrolment year 2016/2017, only 11.4% of entrants came from a low participating neighbourhood (LPN). Given the limited pre-existing work directly investigating why the enrolment rate for LPN's are so low, it was decided to answer this research question by recruiting participants from a LPN. As the participation rate is so low, a better understanding of the factors which influence individuals from this neighbourhood to not enter higher education was attained. Moreover, the role that technology played in their decision making was also investigated. Study 1 (Chapter 3) helped answer this research question. Individuals from a LPN who decided to not enter higher education (although they fulfilled the requirement criteria to enter) were recruited for this study to understand why they made this choice. Results from the study revealed that being worried about 'finance and debt' was the most common barrier encountered by the participants, with half of the participants (5 out of 10) mentioning it. The second most common factor revealed by the participants was their negative attitude towards HE; they had seen their family or friends not being able to find a job after graduating, which let them to believe that a degree is not important. 3 of the participants stated this reason. These participants did not do any research, they just assumed that a degree does not help in building a career. The next most recurrent factor was influence. 2 of the participants stated that they were influenced by their friends to enter, whereas two other participants claimed that their parents influenced their decision to not go. An interesting finding from this study was that all the participants recruited had parents who did not engage in higher education. So, if these participants were to go to university in the future, they would be classified as a 'First Generation Student'. Not having family members or parents going to university could have influenced how they felt about higher education in general. We can assume that this could play a role in influencing their decision.

Motivator to enter higher education: Participants were also asked to comment on what could motivate them to enter higher education in the future. Being certain that they will get a graduate job at the end was the most frequent reason reported. Two of the participants also stated that if they saw their friends or family members find a graduate job, then they would also go. Again, this reveals that family and friends can influence their decision – if they saw others doing by entering HE, then they will also perform the same behaviour and enter HE, and vice versa.

Use of IT in decision making: This study gave further insight about how technology was being used. It revealed that IT (technology of any kind, including social media, software, applications etc.) did not play any role in influencing these individuals' decisions. IT was used in three ways only: (i) to receive higher education related material (such as Open Day invites), (ii) to search for university and course related information, *and* (iii) to complete and submit the university application. Three of the participants stated that their school/colleges encouraged them to follow different universities Facebook pages, however, only one

participant actually did at the time but later unfollowed them. They were also sent emails in regards to any university related information, such as talks and events. Two other participants revealed that their schools/colleges would ask them to search on the university website themselves. One of the participant said that she started searching for courses and universities but it got too difficult for her so she stopped researching. This indicated that technology did not play any role in influencing their decision. This suggested that there is an opportunity arising where technology can be used to support these individuals to make a decision about higher education.

RQ-2: What motivates individuals to enter higher education?

The second research question sought to understand what makes individuals from the same neighbourhood (LPN) make a different decision, and enter higher education - what factors contributed to this decision. The aim was to determine whether these same factors reported could be used to motivate other individuals to enter higher education. Study 2 was conducted to answer this research question (Chapter 4). The motivations reported by the participants included factors such as, better job prospects, building a career, going because of family influence, either to make them proud or because it was expected of them to go, and friends' influence. An additional part of this study included recruiting participants from a different neighbourhood (not a LPN) to compare if their motivation to enter higher education is any different. Only a subtle difference was found between the two groups; those not from a LPN were more likely to be influenced by their family to go. Most of them had parents who had been engaged with higher education, so they were not a first generation student. Due to this, their parents expected them to enter higher education too (even if they did not want to). Half of the participants (5 out of 10) reported to be pressure by their parents to enter. Whereas four of the participants also claimed to be influenced by their friends. They felt that they had to go to university because all their friends were going. In addition, majority of the participants had an idea of what they wanted to do, they had a clear goal and knew from the start that they wanted to go to university.

Barriers which could have influenced their decision: Considering a different route could have caused some individuals to not enter. A few participants mentioned that if they were offered an apprenticeship then they might not have entered higher education. In addition, Three of the participants (two from a LPN and one who was not from a LPN) also stated that their friends could have influenced them to not go, as they encouraged them to start working. This showed that friends' influence affected both groups, those from a LPN and those who were not.

Use of IT in decision making: This study revealed that technology (of any kind, including social media, software, applications etc.) did not play any role in influencing these individuals' decisions to enter HE. All of the participants had an intention to enter HE from the start, or were forced/influenced to enter, therefore used IT to search for courses and apply to a university.

Doing a comparison of the two studies (Study 1 and 2) revealed an interesting insight. There was a difference in the way how three factors were perceived by the participants; this meant that the same factor acted as a motivator to enter HE for one, whereas it acted as a barrier for another. One of these factors

was influence from friends. Results from the two studies provided evidence that while some individuals are pressurised into entering HE by their friends (even though they do not want to), there are others who are influenced by friends to not enter (even though they want to). These individuals end up falling for peer pressure and are unable to make an informed decision about their future. As demonstrated in the literature review conducted, in Chapter 5, we identified that there is limited use of technology to overcome the influence from friends, hence we decided to address this gap and focus our research in designing and developing a persuasive technology which facilitates in mitigating peer pressure.

RQ-3: Does a wider population around England also face the same barriers and motivators to enter higher education?

Convenience sampling was used to recruit Study 1 and 2 participants from a specific area (10 recruited for Study 1 and 20 recruited for Study 2). Therefore a follow up study (Study 3, Chapter 5) aimed to collect responses from a wider population across England, to verify if the same motivators and barriers were important in influencing people's decisions. Using an online survey for this study was ideal, as surveys are useful in not only collecting a high number of responses, but also to reach a wider population across England. A total of 266 responses were collected for this study, with 133 respondents who were in HE, 51 respondents who were not in HE, and 82 respondents who were still deciding about HE. Results from the survey agreed with the findings reported. Those who were in university agreed that their motivation to enter was to build a career and/or to enter a profession. However, another motivation they classified as being important was for self-growth and further educate themselves. Although participants from Study 2, those who went to university, also reported these two motivators, they were not classified to be important. Only 6 of the 20 participants mentioned this being their motivation to enter higher education. Furthermore, those who did go to university, rated being worried about 'finance and debt' and 'not being able to find a graduate job' as the most important factors in influencing their decision to not enter. This was also seen in Study 1 results, where participants reported these two factors to being the most important barrier in influencing their decision. In addition, the respondents from the survey also rated all the other motivators and barriers reported by the previous participants, they did not disagree with any of them. We can therefore conclude that a wider population around England not only face the same barriers and motivators, but also rate the same barriers and motivators to be important in influencing their decision. This increased insight in our results gave assurance that we were not limiting our findings in any way, as a wider population also reported the same.

Once we were confident in the validity of the barriers and motivators reported the next step was to statistically validate if there was any difference in the responses from those who were in university and those who were not. From the previous two studies, the qualitative results revealed that three factors are perceived differently by the participants from the two studies. Therefore from this data we needed to statistically evaluate whether there was any difference between the two groups; if one factor acted as a motivator for one whereas a barrier for the other. Running the Kruskal Wallis test, not only verified that there is a difference in the three factors identified from the previous study, but also revealed five additional

factors displaying a difference. The contribution made within this section, C4, is detailed in the contribution section below.

A literature review was conducted (Chapter 5) to search for existing technologies which address in overcoming the barriers reported. This was done with the intention of finding a gap or opportunity to make a novel contribution to this research. Investigating the various technologies allowed us to establish that limited work is being done to overcome one of the barriers reported – peer pressure from friends. Though there are numerous projects running whose goals is to undermine the influence of parents when it comes to decision make, the work done to mitigate the influence of friends is limited. And for some individuals, friends' influence play a major role, they either enter HE or decide to not go because of the pressure, so that they are socially accepted. They end up making uninformed decisions for their future. Identifying this gap initiated in the design and build of a persuasive technology, which supports individuals in mitigating the influence from friends when making a decision about higher education. Existing studies and work done were used as an inspiration to inform the design of the persuasive technology. These included those studies which aimed to mitigate peer pressure (in other settings), as well as those which were used to undermine the influence from parents. Implications of the contribution made at this stage are covered in C1 below.

RQ-4: How can a persuasive technology be designed to mitigate peer pressure from friends when making the decision to enter higher education?

Answering the previous research questions concluded that there is a lack of established work specifically addressing the topic of peer pressure from friends influencing individual's decisions to enter higher education. It revealed that some individuals are unable to make an informed decision regarding higher education due to this influence and pressure. These results necessitated the creation of a novel approach which changes individual's behaviour and attitude, facilitating them to be able to mitigate peer pressure and make an informed decision about higher education. As we were intending to change the behaviour of the individuals, it was ideal to design a *persuasive technology*, as these technologies are built with the intent of persuading users to change their behaviour.

The design of the persuasive technology was primarily based on Fogg Behaviour Wizard (Fogg, 2017) and the PSD model (Oinas-Kukkonen, 2010). The Behaviour Wizard is method which incorporates the Behaviour Grid (Fogg, 2009 (Behaviour Grid)) and Behaviour Model (Fogg, 2009 (Behaviour Model)) to provide a systematic way of thinking about behaviour change, and is used to provide solutions for achieving the target behaviour defined. The target behaviour we intended the technology to achieve was 'mitigate peer pressure from friends'. The PSD model however, was used to complement the Behaviour Wizard. The PSD model, identified by Harri Oinas and Harjuma, presents 28 persuasive design principles which can be incorporated within a technology, which aid in increasing the persuasiveness of a technology, making it more likely for the user to perform the target behaviour after using the technology.

Employing the Behaviour Wizard enabled us to identify that the behaviour type we are addressing to achieve is a Green Span Behaviour – as we are expecting the users to commit to this behaviour for a period of time, i.e. when they are making the decision to enter higher education. The guidelines for designing a

solution which address this behaviour type (proposed by the Stanford Behaviour Wizard Team) (Behaviour Wizard, 2019) included three elements: (i) boost motivation, (ii) increase the ability, and (iii) deliver a trigger when motivation and ability are high. The Fogg Behaviour Model suggest a number of ways on how to increase motivation, ability and trigger. It was realised at this stage the target users we were working with - those who were deciding to enter higher education - mainly sixth form students, already had the ability to perform the target behaviour. This imposed that the persuasive technology should be designed in a manner which harnesses two elements - increasing motivation, and delivering a trigger (once the motivation was high). The PSD model was then employed, to incorporate design principles which aid in increasing motivation and delivering the trigger.

A background study of the strategies which are already being implemented to overcome peer pressure within a different setting involved, using websites and forums to raise awareness about the consequences of doing drugs in school, or inspirational videos which help build self-confidence so that individuals are able to say no to peers. This imposed that there is existing work which is effective in mitigating peer pressure in different scenarios. In addition, a review done in regards to the work done to mitigate the influence of parents when considering higher education, revealed that websites, emails and chats rooms are readily available to for parents to use. Most of these technologies are used to provide parents with information about how other students benefited from doing a degree, showing them how their child can experience the same if he/she entered higher education. Learning from others experiences was commonly used to address this topic of minimising parental influence. Analysis of the work done in both these areas were used as inspiration, which informed the design of the persuasive technology.

In the end, an interactive storytelling game was designed and developed as a persuasive technology, called 'My Next Step'. This persuasive story was built and published on an already popular app – Episode. The literature review conducted in Chapter 2, detailing a background of the technologies used by our target group, confirmed that 90% of 16-24 year olds in UK claimed to own a mobile phone (Deloitte Survey, 2018). Using their smart phones to play games was extremely common, revealing that 41% of individuals aged 16-24 in UK played games via mobile phones in 2017 (Statista, 2019). It was also evident that the use of social media to connect and interact with friends was a primary way of communicating by these individuals. However, it was decided to design a game as a persuasive technology and not use social media because the first study conducted for this research revealed that individuals were asked to follow university pages on social media, however, they were reluctant to, as they were not interested. Based on this, we could then assume that individuals are more likely to use social media to connect with friends etc., and the social media will not be as persuasive if they are not interested in what they are seeing. Therefore, developing a game which these users could play on their smart phone was ideal, something novel and different in putting a point across. As the guidelines proposed by the Behaviour Wizard were incorporated within the game (so that users perform the Green Span target behaviour type), the game first boosted motivation and then delivered a trigger. Each of the design principles suggested in the PSD model were analysed to determine which are most relevant in boosting the motivation and delivering the trigger. In addition, the persuasive strategies identified by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013) and Cialdini (Cialdini & Goldstein, 2002) were also looked at to check if any additional principles need to be incorporated in the design. A total of 10 persuasive design principles were applied in the game to boost motivation, and 1 design principle to

deliver the trigger was applied. The complete design of the game is covered in Chapter 6. Furthermore, this research question helped in making contribution C1. The implications of this contribution are detailed in the contributions section below.

RQ-5: Can an interactive storytelling game be used as a persuasive technology to facilitate in making an informed decision about the future?

This research question was answered by conducting a final study (reported in Chapter 7). The persuasive interactive storytelling game, My Next Step, was intended to mitigate peer pressure from friends when making the decision to enter higher education. The target behaviours for My Next Step was to be less susceptible to peer pressure from friends, and also raise awareness about the consequences of peer pressure from friends. The users played an interactive story, where they made decisions for their avatar. This avatar faced various pressures from friends in regards to entering or not entering HE. Depending on the decisions the users made for their avatar, they saw a simulation of how their avatars fate changes. In the game, if the user decided to follow the friends, then the avatars' future was not good, it displayed the avatar being sad and regretting the decision made. However, if the users decided to not follow friends, then the simulated future for their avatar is positive, displaying a happy and cheerful avatar, who is content with the decision made. These simulations revealed how pressure from friends can affect their future. The narrative of the story and future simulations were inspired by responses given by Study 1 and 2 participants, those who revealed to have resisted or fallen for peer pressure. This was done to encourage users to learn from others (as a similar technique is used in existing technologies to minimise the influence of parents).

The study was run with sixth form students from two schools in West London. Two measures were taken to identify whether the game was persuasive in achieving the targets behaviours defined. First, pre and post study tests were used to measure how susceptible an individual is to peer pressure before and after playing the game. Second, participants took part in a semi-structured interview which was used to better understand if the game helped in changing their behaviour, and if so, then which part of the game helped supported this change. This let us to analyse which of the design principles incorporated within the game were most effective in facilitating behaviour change.

The pre and post-test used to measure a participants susceptibility to peer pressure score included an adapted version of the Peer Pressure Inventory (PPI) scale, originally developed by Clasen and Brown (1985). The statements in the scale were revised so that they fit this study, to measure the peer pressure score from friends (only). The original scale intended to measure the score of pressure from family, teachers, peers etc. A Wilcoxon signed rank test was then used to determine whether there was any statistical difference overall in the pre and post scores. Results from this test revealed that playing a persuasive interactive storytelling game elicited a statistically significant change in lowering the negative peer pressure from friends when considering higher education ($Z = -3.126$, $p = 0.002$). As the p-value was less than the significance, we rejected the null hypothesis, concluding that there is a difference in the pre and post scores overall. Analysing these scores in detail revealed that from the 21 participants, 16 had a lowed post test score, 4 had a higher post test score and 1 had no change in their score.

The interview were then used to reflect upon which features of the game helped in mitigating the peer pressure or raising awareness, or both. 11 of the 21 participants confirmed that the game has had a positive impact on them, so they will now make better informed decisions rather than follow friends blindly. Almost one third of these participants (5 out of 21), stated that the narrative of the game, where the avatars friends are negative and pushing the avatar to follow them was most effective in changing their behaviour. This was an unanticipated finding as this part of the game did not incorporate any design principle. Social Learning, Authority and Simulation were the three design principles applied intended to change the user behaviour so that they mitigate peer pressure, however, only 4 participants reported these principles to be effective in doing so. Results from this study concluded that the design principles reported in the literature were not effective for this specific age group (adolescents). Parts of the game which did not have any design principles incorporated were more effective in persuading/enabling the users to perform the target behaviour of mitigating peer pressure from friends. The negative attitude of the friends, telling the users avatar to perform the opposite behaviour and follow them was more effective. This resulted in the proposal of a new design principle – *Reverse Psychology*. As this design principle has not been identified in any of the existing frameworks and models, a theoretical contribution was made – C3.

Social Learning, Authority and Simulation design principle applied did help in raising awareness about peer pressure amongst the participants. 17 of the participants agreed that playing the game has made them realise that peer pressure from friends can have a big impact, or it has made them think 'outside the box'. These comments proved that the persuasive did help in raising awareness, and we can presume that this would indirectly result to the participant not being as susceptible to peer pressure. In addition, some of the design principle incorporated were not perceived in the same way an intended by the participants. These design implications when developing a technology for this target group (adolescents) are described in detail in contribution 2 (C2) below.

8.4 Contributions

Answering the research questions defined for this research helped in making 4 key contributions to the field of HCI. Wobbrock (2012) has classified seven research contribution types in Human Computer Interaction. These are: empirical, artefact, methodological, theoretical, dataset, survey and opinion. This research makes more than one type of contribution – empirical, artefact and theoretical. In this section, each contribution is discussed in detail. An overview of the contribution number, type and which research question it emerged from is presented in Table 8.1 below.

Contribution	Type	Research Question	Chapter
C1	Artifact	4 & 5	5 & 6
C2	Artifact	5	6
C3	Theoretical	6	7
C4	Empirical	1, 2, & 3	3, 4 & 5

Table 8.1 – Overview of the contribution made in this research

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C1: An interactive storytelling game to mitigate peer pressure

This research contributes to creating a novel approach to mitigate peer pressure from friends when making the decision about higher education, through the use of a persuasive interactive storytelling game, called 'My Next Step'. An artefact type of contribution is made here, as it reveals a new finding, of how persuasive technology can be used in a novel way (through interactive storytelling) to mitigate peer pressure from friends. The interactive story was developed on an existing app – Episode, and can be played on a smartphone or tablet. The concept of the game arises from the Choose Your Own Adventure book, where the reader is given decision to make during various points in the game. Depending the decision made, the readers characters ends up in different situation. In My Next Step, the users are presented with an interactive story where they have to make various decisions for their avatar. Each decision revolves around friends pressure and making a decision about higher education. Depending on the decisions they make, the story progresses and their character ends up in situations. In the end, a simulation of their avatars future is presented in the game, followed by a true story (which the user reads). The aim is to highlight to the users the consequences of peer pressure from friends, how it can affect their future. The narrative of the game and true stories reported in the game were inspired from incidents mentioned by Study 1 and 2 participants. The game incorporates multiple persuasive design principles in order to make it persuasive in changing the users behaviour so that they are less likely to be susceptible to peer pressure from friends when making the decision about higher education.

Furthermore, conducting a study to determine whether the technology is effective, facilitated new insights and design implications for supporting mid-adolescents to overcome peer pressure from friends. The work done in Study 4 conducted, provided evidence than the persuasive game was effective in reducing the susceptibility to peer pressure from friends. A pre and post-test was used to measure the 21 participants' susceptibility to peer pressure score. A statistical test (Wilcoxon signed test) run in these results confirmed that there was a statistical difference in the scores, the post test scores for the participants were lower. In addition, interviews were used to further understand how the participants felt about the game, and how effective they found the features (design principles) incorporated in the game. These semi-structured interviews facilitated in revealing new insights and design implications. The key implications identified when designing for this target group (mid-adolescents) include: (i) Reverse Psychology, (ii) Physical attractiveness, (iii) Personalisation, and (iv) Balance between positive and negative aspects. These four factors can aid in making the technology more persuasive for this target group.

Some of the participants resisted peer pressure in the game because they claimed that the attitude of their friends were 'too negative'. This implied that they did the opposite of what their friends were telling them to do, similar to the concept of *reverse psychology*. This is covered in more details in C3 below. In addition, physical attractiveness played a vital role in persuading some of the participants (especially females). They claimed that if they characters in the game are good looking, then they are more likely to believe what the character says, increasing the chances of persuasion. Although this design principle has already been identified by Robert Cialdin (Cialdini & Goldstein, 2002) – *Liking*, this study proved that this design principle plays a major role when designing for this target group. Being able to personalise their avatar by changing the features, skin tone, hair etc. and giving the character a name also alleviated in persuading the users to

play differently. The stated that being able to personalise the character gives it more of a real world feel, which effects the decisions they make. These participants also reported that the technology (or game) needs to encompass positivity as well as negativity, if it is too negative then it is more likely that they will not play/use it. Details of the design implications are covered in Chapter 4, Section 7.4.

This work not only helped in presenting a solution for this PhD research, but can also be useful for researchers in the education and persuasive technology area. Findings helped identify that interactive storytelling is useful in raising awareness and mitigating peer pressure. Study 4 conducted also helped identify which persuasive strategies work better for this target group, in motivating them to change their behaviour. This also gives an opportunity for further work and investigation on how interactive storytelling can be used as a persuasive technology to encourage users to perform a target behaviour in different domains.

C2: Design of the persuasive game using a combination of the Behaviour Wizard and the PSD Model

Two different models were combined to design the persuasive interactive storytelling game; the Behaviour Wizard (Fogg, 2009 (Behaviour Wizard)) and PSD model (Oinas-Kukkonen, 2010). This resulted in an artifact contribution type to be made. The Behaviour Wizard is a method which provides a systematic way of thinking about behaviour change. It also provides a guideline of how the target behaviour can be achieved. This method was employed first in order to identify which behaviour type we were addressing, and what techniques could be used to achieve that behaviour type. The behaviour type we were addressing in this research was a *Green Span Behaviour* – as we wanted our users to commit to a behaviour for a limited period of time, i.e. we wanted them to be able to mitigate peer pressure from when they were in the decision making process of entering higher education. The guidelines for designing a solution for a Green Span behaviour (proposed by the Stanford Behaviour Wizard Team) (Behaviour Wizard, 2019) included: (i) boost motivation, (ii) increase the ability, and (iii) deliver a trigger when motivation and ability are high. We only looked at boosting motivation and delivering the trigger as it was recognised that ability of the users was already high, they were able to mitigate peer pressure.

It was at this stage that I realised that I needed to use another model to compliment the Behaviour Wizard, as using the Behaviour Wizard on its own to design the persuasive technology was not sufficient. Although Fogg has attempted to define 7 persuasion strategies, it was recognised that these strategies were limited, there was not much variety. It was therefore decided to use the PSD model (Oinas-Kukkonen, 2010) to identify which design strategies need to be incorporated within the technology. The PSD model defines 28 different design principles which could be incorporated within the system features, to make the technology persuasive. As there were multiple principles defined, covering a variety of areas, ranging from how the principles can be incorporated make the task easy, to how it can be incorporated to provide social support, I decided to use some of the 28 strategies identified in the PSD model to leverage the core motivators and trigger, rather than focus on the 7 suggested by Fogg.

To address this target behaviour of mitigating peer pressure, it was decided that the core motivator #1 (Pleasure/Pain) and #2 (Hope/Fear) would be leveraged in the persuasive game to boost motivation, followed by delivering a 'Spark' as a trigger. All the design principles from the PSD model were examined to determine which were suitable and practical in leveraging the motivators (pleasure/pain and hope/fear) and trigger (spark). Some principles were not relevant for this research, such as the design principle *Competition*, therefore those were not considered. However, as a supplement, the persuasion strategies defined by Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013) and Cialdini (Cialdini & Goldstein, 2002) were also looked at to see if an additional design principles needed to be incorporated (which were not part of the PSD model). In the end, a total of 10 design principles were incorporated within the game. 9 of them were applied to boost motivation, including: *Personalisation, Similarity, Tailoring, Simulation, Conditioning, Suggestion, Authority, Trustworthiness and Liking*, and 1 was applied to deliver the trigger: *Social Learning*.

All the principles applied were from the PSD model, except *Conditioning*, which was identified as a persuasion strategy by Fogg (2002). In addition, there were some other principles which were overlapping and they are identified by either Fogg, Cheng or Cialdini as well. Details of where the principles were referenced from is covered in section 6.2.6.

By employing this structured approach for designing the persuasive technology contributed useful knowledge to other researchers and designers. They are able to see a potential for two models to be combined in order to design for a persuasive technology. These designers and researchers can be assured that combining the Behaviour Wizard with the PSD model can aid in transforming the motivators, ability and triggers into a system effectively, making the system persuasive. Researchers can also get a better understanding of which design principles in particular were effective in leveraging core motivator #1 and #2, and 'Spark' as a trigger.

Another point which stood out when designing the game was the 'ambiguity' of certain factors. There is uncertainty about these factors as users perceive the same factor differently. For example, whilst family influence is perceived as a positive factor for some, motivating individuals to enter HE, the same factor is perceived negatively by others acting as a barrier or constraint to enter HE. How HCI practitioners should deal with ambiguity when designing a technology/solution has already been investigated previously. Yuwei Chen and Mingelei Cheng (Chen, Y. & Cheng, M, 2015) found that uncertainty can be regarded as a basic but difficult problem that every HCI designer needs to deal with within their design process. In their research, they proposed that most uncertainties result from the users, therefore user involvement can be a helper for designers to solve or avoid uncertainty. In addition, Pedro (Canhenha, P. 2018) confirmed in his article that ambiguity is always going to be present in any process. The challenge is to tackle it in a manner where it does not become a gap that removes the initiative of successfully executing the project. He also suggested the best way to deal with ambiguity is through *flexibility*. This is achieved by understanding the problem from different perspectives and not from a single point of view giving the designers an opportunity to explore and seek out new directions. He summarised that the following needs to be done in order to understand the ambiguous factor: (i) Research, (ii) Convene, (iii) Listen, (iv) Document and (v) Prepare. Using this method will allow designers to understand what the best solution possible would be allowing them to tackle complex ambiguous factors.

Moreover, the Chief Design Officer of FutureGov (Holiday, B. 2018), Ben Holliday, emphasized that ambiguity is a key part of design and designers should deal with ambiguity by working around the challenge of existing constraints and being open to finding resolutions through seemingly opposite ideas and perspectives of users. He states that the designer should learn to hold on to both perspectives and opinions and find ways to bring together both ideas. This could include being creative and taking intuitive steps in including users in the design process to understand the ambiguous factor better. Including the users would enable designers to identify the various perspectives on this factor, helping them to identify ways to minimise the ambiguity of the factor so that it does not become a hindrance to the success of the solution. By analysing the results from the first three studies in this research, it was evident that family influence was an ambiguous factors, playing both, a positive and negative role, for the users when making a decision about HE. Taking the proposed solution from previous literature into account, it was decided that this ambiguous factor should be minimised within the design of the game. This would allow the purpose of the game to be achieved successfully i.e. enabling users to make an informed decision about HE. However, as Pedro (Canhenha, P. 2018) stated, more research needs to be done on this ambiguous factor so that designers can explore and acknowledge the differences and seek out new directions in which the design of the technology can go.

Furthermore, analysing the results from the final study (Study 4) allowed a valuable contribution to be made, confirming a critical response to the design approach of persuasive technology. As explained previously in Chapter 2, Section 2.3.5 - Criticism of Persuasive Technology, B.J. Fogg's captological design does not include *unintended consequences*; it focuses on the attitudes and behaviour changes intended by the designers of interactive technology products. The development of the persuasive game was also design-centred and system-centred focusing on the intended consequences only; incorporating ten persuasive design principles to enable users to perform the target behaviour of mitigating peer pressure from friends. Although these principles were carefully implemented they failed to predict the experiences and outcomes of the users, i.e. the unintended consequences. The users perceived parts of the game as persuasive which were ideally not developed or meant to be persuasive, for example, the negative attitude of friends in the game enabled the users to perform the target behaviour. However, this was not intended whilst developing the game; Social Learning and Simulation were developed to be persuasive enabling them to perform the target behaviour but proved to be less effective than the negative friends. Detailed analysis of the unexpected findings from this study can be found in the result section of Study 4 (Section 7.3).

C3: Proposal of a new persuasive design principle – Reverse Psychology

Theoretical contributions consist any new concepts, principles or frameworks identified from those that already exist. From undertaking the work done in this research, we can conclude that a theoretical contribution was made as an identification of a new persuasive design principle was proposed. By conducting Study 4, to test how effective the persuasive game is in facilitating behaviour change, so that individuals are able to mitigate peer pressure from friends, it was identified that a certain feature of the game was more prominent in motivating individuals to change their behaviour. The narrative of the game was such that the users friends within the game, pressurised the users avatars to make a different choice about higher education and follow them. The friends did the complete opposite of what the avatar decided

to do, so for example, if the user decided that his/her will enter higher education, then all the friends win the game will pressurise the avatar to not go because they themselves were not going, and vice versa. Seeing the friends act in such a manner made some of the participants retaliate. They mentioned in their interview that they found the friends 'annoying', and as the friends were adamant in pressuring the participants avatar to follow them, it made them resilient, forcing them to be more firm in their doing and not doing what the friends told them to do.

This effect seen here of the participant doing the opposite of what their friends are telling them to do is similar to reverse psychology, a technique used to encourage a person to perform a behaviour by telling him/her to do the exact opposite. This part of the game did not incorporate any design principles, as it was not intended to change the users behaviours. However, this was an interesting unexpected finding, as this part of the game most effective in changing the users behaviour. After analysing all the persuasion strategies identified by Harri Oinas's PSD model (Oinas-Kukkonen, 2010), BJ Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013), and Robert Cialdini (Cialdini & Goldstein, 2002), it was recognised that no such design principle exists, which persuades the user to perform a target behaviour by telling them to do the exact opposite. It was therefore proposed that a new persuasive design principle should be formed – *Reverse Psychology*.

A design implementation when incorporating this design principle is that it should only be applied for a limited or short period of time. This point was addressed when two of the participants specifically stated that if the game was longer and if the friends kept pressuring their avatar to make a different choice, then they would not have been able to resist, they would have ended up listening to their friends. Therefore, when designing for this target group, it would be ideal to incorporate reverse psychology for a short period of time, where it is not too evident.

Identification of a new design principle demonstrated the potential for additional persuasive design principles and strategies to be formed. They do not need stick to the only ones which have been identified by Harri Oinas's PSD model (Oinas-Kukkonen, 2010), BJ Fogg (Fogg, 2002), Ran Cheng (Cheng, 2013), and Robert Cialdini (Cialdini & Goldstein, 2002). It also contributed useful knowledge and implications which could inform the design for this particular target group, mid-adolescents.

C4: An empirical understanding of the barriers and motivators encountered by individuals from LPN and the role technology played in their decision making

While prior work has been undertaken to analyse the barriers and motivators to enter higher education, this fourth contribution adds knowledge to this existing research. Existing studies focus on the barriers and motivators are limited. The work done in this research targeted the barriers and motivators encountered by individuals who come from a LPN. Moreover, it also covered the role of technology in their decision making. Chapter 3, investigated the barriers and constraints encountered by individuals from a LPN which influenced them to not enter higher education. Whereas Chapter 4 explored what motivated individuals from this same neighbourhood (LPN) to enter higher education. In doing so, we identified that there was a difference in the attitudes of these individuals. While a factor acted as a motivator, facilitating an individual

to enter higher education, the same factor acted as a barrier simultaneously, discouraging another individual to enter higher education. The same factor was perceived in two different ways by the participants, which resulted in them entering or not entering HE. In addition, Chapter 5 verified if there was a statistically significant difference between these two groups. In this study (Study 3), a wider population was recruited so that the findings could be validated. Results to the statistical test revealed that 8 factors in total were perceived differently by the two groups, influencing their decision to either enter or not enter HE. Findings from the first three studies conducted can help future researchers to better understand the factors which influence an individuals decisions to enter HE. They also have a greater insight into what barriers and motivators are encountered by individuals from a LPN in particular.

8.5 Limitations

The work conducted in this research aimed to investigate a novel approach to facilitate individuals in mitigating peer pressure from friends when considering higher education. A persuasive interactive storytelling game was designed and implemented, and its effectiveness was tested in an empirical study. Findings from the study indicated that the persuasive game was useful in supporting participants to change their behaviour. Post test results (after playing the game) showed that 16 of the 21 participants' score for susceptibility to peer pressure has decreased, indicating that they were less likely to be influenced by friends when making the decision to enter higher education. Whilst these results enabled us to conclude that a persuasive interactive storytelling game facilitates in mitigating peer pressure, answering the overall aim of the research and presenting a number of useful contributions to the field of HCI, a few limitations to this research were recognised.

The first limitation to this research was the age range of the participants recruited for the final study, i.e., 18 year olds. It is apparent that once a student enters sixth form that is the time when they start deciding about entering higher education. At this stage they are around 16-17 years of age. A majority of students have already made up their mind by the time they are 18, some even start university by this age. Due to the ethical considerations, it was difficult to recruit participants under the age of 18, as it would have been a high risk ethical application. Extra care would also had to be taken in what is presented in the game. The true stories, scenarios and simulations could not display any extreme consequences, as the topic of peer pressure is already very sensitive. Hence, it was decided to recruit 18 year old sixth form students to test the effectiveness of the persuasive game.

In addition to this, a further limitation which this research faced was the time of the year when the final study was conducted. The study commenced in the last week of January, and this was the time when the UCAS applications had already been submitted. This meant that most of the participants had already made their decision about higher education.

A third and final limitation for this research arose when convenience sampling was used to recruit participants from two schools in West London (10 from one school and 11 from the other) for the final study. There could have been some bias in the data as the participants were only recruited from a specific area,

and as they were recruited from the same school, there was a chance that the same friends were recruited (and they both ended up giving similar responses). Although measures were taken to run the study on a one to one session with the participants, the participants could have told their friends about what the study and game was about, and this could have influenced the friends' responses. Also, the number of participants recruited for the study were limited, only 21. This limitation is seen for Study 1 and 2 as well, where the participants were recruited from a specific area only.

8.6 Future Work

The work conducted in this research indicated that there is a potential for using persuasive technology to overcome one of the barriers to enter higher education, peer pressure from friends. This was one of my motivations to start this research – to help young individuals overcome one or more of the factors which influence their decision making about higher education. Developing and testing this persuasive game, 'My Next Step', has given me the confidence to move forward in this area, as I would like to help as many young individuals as possible in making an informed decision about HE. To do so, my aim is now to approach schools, and Widening Participation and Outreach teams, and work with them so that they start using My Next Step game officially within their projects to help students make informed decision about their future. Before I do that, I would first like make improvements to the game by addressing some of the comments and suggestions made by the participants and taking them on board. Participants suggested that the game was too 'negative', so I would balance out the negativity by adding more positive characters within the game and refining the narrative and storyline accordingly. I would also make the story line a bit longer, as some participants commented on the game being short.

Conducting the final study revealed insights to a few design implications, indicating that there are still numerous opportunities for further work to be conducted. Some of the design principles incorporated in the game were not perceived as persuasive because of the way they were applied. One of these included the design principle *Suggestion*, suggesting the users should restart the game and play differently. However, most of the participants did not restart the game and therefore missed a few key parts of the game which presented the consequence of peer pressure. These parts were essential to view as they encouraged the user to change their behaviour. Therefore, an improvement that could be made is to change the text suggesting the user to restarts so that it is more persuasive. However, another way to overcome this could be to present the users with the consequences of peer pressure in the regardless as a simulation (as an addition), regardless of what choices they made in the game. Characters could also be made attractive and good looking, to see how the game impacts the level of behaviour change.

Further to this, recruiting a larger sample size, and from different schools, areas and backgrounds for testing the effectiveness of the persuasive game could result in identifying new findings and trends within the data. In addition, the study could be run earlier on in the semester, when the students are given an introduction about higher education. By doing so will ensure that majority of the students have not yet made a decision about higher educate and are still deciding, Findings from this study could be compared to the ones

presented in this research, to identify patterns, similarities and differences between the different users; those who are 18 years old and those who are a bit younger. These results can be used to inform the design, as well as development of new technologies to support mitigation of peer pressure from friends.

A possibility for using a different kind of persuasive technology to mitigate peer pressure from friends could also be employed and tested. One of the potential is to use social media. As the statistics prove that mid-adolescents have a high usage of social media, it would therefore be valuable to find out whether using social media as a persuasive technology facilitates in changing the behaviours of these individuals. The other ideas generated with the Ideate stage of the Design Thinking process (Chapter 6), could also be evolved, developed and tested to see if they prove to be more effective.

Lastly, this research presented 8 different factors which were perceived differently by those who were in university and those who were not. Due to the time and scope of this research, only one of those factors was focused on (peer pressure from friends). A potential for researching the remaining 7 factors, and addressing them with the design of a persuasive technology could support individuals across England (who are affected by that factor) to be able to make better decisions for their future.

References

- Adams, A.J. (2009). Seeing Is Believing: The Power of Visualization. *Psychology Today*. December, 3
- Adams, R. (2013). The Guardian, University Fees Biggest Barrier to Wider Access, Research Finds. [Online] Available at: <https://www.theguardian.com/education/2013/may/29/university-fees-barrier-wider-access> [Accessed 05 December 2019]
- Altbach, P.G., Reisberg, L. and Rumbley, L.E., 2019. Trends in global higher education: Tracking an academic revolution. Brill Sense.
- Albert, D., Chein, J., & Steinberg, L. (2013). The teenage brain: Peer influences on adolescent decision making. *Current directions in psychological science*, 22(2), pp.114-120.
- Allen, J., Porter, M., McFarland, F., Marsh, P., & McElhaney, K. (2005). The two faces of adolescents' success with peers: adolescents popularity, social adaptation and deviant behaviour. *Child Development* 76 (3), 747-760.
- Alrobai A., Dogan H., Phalp K., & Ali R. (2018). Building Online Platforms for Peer Support Groups as a Persuasive Behavior Change Technique. In: Ham J., Karapanos E., Morita P., Burns C. (eds) *Persuasive Technology. PERSUASIVE 2018. Lecture Notes in Computer Science*, vol 10809. Springer, Cham
- Atkinson, B.M., 2006, May. Captology: A critical review. In *International conference on persuasive technology* (pp. 171-182). Springer, Berlin, Heidelberg.
- Bagwell, L., Coie, D., Terry, A., & Lochman, E. (2000). Peer clique participation and social status in preadolescence. *Merrill-Palmer Quarterly-Journal of Developmental Psychology*, 46(2), 280–305
- Bailey, L. (2018). How can I Overcome Peer Pressure? [Online] Available at: <https://412teens.org/qna/how-can-i-overcome-peer-pressure.php> [Accessed 10 February 2019]
- Behaviour Wizard. (2019). [Online] The Behaviour Grid Easy Access to Powerful Strategies. Available at: <http://www.behaviorwizard.org/wp/all-previews-list/> [Accessed 6 Feb 2019]
- Bell, A. (2013). 20 Ways to Avoid Peer Pressure [Online] Available at: <https://yourlifecounts.org/learning-center/peer-pressure/20-ways-to-avoid-peer-pressure/> [Accessed 2 December 2019]
- Blanch, A., Filson, B., Penney, D., & Cave, C. (2012). Engaging women in trauma-informed peer support: A guidebook. Alexandria, VA: *National Center for Trauma-Informed Care*.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Braun, V. and Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. sage

-
- Broekhuizen, K., Kroeze, W., Poppel, N., Oenema, A., & Brug, J. (2012). A systematic review of randomized controlled trials on the effectiveness of computer-tailored physical activity and dietary behaviour promotion programs: an update. *Annals of Behavioural Medicine*, 44(2), pp.259-286.
- Brown, B. B., & Clasen, D. R. (1985). Peer pressure inventory. *Journal of Youth and Adolescence*, 14, 451-468.
- Brown, T., & Wyatt, J. (2010). Design Thinking for Social Innovation. *Stanford Social Innovation Review*, pp. 8(1):29-35.
- Bryan, C. J., Yeager, D. S., Hinojosa, C. P., Chabot, A., Bergen, H., Kawamura, M., & Steubing, F. (2016). Harnessing adolescent values to motivate healthier eating. *Proceedings of the National Academy of Sciences*, 113(39), 10830-10835.
- Callender, C. (2006). Access to higher education in Britain: The impact of tuition fees and financial assistance. In *Cost-Sharing and Accessibility in Higher Education: A Fairer Deal?* (pp. 105-132). Springer, Dordrecht.
- Cambridge. (2018). University of Cambridge Undergraduate Study Widening Participation. [Online] Available at: <http://www.undergraduate.study.cam.ac.uk/find-out-more/widening-participation> [Accessed 2 Jan 2020]
- Canhenha, P. (2018). Ambiguity and the Design Process. . [Online] Available at: <https://uxplanet.org/ambiguity-and-the-design-process-1f2982b6d62a> [Accessed 10 Jan 2020]
- Cariota, C (2018). 3 Interactive Story Games that will Change how you Think About Storytelling [Online] Available at: <https://medium.com/@chelseacariota/3-interactive-story-games-that-will-change-how-you-think-about-storytelling-fb4530feac7> [Accessed 1 October 2018]
- Chen, Y. and Cheng, M., 2015. How Do Designers Deal With Uncertainty. *Lund University Department of Informatics*
- Cheng, R. (2013). Persuasion strategies for computers as persuasive technologies. Department of Computer Science, University of Saskatchewan, 10(2010), pp.1-7
- Chittaro, L. (2012). Passengers' Safety in Aircraft Evacuations: Employing Serious Games to Educate and Persuade. In: Bang M., Ragnemalm E.L. (eds) *Persuasive Technology. Design for Health and Safety. PERSUASIVE 2012. Lecture Notes in Computer Science*, vol 7284. Springer, Berlin, Heidelberg
- Chowdry, H., Crawford, C., Dearden, L., Goodman, A., and Vignoles, A., (2013) Widening Participation in higher education: analysis using linked administrative data. *Journal of Royal Statistical Society: Series A*. 176 (2), 431-457.
- Cialdini, R. B., & Goldstein, N. J. (2002). The science and practice of persuasion. *Cornell Hotel and Restaurant Administration Quarterly*, 43(2), 40-50.
- Cialdini, R., Petty, R., & Cacioppo, J. (1991). Attitude and Attitude Change. *Annu. Rev. Psychol.* 32, 357–404 (1991)
- City. (2018). City University London – Widening Participation [Online] Available at: <http://www.city.ac.uk/for-school-and-college-liaison/widening-participation> [Accessed 12 Jan 2019]
- Clarey, C. (2014). Olympians use imagery as mental training. *The New York Times*, 22.

-
- Clark, A., & Loheac, Y. (2007). "It wasn't me, it was them!" social influence in risky behaviour by adolescents. *Journal of Health Economics* 26 (4), 763-784.
- Clasen, D., & Brown, B. (1985). The multidimensionality of peer pressure in adolescence. *Journal of youth and adolescence*, 14(6), pp.451-468.
- Connor, H., Dewson, S., Tyers, C., Eccles J., Regan, J., & Aston, J. (2001). Social Class and Higher Education: Issues Affecting Decision on Participation by Lower Social Class Groups. [Online] Available at: <http://dera.ioe.ac.uk/4621/1/RR267.pdf> [Accessed 10 December 2019]
- Connor, H., Tyers, C., Modood, T., & Hillage, J. (2004). Why the difference? A closer look at higher education minority ethnic students and graduates. *Institute for Employment Studies research report*, (552).
- Consolvo, S., Everitt, K., Smith, I., & Landay, A. (2006). Design requirements for technologies that encourage physical activity. In *Proceedings of the SIGCHI conference on Human Factors in computing systems* (pp. 457-466). ACM.
- Controller, G. (2017). Innovative developments in HCI and future trends. *International Journal of Automation and Computing*, 14(1), pp.10-20.
- De Freitas, S., Magoulas, G., Oliver, M., Papamarkos, G., Poulouvassilis, A., Harrison, I., & Mee, A. (2006). L4all-a web-service based system for lifelong learners. In: *Proceedings of eChallenges'2006 (Workshop on Next Generation in Technology Enhanced Learning)*, pp 1477 – 1484.
- Deloitte (2015). Mobile Consumer 2015: The UK Cut. *Revolution and Evolution*
- Deloitte. (2018). Mobile Consumer 2018: The UK cut [Online] Available at: <https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/mobile-consumer-survey.html> [Accessed 30 August 2019]
- Deloitte Survey. (2018). Mobile Consume 2018: The UK cut [Online] Available at: <https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/mobile-consumer-survey.html> [Accessed 30 September 2018]
- De Vries, H., Backbier, E., Kok, G., & Dijkstra, M. (1995). The impact of social influences in the context of attitude, self-efficacy, intention and previous behaviour as predictors of smoking onset. *Journal of Applied Social Psychology* 25 (3), 237-257.
- Doney, P., & Fabri, M. (2015). Seeking New Insights: A Design Thinking Approach to Persuasive Technology Aimed at Supporting Clients of a Weight Management Program.
- Eagle, N., & Greene, K. (2014). Reality mining: Using big data to engineer a better world. MIT Press
- Edinburgh. (2018). University of Edinburgh Widening Participation – Projects [Online] Available at: <http://www.ed.ac.uk/student-recruitment/widening-participation/projects> [Accessed 2 Jan 2020]
- Engle, J. and Tinto, V., 2008. Moving Beyond Access: College Success for Low-Income, First-Generation Students. *Pell Institute for the Study of Opportunity in Higher Education*.
- EPI. (2017). [Online] Available at: <https://epi.org.uk/publications-and-research/social-media-childrens-mental-health-review-evidence/> [Accessed 30 September 2018]

-
- Esen, K., & Gündoğdu, M. (2010). The relationship between internet addiction, peer pressure and perceived social support among adolescents. *International Journal of Educational Researchers*, 1(2), pp.29-36.
- Fogg, B.J. (2002). Persuasive technology: using computers to change what we think and do. *Ubiquity*, 2002(December), p.5.
- Fogg, B.J. (2009 (Behaviour Grid)). The behaviour grid: 35 ways behaviour can change. In *Proceedings of the 4th international Conference on Persuasive Technology* (p. 42). ACM.
- Fogg, B.J. (2009 (Behaviour Model)). A behaviour model for persuasive design. In *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.
- Fogg, B.J. (2017). Behaviour Wizard. Stanford Persuasive Tech Lab. [Online] Available at: <http://captology.stanford.edu/projects/behavior-wizard-2.html> [Accessed 6 December 2019]
- Fogg, B.J. (2003). Persuasive technology: using computers to change what we think and do. *Ubiquity* 2003, 5
- Fogg, B.J. (2009). Creating persuasive technologies: an eight-step design process. In *Proceedings of the 4th international conference on persuasive technology* (p. 44). ACM.
- Forsyth, A., & Furlong, A. (2003). Socio-economic disadvantage and experience in higher education. [Online] Available at: <https://www.jrf.org.uk/report/socio-economic-disadvantage-and-experience-higher-education> [Accessed 19 December 2019]
- Frances, M. (2019). Staying Focused with a Vision and Positive Affirmations [Online] Available at: <http://www.letstalkaboutwork.tv/staying-focused-with-a-vision-board-and-positive-affirmations/> [Accessed 4 Jan 2019]
- Frith, E. (2017). Social media and children's mental health: a review of the evidence.
- Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study. *Developmental psychology*, 41(4), p.625.
- Gifford-Smith, M., Dodge, K., Dishion, T., & Mccord, J. (2005). Peer influence in children and adolescents: crossing the bridge from development to intervention science. *Journal of Abnormal Child Psychology* 33 (3), 225-265.
- GoGlobe. (2018). The State of Mobile Gamin Industry [Online] Available at: <https://www.go-globe.com/blog/mobile-gaming-industry/> [Accessed 2 December 2019]
- Government Digital Service. (2016). GOV.UK, Types of Schools [Online] Available at: <https://www.gov.uk/types-of-school> [Accessed 10 Jan 2019]
- Greenbank (2018). Professor Fluffy's Primary Roadshow at Greenbank Primary [Online] Available at: <http://www.greenbank-primary.co.uk/news/detail/professor-fluffys-primary-roadshow-at-greenbank-pr/> [Accessed 10 Jan 2019]
- HE Academy. (2005). Widening Participation - A Rough Guide for Higher Education Providers [Online] Available at:

https://www.heacademy.ac.uk/system/files/widening_participation_roughguide_for_education_providers.pdf [Accessed 11 Jan 2019]

HEFCE. (2018). Higher Education Funding Council for England (HEFCE), Glossary [Online] Available at: <https://webarchive.nationalarchives.gov.uk/20180319113457/http://www.hefce.ac.uk/Glossary/#letterH> [Accessed 4 Jan 2019]

HEFCE. (2013). Higher Education Funding Council for England (HEFCE), Trends in young participation in higher education. [Online] Available at: http://www.hefce.ac.uk/media/hefce/content/pubs/2013/201328/HEFCE_2013_28.pdf [Accessed 12 December 2019]

HESA. (2018). Widening participation: UK Performance Indicators 2016/17 [Online] Available at: <https://www.hesa.ac.uk/news/01-02-2018/widening-participation-tables> [Accessed 11 Jan 2019]

HESA Definitions. (2018). Level of Study [Online] Available at: <https://www.hesa.ac.uk/support/definitions/students#level-study-qualification-obtained> [Accessed 11 Jan 2019]

HESA, HE Student Characteristics. (2018). [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/sfr247/figure-4> [Accessed 11 Jan 2019]

HESA, Participation by HE Provider. (2018). Table T1 – Participation of under-represented groups in higher education [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/ukpis/widening-participation/table-t1> [Accessed 10 Jan 2019]

HESA POLAR3. (2018). What is POLAR? [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/students/whos-in-he> [Accessed 11 Jan 2019]

HESA Student Enrolment. (2018). Widening participation: UK Performance Indicators 2016/17 [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/sfr247/figure-3> [Accessed 11 Jan 2019]

HESA, Underrepresented. (2018). Figure 5 - HE undergraduate UK domiciled full-time student enrolments by participation characteristics 2012/13 to 2016/17 [Online] Available at: <https://www.hesa.ac.uk/data-and-analysis/sfr247/figure-5> [Accessed 10 Jan 2019]

HESA, WP Summary. (2018). Widening participation summary: UK Performance Indicators 2016/17 [Online] Available at: <https://www.hesa.ac.uk/news/01-02-2018/widening-participation-summary> [Accessed 10 Jan 2019]

Hester, M. (2013). Oral care products offer fresh alternatives for young and old.

Holliday, B. (2018). Ambiguity and Design. [Online] Available at: <https://medium.com/leadng-service-design/ambiguity-and-design-35e1982e855e> [Accessed 10 Jan 2020]

Houston, K., Cooper, A., & Ford, E. (2002). Internet support groups for depression: A 1-year prospective cohort study. *American Journal of Psychiatry*, 159(12), 2062– 2068. <http://doi.org/10.1176/appi.ajp.159.12.2062>

Inc, K. (2015). Mobile speed awareness device radar trailer (SMART) U.S. Patent 5,231,393

JISC. (2007). E-Portfolios – An overview of JISC activities [Online] Available at: <https://webarchive.nationalarchives.gov.uk/20140703002835/http://www.jisc.ac.uk/media/documents/publications/eportfoliooverviewv2web.pdf> [Accessed 10 Jan 2019]

Jisc Learners Perspectives. (2012). Mobile learning. *Elt Journal*, 67(1), pp.80-84.

Johnson, R.R., (2004). Persuasive Technology: Using Computers to Change What We Think and Do. *Journal of Business and Technical Communication*, 18(2), p.251.

Kimberly, A. (2002). Caring for adolescents in the adult intensive care unit. *Critical care nurse*, 22(2), pp.80-99.

Lancaster. (2018). Lancaster University Widening Participation [Online] Available at: <https://www.lancaster.ac.uk/about-us/widening-participation/> Accessed 12 Jan 2019]

Laskey, A., & Kavazovic, O. (2011). Opower. XRDS: Crossroads, The ACM Magazine for Students, 17(4), pp.47-51.

Laurillard, D., Oliver, M., Wasson, B., & Hoppe, U. (2009). Implementing technology-enhanced learning. In *Technology-enhanced learning* (pp. 289-306). Springer, Dordrecht.

Leard Statistics. (2018). Wilcoxon Signed Rank Test using SPSS [Online] Available at: <https://statistics.laerd.com/spss-tutorials/wilcoxon-signed-rank-test-using-spss-statistics.php> [Accessed 15 March 2019]

Lee, S. (2018). Accredited Schools, Dealing with Peer Pressure in School. [Online] Available at: <https://www.accreditedschoolsonline.org/resources/peer-pressure/> [Accessed 20 Sept 2018]

Leeds. (2017). *Report 2 - Students' motives, aspirations and choices*. [Online] Available at: https://www.leeds.ac.uk/educol/ncihe/r2_021.htm [Accessed 20 December 2019]

Lotar-Rihtaric, M., & Kamenov, Z. (2013). Susceptibility to peer pressure and attachment to friends. *Psihologija*, 46(2), pp.111-126.

Lotar, M. (2012). Determinants of Susceptibility to Peer Pressure in Adolescence. Unpublished doctoral dissertation. Zagreb: Filozofski fakultet Sveučilišta u Zagrebu.

Lucero, A., Zuloaga, R., Mota, S., & Muñoz, F. (2006). Persuasive technologies in education: improving motivation to read and write for children. *Persuasive Technology*, pp.142-153.

MacDonald, G., Nail, P. R., & Harper, J. R. (2011). Do people use reverse psychology? An exploration of strategic self-anticonformity. *Social Influence*, 6(1), 1-14.

Machin, S., & Vignoles, A. (2006). *Education Policy in the UK. CEE DP 57*. Centre for the Economics of Education. London School of Economics and Political Science, Houghton Street, London, WC2A 2AE, UK.

Mahoney, P. (2006). FILE-PASS [Online] Available at: <https://jiscinfonetcasestudies.pbworks.com/w/page/59136939/FILE-PASS> [Accessed 3 Jan 2020]

Mayes, T., Morrison, D., Mellar, H., Bullen, P., & Oliver, M. (Eds.). (2009). *Transforming Higher Education through Technology Enhanced Learning*. York: Higher Education Academy.

Meyers, J. (2017). Peer Pressure: Why we feel it, how to overcome it, and can it be positive? [Online] Available at: <https://blog.cognifit.com/peer-pressure/> [Accessed 10 December 2019]

Mintz, J., & Aagaard, M. (2012). The application of persuasive technology to educational settings. *Educational Technology Research and Development*, 60(3), pp.483-499.

Michelle, H. (2018). Design Thinking Project. [Online] Available at: <https://medium.com/nyc-design/design-thinking-project-95b42998e5d9> [Accessed 10 Feb 2019]

Mullen, F. (2010). Barriers to Widening Access to Higher Education. *working paper No. 10*.

Nabi, L., Prestin, A., & So, J. (2013). Facebook friends with (health) benefits? Exploring social network site use and perceptions of social support, stress, and well-being. *CyberPsychology, Behavior & Social Networking*, 16(10), 721–727. <http://doi.org/10.1089/cyber.2012.0521>

NUS. (2008). NUS Student Experience Report [Online] Available at: https://www.nus.org.uk/PageFiles/4017/NUS_StudentExperienceReport.pdf [Accessed 19 Nov 2016]

Obermayer, L., Riley, T., Asif, O., & Jean-Mary, J. (2004). College smoking-cessation using cell phone text messaging. *Journal of American College Health*, 53(2), pp.71-78

Ofcom. (2015) [Online] Available at: <https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr15> [Accessed 29 September 2018]

Oinas-Kukkonen, H. (2010). Behaviour change support systems: A research model and agenda. *Persuasive technology*, pp.4-14.

Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive systems design: Key issues, process model, and system features. *Communications of the Association for Information Systems*, 24(1), p.28.

Oregon. (2009) [Online] Available at: <https://www.oregon.gov/oha/PH/HEALTHYPEOPLEFAMILIES/YOUTH/ADOLESCENTGROWTHDEVELOPMENT/Documents/adoldevstages.pdf> [Accessed 25 September 2018]

Oxford. (2018). University of Oxford – Widening Access and Participation [Online] Available at: <http://www.ox.ac.uk/about/increasing-access/widening-access-and-participation> [Accessed 12 Jan 2019]

Oxford Brookes University. (2019). University Time Capsule [Online] Available at: <https://www.brookes.ac.uk/studying-at-brookes/schools-and-colleges/primary/university-time-capsule/> [Accessed 12 Jan 2019]

Parent Map. (2016). New Year's Craft: Create a Family Vision Board [Online] Available at: <https://www.parentmap.com/article/family-vision-board-craft-diy> [Accessed 24 October 2018]

Petersen, E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K.. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), pp.16-33.

Plattner, H., Meinel, C., & Weinberg, U. (2009). Design-thinking. *HMD Praxis der Wirtschaftsinformatik*, 56(1), pp.160-171.

-
- Purpura, S., Schwanda, V., Williams, K., Stubler, W., & Sengers, P. (2011). Fit4life: the design of a persuasive technology promoting healthy behavior and ideal weight. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 423-432). ACM.
- Rapid. (2017). Interactive Whiteboards, SMART Boards, BenQ Displays. [Online] Available at: http://www.rapid.co.uk/interactive-whiteboards?gclid=CIf0tl647dQCFa0V0wodUd4H_Q [Accessed 3 Jan 2020]
- RealisingOpportunities. (2018) [Online] Available at <http://www.realisingopportunities.ac.uk/prospective> [Accessed 13 Jan 2019]
- Revelle G., Reardon E., Mays Green M., Betancourt J., & Kotler, J. (2007). The Use of Mobile Phones to Support Children's Literacy Learning. In *International Conference on Persuasive Technology* (pp. 253-258). Springer, Berlin, Heidelberg.
- Riddick, Q. (2015). [Online] Available at: https://scienceleadership.org/blog/creating_awareness_for_teen_peer_pressure [Accessed 13 October 2018]
- Round, A. (2005). A Survey of Student Attitudes, Experiences and Expectations. *School of Education, University of Waikato Retrieved* [Online] Available at: <https://www.termpaperwarehouse.com/essay-on/A-Survey-of-Student-Attitudes-Experiences-and-Expectations/209132> [Accessed 13 Jan 2019]
- Santander. (2018). Children Understand the Value of Money at 10. Strategy for the Sustainability of a Food Production System for the Prosperity of Low-Income Populations in an Emerging Country: Twenty Years of Experience of the Peruvian Poultry Association. *Sustainability*, 10(11), p.4035.
- SEC. (2016). The National Statistics Socio-economic classification (NS-SEC) Definitions [Online] Available at: <https://www.ons.gov.uk/methodology/classificationsandstandards/otherclassifications/thenationalstatistics/socioeconomicclassificationnssecrebasedonsoc2010> [Accessed 11 Sept 2019]
- Shapiro, S., & Margolin, G. (2014). Growing up wired: Social networking sites and adolescent psychosocial development. *Clinical child and family psychology review*, 17(1), pp.1-18.
- Show, C. (2017). The Nation's Largest Auto Show - Media | Chicago Auto Show. [Online] Chicagoautoshow.com. Available at: <http://www.chicagoautoshow.com/> [Accessed 15 Dec 2019].
- Smith, A., & Anderson, M. (2018) [Online] Available at: <http://www.pewinternet.org/2018/03/01/social-media-use-in-2018/> [Accessed 30 September 2018].
- Smith, K. M. (2008). Meanings of "design" in instructional technology: A conceptual analysis based on the field's foundational literature (Doctoral dissertation, Indiana University).
- Spielhofer, T., Golden, S., Evans, K., Marshall, H., Mundy, E., Pomati, M., & Styles, B. (2010). Barriers to participation in education and training.
- Statista. (2018). [Online] Available at: <https://www.statista.com/statistics/617136/digital-population-worldwide/> [Accessed 29 September 2018]

-
- Statista. (2019). Gaming on a mobile phone in the United Kingdom (UK) 2012-2017, by age [Online] Available at: <https://www.statista.com/statistics/300522/mobile-gaming-in-the-uk-by-age/> [Accessed 12 Feb 2019]
- Stanford Behaviour Wizard Team. (2019). Green Span Behaviour Overview [Online] Available at: <http://www.behaviorwizard.org/wp/all-previews-list/GreenSpan-behaviors-preview/> [Accessed 7 Feb 2019]
- Stanford D School. (2010). Bootcamp Bootleg. [Online] Available at: <http://dschool.stanford.edu/blog/> [Accessed 4 Dec 2019].
- Stang, J., & Story, M. (2005). Adolescent growth and development. Guidelines for adolescent nutrition services, 1(6).
- Stebbleton, M. and Soria, K., 2013. Breaking down barriers: Academic obstacles of first-generation students at research universities.
- Steinberg, L. & Monahan, C. (2007). Age differences in resistance to peer influence. *Developmental Psychology*. 2007;43:1531–1543
- Stevens, S. (2017). Widening participation statistics [Online] Available at: <https://russellgroup.ac.uk/news/widening-participation-statistics/> [Accessed 12 Jan 2019]
- Stuart, M. (2006) 'My friends made all the difference': Getting into and succeeding at university for first-generation entrants. *Journal of Access Policy and Practice*, 3(2), 162-184
- Survelam. (2010). Peer Pressure Survey Statistics and Results Survelum Public Data [Online] Available at: <http://www.survelum.com/survey-results/PeerPressure> [Accessed 9 Jan 2019]
- Telegraph, (2019). A Decade of Smartphones: We now spend an entire day every week online [Online] Available at: <https://www.telegraph.co.uk/news/2018/08/01/decade-smartphones-now-spend-entire-day-every-week-online/> [Accessed 12 April 2019]
- Techcrunch. (2013). Meet Cody, the Casual Fitness Coach and Social Discovery Tool for Everyone Else [Online] Available at: <https://techcrunch.com/2013/06/21/meet-cody-the-casual-fitness-coach-and-social-discovery-tool-for-everyone-else/> [Accessed 17 July 2018]
- Thayer, P.B. (2000). Retention of students from first generation and low income backgrounds.
- The Russell Group of Universities. (2019). Russell Group [Online] Available at: <https://russellgroup.ac.uk/> [Accessed 2 Jan 2020]
- Topbloodpressuremonitor. (2017). Omron 10 Series Wireless Blood Pressure Monitor Reviews. [Online] Available at: <http://topbloodpressuremonitor.com/omron-10-series-wireless-blood-pressure-monitor-reviews> [Accessed 23 October 2019].
- Torning, K. (2008). Persuasive Technology Design—A Rhetorical Approach. In *International Conference on Persuasive Technology* (pp. 83-93). Springer, Berlin, Heidelberg.
- Toscos, T., Faber, A., An, S., & Gandhi, P. (2006). Chick clique: persuasive technology to motivate teenage girls to exercise. In CHI'06 extended abstracts on Human factors in computing systems (pp. 1873-1878). ACM.

-
- Tsitsika, K., Tzavela, C., Janikian, M., Olafsson, K., Iordache, A., Schoenmakers, M., & Richardson, C. (2014). Online social networking in adolescence: patterns of use in six european countries and links with psychosocial functioning. *Journal of Adolescent Health*, 55(1), 141–147. <http://doi.org/10.1016/j.jadohealth.2013.11.010>
- Tsitsika, A., Janikian, M., Schoenmakers, T. M., Tzavela, E. C., Olafsson, K., Wójcik, S., ... & Richardson, C. (2014). Internet addictive behavior in adolescence: a cross-sectional study in seven European countries. *Cyberpsychology, Behavior, and Social Networking*, 17(8), 528-535.
- Unison. (2019). Learning Mentor [Online] Available at: <http://www.skillsforschools.org.uk/roles-in-schools/learning-mentor> [Accessed 02 Jan 2020]
- University of California. (2018). How to Handle Peer Pressure [Online] Available at: <https://caps.ucsc.edu/counseling/aod/peer-pressure.html> [Accessed 04 Dec 2019]
- University of Liverpool. (2018). Product Catalogue: Raising Aspirations Teachers Pack [Online] Available at: <https://payments.liv.ac.uk/product-catalogue/raising-aspirations/raising-aspirations/raising-aspirations-teachers-pack> [Accessed 10 Jan 2019]
- Venere, F., Mila, S., & Silvia, F. (2017). Persuasive Technology as key to increase Working Health Condition. The Case study of a Wearable System to prevent Respiratory Disease, *The Design Journal*, 20:sup1, S2439-S2450, DOI: 10.1080/14606925.2017.1352757
- Verbeek, P.P., 2009. Ambient intelligence and persuasive technology: The blurring boundaries between human and technology. *Nanoethics*, 3(3), p.231.
- Waardenburg T., Winkel R., & Lamers H. (2012). Normative Social Influence in Persuasive Technology: Intensity versus Effectiveness. In: Bang M., Ragnemalm E.L. (eds) *Persuasive Technology. Design for Health and Safety. PERSUASIVE 2012. Lecture Notes in Computer Science*, vol 7284. Springer, Berlin, Heidelberg
- Walther, B., Liang, Y., DeAndrea, D. C., Tong, S. T., Carr, C. T., Spottswood, E. L., & Amichai-Hamburger, Y. (2011). The effect of feedback on identity shift in computermediated communication. *Media Psychology*, 14(1), 1–26. <http://doi.org/10.1080/15213269.2010.547832>
- Wobbrock, J. O. (2012). Seven research contributions in HCI. *studies*, 1(1), 52-80.
- World Health Organization. (2010). Participant manual: IMAI one-day orientation on adolescents living with HIV.
- Zimbardo, G., & Leippe, R. (1991). *McGraw-Hill series in social psychology. The psychology of attitude change and social influence*. New York, NY, England: McGraw-Hill Book Company.
- Zimmerman, E. (2016). Survey Shows Visualizing Success Works [Online] Available at: <https://www.forbes.com/sites/eilenezimmerman/2016/01/27/survey-shows-visualizing-success-works/#10ed0161760b> [Accessed 13 December 2019]

Appendix

Appendix A: Study One

Appendix A.1

Study One: Ethics Form

Ethics Proportionate Review Application: Staff and Research Students

Computer Science Research Ethics Committee (CSREC)

Staff and research students in the Department of Computer Science undertaking research that involves human participation must apply for ethical review and approval before the research can commence. If the research is low-risk, an application can be submitted for a proportionate review using this form. Applicants are advised to read the information in the SMCSE Framework for Delegated Authority for Research Ethics prior to submitting an application.

There are two parts:

Part A: Ethics Checklist. The checklist determines whether the research is low-risk. If it is, Part B of the form should also be completed. If not, the checklist provides guidance as to where approval should be sought, but the checklist itself does not need to be submitted.

Part B: Ethics Proportionate Review Form. This part is the application for ethical approval of low-risk research and should only be completed if the answer to all questions (1 – 18) is NO.

Completed forms should be returned to the Chair of CSREC by email (s.m.wilson@city.ac.uk).

Part A: Ethics Checklist

If your answer to any of the following questions (1 – 3) is YES, you must apply to an appropriate external ethics committee for approval:		Delete as appropriate
1.	Does your research require approval from the National Research Ethics Service (NRES)? (E.g. because you are recruiting current NHS patients or staff? If you are unsure, please check at http://www.hra.nhs.uk/research-community/before-you-apply/determine-which-review-body-approvals-are-required/)	No
2.	Will you recruit any participants who fall under the auspices of the Mental Capacity Act? (Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee http://www.scie.org.uk/research/ethics-committee/)	No
3.	Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation? (Such research needs to be authorised by the ethics approval system of the National Offender Management Service.)	No

If your answer to any of the following questions (4 – 11) is YES, you must apply to the Senate Research Ethics Committee for approval (unless you are applying to an external ethics committee):		Delete as appropriate
4.	Does your research involve participants who are unable to give informed consent, for example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf?	No
5.	Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities?	No
6.	Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)?	No
7.	Does your research involve participants disclosing information about sensitive subjects?	No
8.	Does your research involve the researcher travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning? (http://www.fco.gov.uk/en/)	No
9.	Does your research involve invasive or intrusive procedures? For example, these may include, but are not limited to, electrical stimulation, heat, cold or bruising.	No
10.	Does your research involve animals?	No
11.	Does your research involve the administration of drugs, placebos or other substances to study participants?	No

If your answer to any of the following questions (12 – 18) is YES, you must submit a full application to the Computer Science Research Ethics Committee (CSREC) for approval (unless you are applying to an external ethics committee or the Senate Research Ethics Committee). Your application may be referred to the Senate Research Ethics Committee.		Delete as appropriate
12.	Does your research involve participants who are under the age of 18?	No
13.	Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)? This includes	No

	adults with cognitive and / or learning disabilities, adults with physical disabilities and older people.	
14.	Does your research involve participants who are recruited because they are staff or students of City University London? For example, students studying on a particular course or module. (If yes, approval is also required from the Head of Department or Programme Director.)	No
15.	Does your research involve intentional deception of participants?	No
16.	Does your research involve participants taking part without their informed consent?	No
17.	Does your research pose a risk to participants greater than that in normal working life?	No
18.	Does your research pose a risk to you, the researcher(s), greater than that in normal working life?	No

You must make a proportionate review application to the CSREC if your research involves human participation and you are not submitting any other ethics application (i.e. your answer to all questions 1 – 18 is “NO”).

Part B: Ethics Proportionate Review Form

If you answered NO to all questions 1 – 18, you may use this part of the form to submit an application for a proportionate ethics review of your research. The form must be accompanied by all relevant information sheets, consent forms and interview/questionnaire schedules.

Note that all research participants should be fully informed about: the purpose of the research; the procedures affecting them or affecting any information collected about them, including information about what they will be asked to do, what data will be collected, how the data will be used, to whom it will be disclosed, and how long it will be kept; the fact that they can withdraw at any time without penalty.

Background Information	
Name:	Aamna Toor – aamana.toor.1@city.ac.uk
Supervisor (if student):	Stephanie Wilson – S.M.Wilson@city.ac.uk

Your Research Project	
Title:	Understanding Student Choices Regarding Higher Education
Start date:	11/06/2015
End date:	02/2019
The goal of my project is to be able to use persuasive technology to motivate students to enter university. 'Persuasive Technology' is broadly defined as technology that is designed to change the attitudes or behaviour of the users through persuasion and social influence, but not through coercion. In my research, I will be aiming to change the behaviour and attitudes of students so that they are motivated to enter higher education. I am seeking approval for the initial interview study to establish why students have chosen not to go into higher education, or whether they are intending to in the future. In addition, it will be used to determine what role technology plays in their decision making. My target group will consist of students who have taken A Levels/ BTEC or any other Level 3 qualification but did not go to university. I will use convenience sampling and will include an equal number of male and female participants (5 males and 5 females). All participants will be over 18 years of age, so they are not vulnerable in any way. 2. The participants are required to complete a demographic questionnaire first, and then will be asked to take part in an informal interview so that I can ask them a few questions to understand the choices they made after college regarding higher education. The interview will be audio recorded. The questionnaire will ask for their demographic and social media usage information, which will take less than 2 minutes to complete. The interview held will be a semi-structured one, and will last about 10-15 minutes. The questionnaire and interview will be conducted within the same meeting, so the	

participant will only have to meet me once. All data will be de-identified when reported in my thesis and any other publications, so that no participants' identity is known.

The meeting will be held at a public place so that there is no danger imposed on either one of us. The interview will be audio recorded and stored in a password protected laptop to ensure confidentiality. The questionnaires will be stored in a locked drawer at City University which no one will have access to.

This interview will help determine what factors stopped them from going to university. The questionnaire will be used as an add-on to understand what background the student comes from, which may lead to the choices he/she made. Also, I will establish whether any kind of technology is being used by universities currently that encourage students to think about entering higher education.

Attachments (these must be provided if applicable):	<i>Delete as appropriate</i>
Participant information sheet(s)	Yes
Consent form(s)	Yes
Questionnaire(s)	Yes
Topic guide(s) for interviews and focus groups	Yes
Permission from external organisations (e.g. for recruitment of participants)	Not applicable

Appendix A.2

Study One: Consent Form

Title of Study: Understanding Student Choices Regarding Higher Education

*Please tick the box

1.	I agree to take part in the above City University London research project. I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records. I understand this will involve: • Being interviewed by the researcher • Allowing the interview to be audiotaped • Completing a questionnaire asking me about my background information	
2.	This information will be held and processed for the following purpose(s): • To understand the choices made regarding higher education. • To contribute to Aamna Toor's PhD research I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. AND I understand that my home postcode will be generalised to an 'area' to protect my identity from being made public.	
3.	I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalized or disadvantaged in any way. I do not have to disclose sensitive data if I do not wish to.	
4.	I agree to City University London recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on the University complying with its duties and obligations under the Data Protection Act 1998.	

5.	I agree to take part in the above study.	

Name of Participant

Signature

Date

Name of Researcher

Signature

Date

When completed, 1 copy for participant; 1 copy for researcher file.

Appendix A.3

Study One: Participant Information Sheet

Title of study: Understanding Student Choices Regarding Higher Education

We would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The purpose of this study is to be able to understand the choices students make regarding higher education. It will also be used to comprehend what role technology plays in making these choices. This study is undertaken as my PhD Research and will continue for a period of 4 years.

Why have I been invited?

You have been invited to take part in this study because you fulfil the inclusion criteria set for this research. This means you had taken either A Levels or BTEC within the last 4 years, and did not enter higher education.

Do I have to take part?

Participation in the project is voluntary, and you can choose not to participate in part or all of the project. You can withdraw at any stage of the project without being penalised or disadvantaged in any way. You can also avoid answering questions which you feel are too personal or intrusive.

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. You do not have to disclose sensitive data if you do not wish to.

What will happen if I take part?

If you take part in the study, you will be asked to complete a questionnaire first, and then be asked a few questions to understand the choices you made after college regarding higher education.

The questionnaire will ask for your background and social media usage information. It should take less than 2 minutes to complete. The interview held will be an informal and semi-structured one, and will last about 10-15 minutes. The questionnaire and interview will be conducted within the same meeting, thus, you will only have to meet me once. The meeting will be held at a public place so that there is no danger imposed on either one of us. The interview will be audio recorded.

What do I have to do?

You are required to complete a questionnaire first, and then answer a few questions. Please be honest and as clear and precise with your answers as possible as this knowledge of yours will be used to contribute towards the field of education. You do not have to disclose sensitive data if you do not wish to.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks involved when taking part in this study.

What are the possible benefits of taking part?

By taking part in this research, you will contribute useful information to help understand the choices made regarding higher education.

What will happen when the research study stops?

As soon as the research study stops all information held about you will be deleted and destroyed. The questionnaires will be shredded, and the audio recording of the interview will be deleted permanently.

Will my taking part in the study be kept confidential?

All data held about you will be kept confidential. The only people who will have access to your data other than myself will be my research supervisors and examiners. The questionnaires will be kept in a locked drawer at City University, and your interviews audio recording will be stored in my password protected laptop. The audio data will be transcribed in my thesis or any publications. All data (audio recordings and questionnaire answers) will be de-identified, so that your identity is not known. The key kept for de-identification of data will be stored in a separate file and location.

What will happen to the results of the research study?

The results of the study will be used to inform future work about the role of technology in Widening Participation. The data will be de-identified so that your identity is now known. All information you contributed will be generalised in the thesis to maintain anonymity. Data that can be used to identify you, such as your home postcode, will also be generalised to an 'area' for the thesis.

If you would like to receive a copy of the summary of the results, please email me on aamana.toor.1@city.ac.uk.

What will happen if I don't want to carry on with the study?

Your participation is voluntary, if you decide to take part you are still free to withdraw from the study at any time and without giving a reason.

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: 'Understanding Student Choices Regarding Higher Education'.

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee

Research Office, E214
City University London, Northampton Square
London
EC1V 0HB

Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?

This study has been approved by City University London School of Mathematics, Computer Science & Engineering Research Ethics Committee

Further information and contact details

Contact Stephanie Wilson who is the supervisor of this research at: s.m.wilson@city.ac.uk

Thank you for taking the time to read this information sheet.

Appendix A.4

Study One: Interview Questions

1. In which year did you take your A Level/BTEC?
 - 1.1 What subjects did you enter for?
2. What are you currently doing?
3. Why did you not enter university?
 - 3.1 If they reply 'finance', then ask, are you aware of the financial support available to you?
 - 3.2 If we ignore finance for the moment – was there anything other reason why you did not go into university?
 - 3.3 Did you start thinking about going to university at some point? How far did you go with the initial stages of going into university? What stopped you from continuing?
 - 3.4 Did you have enough course/university information to be able to apply at that time?
 - 3.5 What did your family/friends think about your decision?
4. What did your family/friends think about your decision?
 - 4.1 Out of your friends circle, were there any other friends who decided not enter university? Was there anything that stopped them?
5. Was higher education promoted in your school when you were in school/college?
 - 5.1. How (Talks, university members visits, e-mentors, online resources)?
 - 5.2. How useful were they?
6. Were you aware of any University open days/taster weeks when you were in school/college? How did you know about these events (online)? Did you attend any? Did you friends attend any?
7. What would you like to do in the future?
8. Do you feel you need a qualification to pursue a career in this area of interest?
 - 8.1 Yes, what have you done about it? Do you know what options are available to you?
 - 8.2 No, why do you think so?
9. Would you consider entering university in the future?
 - 9.1 Yes - Why? Has anything changed your mind?
 - 8.1.1 How will you start looking for the right course and university for you?
 - 8.1.2 Will you require guidance/assistance?
 - 9.2 No – Why not? Is there anything that mind change your mind?
 - 9.3 What do you think would happen if you applied to university?
10. Are you aware of any Open Days hosted by universities presently?
11. Are there any universities contacting you? Are you in touch with any universities? How?

Appendix A.5

Study One: Questionnaire

For Classification Purposes Only:

1. Gender: ☐ Male ☐ Female
2. Age: ☐ 18–19 ☐ 20–22 ☐ Over 23
3. Home Postcode: _____
4. Race/Ethnicity: ☐ White UK ☐ White European ☐ White Other
☐ Black African ☐ Black Caribbean ☐ Black Other
☐ Asian Indian ☐ Asian Pakistani ☐ Asian Bangladeshi
☐ Asian Chinese ☐ Asian Other ☐ Mixed
☐ Other: _____
5. Highest Level of Qualification: ☐ 2+ A-Levels ☐ BTEC or Equivalent (Level 3)
☐ 1–2 A-Levels ☐ Apprenticeship
☐ 5+ GCSEs or Equivalent (Level 2)
☐ 1–4 GCSEs or Equivalent (Level 1)
☐ No Qualifications
☐ Other Qualifications: _____
6. Do you have an e-portfolio? ☐ No
☐ Yes, (please specify) _____
7. Which of the following social media do you use? ☐ Facebook ☐ YouTube
(Tick all that apply) ☐ Twitter ☐ Google+
☐ LinkedIn ☐ Pinterest
☐ Myspace ☐ Instagram
☐ Tumblr ☐ Foursquare
☐ Other: _____

Appendix A.6
Study One: Coding Scheme

Theme	Codes	Participant #
1. Barriers – Reasons for not entering HE		
Finance	1.1 Concerned about finance and debt	P1, P4, P7, P9, P10
Influence	1.2 Seeing graduates not able to find a job (related to degree)	P1, P9, P4
	1.3 Friends influence	P3, P8
	1.4 Family was not supportive	P2, P5
Help and Guidance	1.5 College was unhelpful regarding HE material	P10
	1.6 Late in submitting UCAS application	P3
Self-Esteem	1.7 Not interested in education as I am not clever	P6
	1.8 Not confident as not sure about university life	P2
Indecisive	1.9 Indecisive	P8
Job	1.10 Found a job	P7
Personal	1.11 Did not want to travel far	P10
	1.12 Wanted a break from education	P4
2. Motivators – What could motivate the participant to enter		
Job	2.1 Getting a relevant job/work experience after graduating (without prior experience)	P1, P3, P4, P9, P10
	2.2 Company offers a promotion and pays for degree	P7
Influence	2.3 Seeing others go to university (Influence)	P1, P4
	2.4 Change of parents mind-set and attitude	P2, P5
Indecisive	2.5 Be certain of what to do in the future	P8
Personal	2.6 Need more time to think about Higher Education (HE)	P6
	2.7 Flexible Study	P2
3. Use of Information Technology (IT)		
N/A	3.1 Receiving university related information	P1, P3, P4, P5, P7, P8, P9,
	3.2 Searching for courses/universities	P3, P5, P9
	3.3 Applying to university	P1, P7
4. Attitude towards higher education (HE)		
N/A	4.1 No qualification required to progress within a company	P1, P8, P9
	4.2 Family/friends could not find job with a degree	P1, P4, P9
	4.3 Experience is more important	P1, P9
	4.4 Rather work and earn money than spend at university	P1, P4
	4.5 Degree will help with career progression	P5, P7
	4.6 Might not get a job with a degree	P2
	4.7 Qualification not important to do well in life	P8
5. Awareness about higher education (HE)		
N/A	5.1 Aware of help available for:	

	5.1.1 Student Finance	P1, P2, P4, P5, P7, P8, P9, P10
	5.1.2 Confidence Builder sessions/schemes	P6
	5.1.3 Mature Student Help	P4
	5.2 Able to apply to university myself – without any help	P7, P9
	5.3 Not aware of university life	P3
6. Widening Participation Activities		
N/A	6.1 Did not attend	P1, P3, P4, P5, P6
	6.2 Attended	
	6.2.1 Did not find it useful	P2, P8, P9
	6.2.2 Found it useful	P7, P10

Appendix B: Study Two

Appendix B.1

Study Two: Ethics Form

Ethics Proportionate Review Application: Staff and Research Students

Computer Science Research Ethics Committee (CSREC)

Staff and research students in the Department of Computer Science undertaking research that involves human participation must apply for ethical review and approval before the research can commence. If the research is low-risk, an application can be submitted for a proportionate review using this form. Applicants are advised to read the information in the SMCSE Framework for Delegated Authority for Research Ethics prior to submitting an application.

There are two parts:

Part A: Ethics Checklist. The checklist determines whether the research is low-risk. If it is, Part B of the form should also be completed. If not, the checklist provides guidance as to where approval should be sought, but the checklist itself does not need to be submitted.

Part B: Ethics Proportionate Review Form. This part is the application for ethical approval of low-risk research and should only be completed if the answer to all questions (1 – 18) is NO.

Completed forms should be returned to the Chair of CSREC by email (s.m.wilson@city.ac.uk).

Part A: Ethics Checklist

If your answer to any of the following questions (1 – 3) is YES, you must apply to an appropriate external ethics committee for approval:		Delete as appropriate
1.	Does your research require approval from the National Research Ethics Service (NRES)? (E.g. because you are recruiting current NHS patients or staff? If you are unsure, please check at http://www.hra.nhs.uk/research-community/before-you-apply/determine-which-review-body-approvals-are-required/)	No
2.	Will you recruit any participants who fall under the auspices of the Mental Capacity Act? (Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee http://www.scie.org.uk/research/ethics-committee/)	No
3.	Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation? (Such research needs to be authorised by the ethics approval system of the National Offender Management Service.)	No

If your answer to any of the following questions (4 – 11) is YES, you must apply to the Senate Research Ethics Committee for approval (unless you are applying to an external ethics committee):		Delete as appropriate
4.	Does your research involve participants who are unable to give informed consent, for example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf?	No
5.	Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities?	No
6.	Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)?	No
7.	Does your research involve participants disclosing information about sensitive subjects?	No
8.	Does your research involve the researcher travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning? (http://www.fco.gov.uk/en/)	No
9.	Does your research involve invasive or intrusive procedures? For example, these may include, but are not limited to, electrical stimulation, heat, cold or bruising.	No
10.	Does your research involve animals?	No
11.	Does your research involve the administration of drugs, placebos or other substances to study participants?	No

If your answer to any of the following questions (12 – 18) is YES, you must submit a full application to the Computer Science Research Ethics Committee (CSREC) for approval (unless you are applying to an external ethics committee or the Senate Research Ethics Committee). Your application may be referred to the Senate Research Ethics Committee.		Delete as appropriate
12.	Does your research involve participants who are under the age of 18?	No
13.	Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)? This includes	No

	adults with cognitive and / or learning disabilities, adults with physical disabilities and older people.	
14.	Does your research involve participants who are recruited because they are staff or students of City University London? For example, students studying on a particular course or module. (If yes, approval is also required from the Head of Department or Programme Director.)	No
15.	Does your research involve intentional deception of participants?	No
16.	Does your research involve participants taking part without their informed consent?	No
17.	Does your research pose a risk to participants greater than that in normal working life?	No
18.	Does your research pose a risk to you, the researcher(s), greater than that in normal working life?	No

You must make a proportionate review application to the CSREC if your research involves human participation and you are not submitting any other ethics application (i.e. your answer to all questions 1 – 18 is “NO”).

Part B: Ethics Proportionate Review Form

If you answered NO to all questions 1 – 18, you may use this part of the form to submit an application for a proportionate ethics review of your research. The form must be accompanied by all relevant information sheets, consent forms and interview/questionnaire schedules.

Note that all research participants should be fully informed about: the purpose of the research; the procedures affecting them or affecting any information collected about them, including information about what they will be asked to do, what data will be collected, how the data will be used, to whom it will be disclosed, and how long it will be kept; the fact that they can withdraw at any time without penalty.

Background Information	
Name:	Aamna Toor – aamana.toor.1@city.ac.uk
Supervisor (if student):	Stephanie Wilson – S.M.Wilson@city.ac.uk

Your Research Project	
Title:	Understanding Student Choices Regarding Entering Higher Education
Start date:	11/11/2015
End date:	02/2019
The goal of the project is to be able to use persuasive technology to motivate students to enter university. 'Persuasive Technology' is broadly defined as technology that is designed to change the attitudes or behaviour of the users through persuasion and social influence, but not through coercion. In this research, I will be aiming to change the behaviour and attitudes of students so that they are motivated to enter higher education. I am seeking approval for a second interview study to establish why students have chosen to go into higher education and what role technology played in their decision-making. The first interview study focused on students who had chosen not to enter higher education. The target group will consist of two groups of participants who have recently enrolled into university. The first group of participants will be first year undergraduate students based around Slough area. Their demographic information will be similar to the participants from the first interview study. The second group of participants will be first year undergraduate students studying at City University London. These participants will be recruited from City University and will not be based around Slough area. They will have a different demographic background when compared to participants from the first interview. I will use convenience sampling and will include an equal number of male and female participants (5 males and 5 females) for both the groups. All participants will be over 18 years of age, so they are not vulnerable in any way. Before the meeting all participants will be given an Information Sheet, which briefs them about the project, and then will be asked to fill out a Consent Form.	

During the meeting, the participants are required to complete a demographic questionnaire first, and will then be asked to take part in an informal interview. The interview will have questions that will help understand the choice they made regarding entering higher education and the role of technology. The interview will be audio recorded. The questionnaire will ask for their demographic and social media usage information, which will take less than 2 minutes to complete. The interview held will be a semi-structured one, and will last about 10-15 minutes. The questionnaire and interview will be conducted within the same meeting, so the participant will only have to meet me once. All data will be de-identified when reported in my thesis and any other publications, so that no participants' identity is known.

The meeting will be held at a public place so that there is no danger imposed on either one of us. The interview will be audio recorded and stored in a password-protected laptop to ensure confidentiality. The questionnaires will be stored in a locked drawer at City University, which no one will have access to.

This interview will help determine what factors encouraged or motivated these participants to go to university. The questionnaire will be used as an add-on to understand what background the student comes from, which may lead to the choice he/she made. Also, I will establish whether universities or schools/colleges are using any kind of technology that might have encouraged students to think about entering higher education, and finally persuading them to perform this target behaviour.

Attachments (these must be provided if applicable):	<i>Delete as appropriate</i>
Participant information sheet(s)	Yes
Consent form(s)	Yes
Questionnaire(s)	Yes
Topic guide(s) for interviews and focus groups	Yes
Permission from external organisations (e.g. for recruitment of participants)	Not applicable

Appendix B.2

Study Two: Consent Form

Title of Study: Understanding Student Choices Regarding Entering Higher Education

*Please tick the box

1.	I agree to take part in the above City University London research project. I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records. I understand this will involve: • Being interviewed by the researcher • Allowing the interview to be audiotaped • Completing a questionnaire asking me about my background information	
2.	This information will be held and processed for the following purpose(s): • To understand the choices made regarding entering higher education. • To contribute to Aamna Toor's PhD research. • To be published in papers arising from the research. I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. AND I understand that my home postcode will be generalised to an 'area' to protect my identity from being made public.	
3.	I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalized or disadvantaged in any way. I do not have to disclose sensitive data if I do not wish to.	
4.	I agree to City University London recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on the University complying with its duties and obligations under the Data Protection Act 1998.	

5.	I agree to take part in the above study.	

_____	_____	_____
Name of Participant	Signature	Date
_____	_____	_____
Name of Researcher	Signature	Date

When completed, 1 copy for participant; 1 copy for researcher file.

Appendix B.3

Study Two: Participant Information Sheet

Title of study: Understanding Student Choices Regarding Entering Higher Education

We would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The purpose of this study is to be able to understand why the students choose to enter higher education. It will also be used to comprehend what role technology plays in making this choice. This study is undertaken as part of my PhD Research and will continue for a period of 4 years.

Why have I been invited?

You have been invited to take part in this study because you fulfil the inclusion criteria set for this research. This means you have joined university and enrolled into an undergraduate course within the last year.

Do I have to take part?

Participation in the project is voluntary, and you can choose not to participate in part or all of the project. You can withdraw at any stage of the project without being penalised or disadvantaged in any way. You can also avoid answering questions that you feel are too personal or intrusive.

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. You do not have to disclose sensitive data if you do not wish to.

What will happen if I take part?

If you take part in the study, you will be asked to complete a questionnaire first, and then be asked a few questions to understand the choices you made regarding entering higher education.

The questionnaire will ask for your background and social media usage information. It should take less than 2 minutes to complete. The interview will be an informal and semi-structured one, and will last about 10-15 minutes. The questionnaire and interview will be conducted within the same meeting, thus, you will only have to meet me once. The meeting will be held at a public place so that there is no danger imposed on either one of us. The interview will be audio recorded.

What do I have to do?

You are required to complete a questionnaire first, and then answer a few questions. Please be honest and as clear and precise with your answers as possible as this knowledge of yours will be used to contribute towards the field of education. You do not have to disclose sensitive data if you do not wish to.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks involved when taking part in this study.

What are the possible benefits of taking part?

By taking part in this research, you will contribute useful information to help understand why students make the choice to enter higher education and what role technology plays in making this decision.

What will happen when the research study stops?

As soon as the research study stops all information held about you will be deleted and destroyed. The questionnaires will be shredded, and the audio recording of the interview will be deleted permanently.

Will my taking part in the study be kept confidential?

All data held about you will be kept confidential. The only people who will have access to your data other than myself will be my research supervisors and examiners. The questionnaires will be kept in a locked drawer at City University London, and your interviews audio recording will be stored in my password protected laptop. The audio data will be transcribed in my thesis or any publications. All data (audio recordings and questionnaire answers) will be de-identified, so that your identity is not known. The key kept for de-identification of data will be stored in a separate file and location.

What will happen to the results of the research study?

The results of the study will be used to inform future work about the role of technology in Widening Participation. The data will be de-identified so that your identity is now known. All information you contributed will be generalised in the thesis to maintain anonymity. Data that can be used to identify you, such as your home postcode, will also be generalised to an 'area' for the thesis.

If you would like to receive a copy of the summary of the results, please email me on aamana.toor.1@city.ac.uk.

What will happen if I don't want to carry on with the study?

Your participation is voluntary, if you decide to take part you are still free to withdraw from the study at any time and without giving a reason.

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: 'Understanding Student Choices Regarding Higher Education'.

You could also write to the Secretary at:

Anna Ramberg
Secretary to Senate Research Ethics Committee

Research Office, E214
City University London, Northampton Square
London
EC1V 0HB

Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?

This study has been approved by City University London School of Mathematics, Computer Science & Engineering Research Ethics Committee

Further information and contact details

Contact Stephanie Wilson who is the supervisor of this research at: s.m.wilson@city.ac.uk

Thank you for taking the time to read this information sheet.

Appendix B.4

Study Two: Interview Questions

1. In which year did you take your A-Levels/BTEC?
 - 1.1 What subjects did you enter for?
2. Which university are you going to?
 - 2.1 What course are you doing?
 - 2.2 In what year did you join university?
 - 2.2.1 If there was a gap between completing college and entering university, ask why?
What were they doing during the gap year(s)?
 - 2.3 Are you studying full time?
 - 2.4 Are you working part-time while studying?
3. Why did you choose to go to university?
 - 3.1 Was there any time when you thought you did not want to go to university? What changed your mind?
4. What did your family/friends think about your decision?
 - 4.1 What was your parent's attitude towards you entering university?
 - 4.2 Out of your friend's circle, who else joined university? Do you know what motivated them to enter?
 - 4.3 Out of your friend's circle, were there any who did not enter university? Do you know what stopped them?
 - 4.4 Have any of your siblings been to university? If not, why? What stopped them?
 - 4.5 Did your parents, siblings or friends have any influence on your decision to enter university?
 - 4.6 What is your parent's attitude towards university and higher education in general?
5. When did you make the decision to go to university?
 - 5.1 When did you start making your application? In school/college or on your own?
 - 5.2 If through school/college then ask- Would you have started a university application on your own if your school/college did not push you?
 - 5.3 How did you start making your university application? What was the first step?
 - 5.4 Did anyone help you with the application? Did you use any resources to help with the application? How did you find the course and university you have enrolled into?
 - 5.5 Were there any constraints or problems faced when you were making the application?
 - 5.6 Was there any time when you thought you did not want to continue with the application?
6. Was higher education promoted in your school when you were in school/college?
 - 6.1. How (Talks, university members visits, e-mentors, online resources)?
 - 6.2. How useful were they?
7. Were you aware of any University Activities (Open days, taster weeks) when you were in school/college? How did you know about these events (online)?

-
- 7.1** If yes, did you attend any? If yes, did you find them useful?
- 7.2** Did you friends attend any?
- 8.** Were you aware of any Guidance/Help sessions and services offered by universities or at your own school/college?
- 8.1** If yes, how did you find out about them? Did you make use of any?
- 9.** What do you expect to get out of your degree?
- 3. 10.1** Did you ever feel that you want to drop out of university, that you made the wrong choice?
- 4. 10.2** What would your friends/family reaction be if you drop out of university?
- 10.** What would you like to do in the future?
- 10.1** Do you feel your qualification will help you pursue a career in your area of interest?
- 10.2** If yes, do you know what career options are available to you?
- 10.3** Are you aware of the work placements, internships and sandwich courses offered currently?

Appendix B.5

Study Two: Questionnaire

For Classification Purposes Only:

8. Gender: ☐ Male ☐ Female

9. Age: ☐ 18–19 ☐ 20–22 ☐ Over 23

10. Home Postcode: _____

11. Race/Ethnicity: ☐ White UK ☐ White European ☐ White Other
☐ Black African ☐ Black Caribbean ☐ Black Other
☐ Asian Indian ☐ Asian Pakistani ☐ Asian Bangladeshi
☐ Asian Chinese ☐ Asian Other ☐ Mixed
☐ Other: _____

12. Which university are you enrolled into: _____

a. Course: _____

13. Highest Level of Qualification: ☐ 2+ A-Levels
☐ 1–2 A-Levels
☐ BTEC or Equivalent (Level 3)
☐ Other Qualification: _____

14. Do you have an e-portfolio? ☐ No
☐ Yes: _____

15. Which of the following social media do you use? ☐ Facebook ☐ YouTube
(Tick all that apply) ☐ Twitter ☐ Google+
☐ LinkedIn ☐ Pinterest
☐ Myspace ☐ Instagram
☐ Tumblr ☐ Foursquare
☐ Other: _____

Appendix B.6
Study Two: Coding Scheme

Theme	Sub-Codes	Participant #	
		2a (From LPN)	2b (Not from LPN)
1. Motivators – Reasons for entering HE			
Career Prospects/ Jobs	1.1 Helps getting relevant job after graduating	P2, P5, P9	P12, P15, P16, P18, P19, P20
	1.2 Degree mandatory for profession (e.g. medical)	P3, P9	P15, P16, P18, P19
	1.3 Build a career	P1, P4	P13, P20
	1.4 Did not want to be stuck in a dead end job	-	P12
Influence (Family and Friends)	1.5 Family:		
	1.5.1 Family expectation	P3, P5	P11, P13, P15, P17, P19,
	1.5.2 Family pressure – First in family to go	P1, P7, P10	P13
	1.5.3 Make family proud and set an example	P7, P8	-
	1.6 Seeing family and friends doing better with a degree	P6, P4	-
	1.7 Friends influence:		
	1.7.1 All friends applied and/or decided together	P2, P7	P16, P18
	1.7.2 Did not want to regret not going as friends went	-	P14, P16
Self-Growth/ Experience	1.8 Experience university life, be independent and grow	P2, P8, P9	P16
	1.9 Further educate myself / Reach a level of education	P10	P14
Personal	1.10 To get graduation picture on the wall	-	P16
	1.11 Was inspired by someone (wanted to be like them)	-	P19
	1.12 Wanted to try it out	P6	-
Indecisive	1.13 Indecisive – did not know what else to do	P2	-
2. Barriers – What could have discouraged participant to enter			
Job	2.1 If they got an apprenticeship	P1	P11, P17
Help and Guidance	2.2 If no help was available for applying	P8	-
Influence (Family and Friends)	2.3 Friends influence – there is no point going	P6, P10	P16
	2.4 Family influence		
	2.4.1 Graduates do not succeed	P4	-
	2.4.2 Apprenticeship is a better route	P1	-
3. Use of Information Technology (IT)			
N/A	3.1 Receiving university related information	P1, P3, P4, P5, P6, P7, P9, P10	P11, P13, P14, P15, P16, P17, P18
	3.2 Searching for courses/universities	P1, P2, P4, P6, P7, P9	P12, P13, P17, P20

	3.3 Searching for career options and placements	P1	P11, P15, P17
4. University Application			
N/A	4.1 Did seek help and guidance:		
	4.1.1 Teachers and career advisors helped	P1, P2, P3, P4, P6, P7, P9, P10	P11, P15, P16, P17, P20
	4.1.2 Friends and family helped	P4, P9	P15, P18, P19
	4.1.3 Help taken from university	P3	-
	4.2 Could not have made application (needed help)	P1, P2, P3, P5, P6, P7, P8, P10	P11, P13, P14, P16, P17, P18
	4.3 Could have made application (without help)	P4, P9	P12, P15, P19, P20
5. Widening Participation Activities			
N/A	5.1 Did not attend	P9	P12
	5.2 Attended:		
	5.2.1 Did not find it useful	P1, P6	P16
	5.2.2 Found it useful	P2, P3, P4, P5, P7, P8, P10	P11, P13, P14, P15, P17, P18, P19, P20

Appendix C: Study Three

Appendix C.1

Study Three: Ethics Form

Ethics Proportionate Review Application: Staff and Research Students

Computer Science Research Ethics Committee (CSREC)

Staff and research students in the Department of Computer Science undertaking research that involves human participation must apply for ethical review and approval before the research can commence. If the research is low-risk, an application can be submitted for a proportionate review using this form. Applicants are advised to read the information in the SMCSE Framework for Delegated Authority for Research Ethics prior to submitting an application.

There are two parts:

Part A: Ethics Checklist. The checklist determines whether the research is low-risk. If it is, Part B of the form should also be completed. If not, the checklist provides guidance as to where approval should be sought, but the checklist itself does not need to be submitted.

Part B: Ethics Proportionate Review Form. This part is the application for ethical approval of low-risk research and should only be completed if the answer to all questions (1 – 18) is NO.

Completed forms should be returned to the Chair of CSREC by email (s.m.wilson@city.ac.uk).

Part A: Ethics Checklist

If your answer to any of the following questions (1 – 3) is YES, you must apply to an appropriate external ethics committee for approval:		Delete as appropriate
1.	Does your research require approval from the National Research Ethics Service (NRES)? (E.g. because you are recruiting current NHS patients or staff? If you are unsure, please check at http://www.hra.nhs.uk/research-community/before-you-apply/determine-which-review-body-approvals-are-required/)	No
2.	Will you recruit any participants who fall under the auspices of the Mental Capacity Act? (Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee http://www.scie.org.uk/research/ethics-committee/)	No
3.	Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation? (Such research needs to be authorised by the ethics approval system of the National Offender Management Service.)	No

If your answer to any of the following questions (4 – 11) is YES, you must apply to the Senate Research Ethics Committee for approval (unless you are applying to an external ethics committee):		Delete as appropriate
4.	Does your research involve participants who are unable to give informed consent, for example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf?	No
5.	Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities?	No
6.	Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)?	No
7.	Does your research involve participants disclosing information about sensitive subjects?	No
8.	Does your research involve the researcher travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning? (http://www.fco.gov.uk/en/)	No
9.	Does your research involve invasive or intrusive procedures? For example, these may include, but are not limited to, electrical stimulation, heat, cold or bruising.	No
10.	Does your research involve animals?	No
11.	Does your research involve the administration of drugs, placebos or other substances to study participants?	No

If your answer to any of the following questions (12 – 18) is YES, you must submit a full application to the Computer Science Research Ethics Committee (CSREC) for approval (unless you are applying to an external ethics committee or the Senate Research Ethics Committee). Your application may be referred to the Senate Research Ethics Committee.		Delete as appropriate
12.	Does your research involve participants who are under the age of 18?	No

13.	Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)? This includes adults with cognitive and / or learning disabilities, adults with physical disabilities and older people.	No
14.	Does your research involve participants who are recruited because they are staff or students of City University London? For example, students studying on a particular course or module. (If yes, approval is also required from the Head of Department or Programme Director.)	No
15.	Does your research involve intentional deception of participants?	No
16.	Does your research involve participants taking part without their informed consent?	No
17.	Does your research pose a risk to participants greater than that in normal working life?	No
18.	Does your research pose a risk to you, the researcher(s), greater than that in normal working life?	No

You must make a proportionate review application to the CSREC if your research involves human participation and you are not submitting any other ethics application (i.e. your answer to all questions 1 – 18 is “NO”).

Part B: Ethics Proportionate Review Form

If you answered NO to all questions 1 – 18, you may use this part of the form to submit an application for a proportionate ethics review of your research. The form must be accompanied by all relevant information sheets, consent forms and interview/questionnaire schedules.

Note that all research participants should be fully informed about: the purpose of the research; the procedures affecting them or affecting any information collected about them, including information about what they will be asked to do, what data will be collected, how the data will be used, to whom it will be disclosed, and how long it will be kept; the fact that they can withdraw at any time without penalty.

Background Information	
Name:	Aamna Toor – aamana.toor.1@city.ac.uk
Supervisor (if student):	Stephanie Wilson – S.M.Wilson@city.ac.uk

Your Research Project	
Title:	Exploring Young Adults Attitudes Towards Higher Education
Start date:	12/02/2017
End date:	02/2019
The goal of the project is to be able to use persuasive technology to motivate students to enter university. 'Persuasive Technology' is broadly defined as technology that is designed to change the attitudes or behaviour of the users through persuasion and social influence, but not through coercion. In this research, I will be aiming to change the behaviour and attitudes of students so that they are motivated to enter higher education. I am seeking approval for a third online study to establish why students have chosen to go or not go into higher education, and what role technology played in their decision-making. Participants who are still deciding whether to go or not will also be involved in this study. This study will be used to get more data and validate the findings from the first two interview based studies, which consisted of 30 participants. As it is an online survey, the goal is to recruit at least 500 participants. This will give more confidence and assurity to the findings, allowing me to evaluate the perceptions of a wider audience regarding which barriers and motivators are most important when deciding to enter higher education. The survey is created on Qualtrics, and will be distributed via a link generated - https://cityunilondon.eu.qualtrics.com/jfe/form/SV_3W7BI06rCFFoP8p. The participants will need to click on the link to complete the survey. The survey is branched into three categories according to the participants current status: 1. Participant has decided not to enter university 2. Participant is enrolled onto a university course; is a first/second year undergrad student.	

3. Participant is deciding whether to enter or not.

The questions to all three branches of the survey are similar, asking participants to rate what barriers, motivators and technologies they feel are most important to them when deciding to enter higher education, the wording is slightly different. Once they select what status they fall under, the survey questions will be displayed accordingly. The criteria for a participant to be eligible to take part in the survey is:

1. They need to be between age 18 and 22.
2. They need to be based in UK

In order to recruit participants from each of the three categories listed above, a number of methods will be used to reach out to this target audience. I will be using convenience sampling initially to reach out to friends, family and colleagues who can take part if they fit the criteria, or who can forward the link on to anyone they know who could be a potential participant. I will also adding my survey online <https://www.callforparticipants.com> to recruit as many participants as possible.

Furthermore, additional steps will be taken to address individuals who fall under a specific category. These are:

1. Participant has decided not to enter university
 - As these participants are not in university, it could be that either they are working or are unemployed. I will use social media, such as LinkedIn, and post a link to the survey in order to recruit participants who are working currently or are doing an Apprenticeship.
2. Participant is enrolled onto a university course; is a first/second year undergrad student.
 - I will forward an email (with the link to the survey) to City University HCID group and ask them to forward the email to any group or individual who they feel fit the criteria.
 - I will use Whatsapp, Twitter, Facebook and Snapchat as social media to forward the link of my survey to friends who are first/second year undergrad students (excluding City University students). They can then forward on the link to their university friends and classmates.
3. Participant is deciding whether to enter or not.
 - As these participants are still deciding whether they want to enter university, there is a probability that they are in college/secondary school completing their A Levels or BTEC. Hence, to recruit participants who have still not made a decision, I will use convenience sampling to contact the head teachers and admin department in schools to reach out to AS, A Level and BTEC students. I will then forward an email (with the link to the survey) to the person in charge and ask them if they can get their students to fill out the survey.
 - I will contact City University Widening Participation team to help forward the link onto schools they are currently working with.
 - I will use Whatsapp, Twitter, Facebook and Snapchat as social media to forward the link of my survey to friends who are currently in college/secondary school. They can then forward on the link to their university friends and classmates.

The aim is to recruit a minimum of 150 participants from each of the three categories; those who are in university, those who have decided not to go to university so are working or unemployed, and those who are still deciding whether they want to go to university or not. This will give me a minimum of 450 participant responses (but hoping for at least 500) to be able to validate the initial findings and make a conclusive decision about the future steps and technology to develop. An incentive is

included with this survey, where participants have a chance to be entered into a prize draw to win a £25 Amazon Gift Card. They will be asked to enter their email address if they wish to take part in the prize draw.

A summary which briefs the purpose of the project and survey, will be included in the email and the first page of the online survey (once they click on the survey link). Once the participants click on the link in the email that takes them to the survey, they will be given a small introduction before they start the survey. This first page of the survey will again summarise the purpose of the research, state the requirements to meet in order to take part in the survey, and also remind them that their answers will be kept confidential and that they can withdraw at anytime, their participation is entirely voluntary. This summary will also tell the participants that the only identifiable data in the survey is their 'home postcode'. They will be given confidence that the postcodes will be generalised to an 'area' and all other data will be de-identified when reported in my thesis and any other publications, so that no participants' identity is known.

Here they will then agree that they fit the criteria and continue to take part in the survey. As participants who take part in the survey will be over 18 years of age, they are not vulnerable in any way. Precautions are taken to eliminate individuals below the age of 18 to take part in the survey; if the respondent selects their age as 'Below 18' in question2, the survey will end immediately. to The online survey should take 5-10 minutes to complete.

Attachments (these must be provided if applicable):	<i>Delete as appropriate</i>
Participant information sheet(s). This is incorporated within the survey; it will be displayed on the first page of the survey.	Yes
Consent form(s)	Not applicable
Questionnaire(s)	Yes
Topic guide(s) for interviews and focus groups	Not applicable
Permission from external organisations (e.g. for recruitment of participants)	Not applicable

Appendix C.2

Study Three: Information Sheet and Consent Form

I am Aamna Toor, a third year PhD student exploring factors influencing young adults attitudes towards higher education. My aim in this PhD research is to build a persuasive technology, which allows young adults to make an informed decision about their future. I am requesting your participation in this study because you are aged between 18 and 22, and are based in UK.

This survey will take you approximately 5-10 minutes to complete. Your participation is voluntary, and you may wish to withdraw at any time without being penalized or disadvantaged in any way. If you do decide to take part, you have the option to enter a prize draw for a chance to win a £25 Amazon Gift Card.

By taking part in this research, you will not only contribute in providing useful information to help understand the factors affecting attitudes towards higher education, your response will also play a vital role in developing an evidence based technology which allows young adults to make an informed decision about their future. As the aim of the study is to design and build a persuasive technology, this study focuses on online sources only.

This study has been approved to proceed by City University of London Computer Science Research Ethics Committee. All data you provide will be kept confidential and stored in Qualtrics, which is password protected. Your identity will remain anonymous. The only identifiable data I will collect from you is your home postcode, which will be generalized to an 'area' when examining the results, it will not be reported anywhere.

If you wish to receive further information about the study, please contact me on - aamna.toor@city.ac.uk.

You agree that you are 18 or over, based in UK, and are happy to participate.

- ❖ Yes, I agree
- ❖ No, I do not agree

Appendix C.3

Study Three: Survey Questions

1. Age:

- Under 18 (survey will end if participant selects this option)
- 18
- 19
- 20
- 21
- 22
- Over 22 (survey will end if participant selects this option)

2. Gender:

- Male
- Female

3. Home Postcode: _____

4. What is your current status?

- University student
- College/Secondary school student
- Not in Education - Employed (full/part time) or Unemployed

If participant is a **University Student**

5. Did your parents expect you to go to university?

- Yes
- No
- I don't know / Prefer not to say

6. Please rate how important these factors were in influencing your decision to go to university.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. To make parents/family members proud					
2. To build a career					
3. For self-growth and to further educate myself					
4. To become independent					
5. To experience university life					

6.	To enter a profession which requires a degree					
7.	Because all my friends were going to university					
8.	Did not want to regret not going to university					
9.	Did not know what else to do					

7. What motivated you to go to university? _____

8. Please rate the extent to which you agree or disagree with the following statements about choosing to go to university.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1. My parents/family were not supportive of me going to university					
2. My friends influenced me not to go to university because they were not going to university					
3. I was worried about the tuition fees and being in debt when I complete my degree.					
4. I did not want to travel far to go to university.					
5. I was worried that I won't be able to find a job after graduating					
6. The application form was difficult to fill out.					
7. I did not enough information and guidance on courses/universities					
8. I was not sure what course/university to take, so was indecisive whether I should go to university.					
9. I did not have enough confidence to go to university					
10. I was not sure of what university life would be like					

9. Which of the following online sources/channels did you use to search for higher education related information? (Tick all that apply)

- Email
- Facebook
- Twitter
- YouTube
- LinkedIn
- Snapchat
- Instagram
- Google
- E-portfolio
- Online League Tables
- University Website

- Whatsapp
- Other (please state): _____
- I did not search for any higher education related information

10. Have you used Virtual Reality in a classroom or learning environment?

- Yes (if yes, Q10.1 is displayed)
- No
- I don't know

10.1 Briefly state which Virtual Reality you used and where.

11. Finally, if you'd like to be entered into the prize draw, please enter your email address below. This information will only be used to notify the winner of the draw. _____

If participant is a **College/Secondary School Student** (Still Deciding)

5. Do your parents expect you to go to university?

- Yes
- No
- I don't know / Prefer not to say

6. Do you think you will go to university?

- Yes (Q7, Q8 will be displayed)
- No (Q7.1, Q8.1 will be displayed)
- I don't know (Q7.2, Q8 will be displayed)

7. What is motivating you to go to university? _____

7.1 Please state briefly why you do not want to go to university.

7.2 Please state briefly what would motivate you to go to university.

8. Please rate how important these factors are in influencing your decision to go to university.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important

1. To make parents/family members proud					
2. To build a career					
3. For self-growth and to further educate myself					
4. To become independent					
5. To experience university life					
6. To enter a profession which requires a degree					
7. Because all my friends are going to university					
8. Don't want to regret not going to university					
9. Don't know what else to do					

8.1 Please rate how important these factors would be if you decided to go to university.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. To make parents/family members proud					
2. To build a career					
3. For self-growth and to further educate myself					
4. To become independent					
5. To experience university life					
6. To enter a profession which requires a degree					
7. Because all my friends are going to university					
8. Don't want to regret not going to university					
9. Don't know what else to do					

9. Do you think higher education would help build your career?

- Yes
- No
- I don't know

10 Please rate the extent to which you agree or disagree with the following statements about choosing to go to university.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

1. My parents/family are not supportive of me going to university					
2. My friends are influencing me not to go to university because they are not going.					
3. I am worried about the tuition fees and being in debt when I complete my degree.					
4. I don't want to travel far to go to university.					
5. I am worried that I won't be able to find a job after graduating					
6. The application form is difficult to fill out.					
7. I don't enough information and guidance on courses/universities					
8. I am not sure what course/university to take, so am being indecisive whether I should go to university.					
9. I don't have enough confidence to go to university					
10. I am not sure of what university life would be like					

11. Which of the following online sources/channels do you use to search for higher education related information? (Tick all that apply)

- Email
- Facebook
- Twitter
- YouTube
- LinkedIn
- Snapchat
- Instagram
- Google
- E-portfolio
- Online League Tables
- University Website
- Whatsapp
- Other (please state): _____
- I did not search for any higher education related information

12. Have you used Virtual Reality in a classroom or learning environment?

- Yes (if yes, Q12.1 is displayed)
- No
- I don't know

12.1 Briefly state which Virtual Reality you used and where.

13. Have you got enough information to apply to university (without anyone's help)?

- Yes
- No
- I don't know

14. Finally, if you'd like to be entered into the prize draw, please enter your email address below. This information will only be used to notify the winner of the draw. _____

If participant is **Not in Education (Employed or Unemployed)**

5. Are you currently working?

- Yes (Q6 will be displayed)
- No

6. Job Role: _____

7. What is your highest level of qualification?

- 2 or more A Levels
- 1-2 A Levels
- AS Level
- BTEC or Equivalent (NVQ Level 3)
- GCSE (Q18- 28 will be displayed)
- Other (please state)

8. Did your parents expect you to go to university?

- Yes
- No
- I don't know / Prefer not to say

9. Do you think you will go to university in the future sometime in the future?

- Yes (Q10 will be displayed)
- No (Q10.1 will be displayed)
- I don't know (Q10.2 will be displayed)

10. What is motivating you to go to university? _____

10.1 Please state briefly why you do not want to go to university.

10.2 Please state briefly what would motivate you to go to university.

11 Please rate how important these factors are in influencing your decision to go to university.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. To make parents/family members proud					

2. To build a career					
3. For self-growth and to further educate myself					
4. To become independent					
5. To experience university life					
6. To enter a profession which requires a degree					
7. To go because all my friends are going to university					
8. Don't want to regret not going to university					
9. Don't know what else to do					

12. Please rate the extent to which you agree or disagree with the following statements about choosing to go to university.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1. My parents/family were not supportive of me going to university					
2. My friends influenced me not to go to university because they were not going to university					
3. I was worried about the tuition fees and being in debt when I complete my degree.					
4. I did not want to travel far to go to university.					
5. I was worried that I won't be able to find a job after graduating					
6. The application form was difficult to fill out.					
7. I did not enough information and guidance on courses/universities					
8. I was not sure what course/university to take, so was indecisive whether I should go to university.					
9. I did not have enough confidence to go to university					
10. I was not sure of what university life would be like					

13. Do you think higher education would help build your career?

- Yes
- No
- I don't know

14. Which of the following online sources/channels have you used to search for higher education related information? (Tick all that apply)

- Email
- Facebook
- Twitter

- YouTube
- LinkedIn
- Snapchat
- Instagram
- Google
- E-portfolio
- Online League Tables
- University Website
- Whatsapp
- Other (please state): _____
- I have not searched for any higher education related information

15. Have you used Virtual Reality in a classroom or learning environment?

- Yes (if yes, Q15.1 is displayed)
- No
- I don't know

15.1 Briefly state the Virtual Reality you used and where.

16. Are you in contact with any higher education providers?

- Yes
- No

16. Have you got enough information to make an application to university?

- Yes
- No
- I don't know

17. Finally, if you'd like to be entered into the prize draw, please enter your email address below. This information will only be used to notify the winner of the draw. _____

If highest level of qualification is GCSE then the following questions will appear:

18. Did you know that even without an A-Level or BTEC, if you have relevant experience, you can still be considered for a place at certain universities through the Accreditation of Prior Experiential Learning (APEL) process?

- Yes, I know
- No, I did not know

19. Did your parents expect you to go to university?

- Yes
- No
- I don't know / Prefer not to say

20. Do you think you will go to university sometime in the future?

- Yes (Q20.1 will be displayed)

- No (Q20.2 will be displayed)
- I don't know (Q20.3 will be displayed)

20.1 What is motivating you to go to university? _____

20.2 Please state briefly why you do not want to go to university.

20.3 Please state briefly what would motivate you to go to university.

21 Please rate how important these factors would be in influencing your decision to go to university.

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. To make parents/family members proud					
2. To build a career					
3. For self-growth and to further educate myself					
4. To become independent					
5. To experience university life					
6. To enter a profession which requires a degree					
7. To go because all my friends are going to university					
8. Don't want to regret not going to university					
9. Don't know what else to do					

22. Please rate the extent to which you agree or disagree with the following statements about choosing to go to university.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1. My parents/family are not supportive of me going to university					
2. My friends influence me not to go to university because they didn't go					
3. I am worried about the tuition fees and being in debt when I complete my degree.					
4. I don't want to travel far to go to university.					
5. I am worried that I won't be able to find a job after graduating					
6. The application form is difficult to fill out.					
7. I do not have enough information and guidance on courses/universities					

8. I am not sure what course/university to take, so am indecisive whether I should go to university.					
9. I did not have enough confidence to go to university					
10. I am not sure what university life would be like					

23. Do you think higher education would help build your career?

- Yes
- No
- I don't know

24. Which of the following online sources/channels have you used to search for higher education related information? (Tick all that apply)

- Email
- Facebook
- Twitter
- YouTube
- LinkedIn
- Snapchat
- Instagram
- Google
- E-portfolio
- Online League Tables
- University Website
- Whatsapp
- Other (please state): _____
- I have not searched for any higher education related information

25. Have you used Virtual Reality in a classroom or learning environment?

- Yes (if yes, Q25.1 is displayed)
- No
- I don't know

25.1 Briefly state the Virtual Reality you used and where.

26. Are you in contact with any higher education providers?

- Yes
- No

27. Have you got enough information to make an application to university?

- Yes
- No
- I don't know

28. Finally, if you'd like to be entered into the prize draw, please enter your email address below. This information will only be used to notify the winner of the draw. _____

Appendix C.4

Study Three: Open Ended Question Responses

Themes	Sides	Study 3 (Data/Instances)		
		In University	Not in University	Still Deciding
Finance/Money	Positive (+)	- To earn more money and get a respected job - Prospects of more job opportunities and higher salary - Better job and pay Total: 3	- Will go if - cheaper costs - Will go if – scholarship - Will go if – cheaper university costs - Will go if – low funding Total: 4	- I want a good career, a good job, earn good money - Get a good job and make a career, and make good money - Money and good life Total: 3
	Negative (-)		- The cost and lack of income - It wouldn't be worth the debt - Lengthy, time, mortgage and student loan - Fees and finance, being in debt - Too expensive, I need money now Total: 5	
Future Career Prospects/ Jobs	Positive (+)	- To earn more money and get a respected job - Job prospects and higher average salary compared to not going to university. Jobs I looked at required degree level education - To have a good job and provide for myself and give back to my family - To get a better future - Better job prospects - To start a career in the area I wanted to - I felt I needed to go to achieve the career I wanted and become an expert in my field - To further my career - Better prospects in life and having something productive to do - Getting out of London and achieving my career goals - Getting a good job to look after my family was my biggest motivation - Better job and pay - To make steps towards a better career for myself - Better job - Create a better future for myself and my family - Good job, good future, financial independence - No career without it - Better future - Career - University was the only way forward for me to have a better future - Improve future job opportunities	- Will go in the future because - The chance to enter a career that is more fulfilling - Will go in the future because - Get a better job for the future - Will go if – Knowing at the end of my course I would have a secure job to go into - Will go if – for a higher job you must have good degree - Will go if – Getting the job I want and studying an interesting course Total: 5	- Prospects of more job opportunities and higher salary - I want a good career, a good job, earn good money - Get a good job and make a career, and make good money - Good job - Want to get a good job when I'm older - Need degree for job - Need a job - Passion for my subject and better career prospects - Good job prospects - Have a good career - It is required for my chosen career - Cant get into profession without a degree Total: 12

		- Prospects of more job opportunities and higher salary - Wanted a higher education to get a better job related to the subject I enjoyed - I require a degree for my profession - Want to become an engineer - I became interested in Psychology at GCSE which led me to desire a career in psychology – something you can only get into with a BSc minimum Total: 26		
	Negative (-)		- It's a waste of time, I have successfully invested in a business and bought my first home while my friends with degrees cant even get a dead end job with the degrees - I have always wanted to go straight into the world of business and I knew I didn't need a degree to get where I wanted to be - Already in work. Happy as I am - Prefer an apprenticeship - Can work my way up with an apprenticeship - Already in work. Happy as I am Total: 6	- Waste of money as I cant find job Total: 1
Influence (Family/Friends)	Positive (+)	- University was my parents choice - It was my parents decision it wasn't my first choice - Getting a good job to look after my family was my biggest motivation - To have a good job and provide for myself and give back to my family - Family and friends - I never really properly applied to go to university. I applied with everyone - Everyone goes to university Total: 7	- Will go in the future because – I see lots of other people who goes uni every day and working hard that's motivated me Total: 1	- Everyone else is going and everyone expects to go - My parents are forcing me - I don't have a choice as everyone in the family goes to uni - Make parents proud - My mother didn't go - Parents Total: 6
	Negative (-)	N/A	N/A	N/A
Self-esteem / Self growth	Positive (+)	- To further my education and exploring the subject more - I wanted to continue to learn and wasn't ready to go into full time work - Knowledge - Wanted to expand my knowledge and get a degree - To further my education status and knowledge - To learn more about my subject and passion - A love of learning and wanting to become more knowledgeable about the subjects I love		- I saw that it specialises in the courses I desire to study - I am looking forward to the opportunity to explore my chosen discipline (history) in greater detail - I have always a career in law and so need a law degree although I wish to go further and achieve a masters in law - Passion for my subject and better career prospects - To achieve the qualification I want I want to study my subject at a high level and carry out academic research (7)

		- Further my knowledge of a subject that interested me; for the general uni experience - I am a keen learner naturally and wanted to learn more - Further my knowledge of a subject that interested me; for the general uni experience - Myself - I enjoy learning - I wanted to study art and develop my skills for myself, not any other reason other than self-development - Be educated - Desire to better myself - I suppose a desire to improve and better myself, it was an opportunity to make the most out of my life - I wanted to go to uni because I wanted to study Psychology more as I really enjoy it and find it interesting - Wanted to get a degree - I wanted to do higher studies and get a degree - To get a degree and achieve a goal Total: 20		
Personal Reasons	Positive (+)	- Education is a valuable asset to have that cannot be taken away from you, with that mind-set I always planned to make use of the opportunity - I have always wanted to go to university - Interest in my subjects at A-level - University is something I just always aspired to go since I was in high school, as I've always been quite academic Total: 4	- Will go if – higher standards of teaching Total: 1	- I always wanted to go to uni - The social factors Total: 2
	Negative (-)		- I am not great at exams and they make me very nervous - I feel I don't need to, I have what I need in life - No point, waste of time - Don't need a qualification to get what I want Total: 4	- I am not a university person personally Total: 1

Appendix C.5

Study Three: Survey Response (Motivators)

Please rate how important these factors were in influencing your decision to go to university

In University (Group 1) – Frequency

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Sample Size
1. To make parents/family members proud	15	37	18	38	25	133
2. To build a career	5	8	3	48	69	133
3. For self-growth and to further educate myself	0	8	3	58	63	133
4. To become independent	3	8	25	46	51	133
5. To experience university life	15	30	46	25	15	133
6. To enter a profession which requires a degree	18	3	28	36	48	133
7. Because all my friends were going to university	74	25	20	10	3	133
8. Did not want to regret not going to university	36	33	28	20	15	133
9. Did not know what else to do	64	10	28	20	10	133

In University (Group 1) – Frequency Multiplied by the Rating Score (to calculate mean)

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Mean	Sample Size
1. To make parents/family members proud	15	72	54	152	125	3.17	133
2. To build a career	5	16	9	192	345	4.30	133
3. For self-growth and to further educate myself	0	16	9	232	315	4.33	133
4. To become independent	3	16	75	184	255	4.04	133
5. To experience university life	15	60	138	100	75	2.94	133
6. To enter a profession which requires a degree	18	6	84	144	240	3.73	133
7. Because all my friends were going to university	74	50	60	40	15	1.81	133
8. Did not want to regret not going to university	36	66	84	80	75	2.58	133
9. Did not know what else to do	64	20	84	80	50	2.25	133

Not in University (Group 2) – Frequency

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Sample Size
1. To make parents/family members proud	5	3	18	23	2	51
2. To build a career	2	3	5	26	15	51
3. For self-growth and to further educate myself	2	2	10	28	10	51
4. To become independent	3	3	12	18	15	51
5. To experience university life	16	7	18	8	2	51
6. To enter a profession which requires a degree	10	5	8	16	12	51
7. To go because all my friends were going to university	30	14	5	2	0	51
8. Did not want to regret not going to university	23	3	16	7	2	51
9. Did not know what else to do	24	10	15	2	2	51

Not in University (Group 2) – Frequency Multiplied by the Rating Score (to calculate mean)

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Mean	Sample Size
1. To make parents/family members proud	5	6	54	92	10	3.27	51
2. To build a career	2	6	15	104	75	3.96	51
3. For self-growth and to further educate myself	2	4	30	112	50	3.88	51
4. To become independent	3	6	36	72	75	3.76	51
5. To experience university life	16	14	54	32	10	2.47	51
6. To enter a profession which requires a degree	10	10	24	64	60	3.29	51
7. To go because all my friends were going to university	31	30	15	8	0	1.65	51
8. Did not want to regret not going to university	23	6	48	28	10	2.25	51
9. Did not know what else to do	24	20	45	8	10	2.10	51

Still Deciding (Group 3) – Frequency

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Sample Size
1. To make parents/family members proud	9	17	13	22	22	82
2. To build a career	0	0	9	30	43	82
3. For self-growth and to further educate myself	0	13	9	17	43	82
4. To become independent	0	9	30	13	30	82
5. To experience university life	13	14	23	18	14	82
6. To enter a profession which requires a degree	4	4	13	22	39	82
7. To go because all my friends are going to university	30	22	17	13	0	82
8. Don't want to regret not going to university	9	39	17	17	0	82
9. Don't know what else to do	58	6	9	5	5	82

Still Deciding (Group 3) – Frequency Multiplied by the Rating Score (to calculate mean)

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)	Mean	Sample Size
1. To make parents/family members proud	9	34	39	88	110	3.41	82
2. To build a career	0	0	27	120	215	4.41	82
3. For self-growth and to further educate myself	0	26	27	68	215	4.10	82
4. To become independent	0	18	90	52	150	3.78	82
5. To experience university life	13	28	69	72	70	3.09	82
6. To enter a profession which requires a degree	4	8	39	88	195	4.07	82
7. To go because all my friends are going to university	30	44	51	52	0	2.16	82
8. Don't want to regret not going to university	9	78	51	68	0	2.51	82
9. Don't know what else to do	58	12	27	20	25	1.73	82

Appendix C.6

Study Three: Survey Response (Barriers)

Please rate how important these factors were in influencing your decision to go to university

In University (Group 1) – Frequency

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Total
1. My parents/family were not supportive of me going to university	96	12	10	9	6	133
2. My friends influenced me against going to university because they were not going	96	16	10	7	4	133
3. I was worried about the tuition fees and being in debt	43	21	21	39	9	133
4. I did not want to travel far to go to university	44	30	21	27	11	133
5. I was worried that I won't be able to find a job after graduating	95	18	10	7	3	133
6. The application form was difficult to fill out	47	30	21	29	6	133
7. I did not have enough information and guidance on courses/universities	39	30	23	20	21	133
8. I was not sure what course/university to take, so was indecisive whether I should go to university	52	36	19	18	8	133
9. I did not have enough confidence to go to university	61	32	20	18	2	133
10. I was not sure what university life would be like	33	32	27	26	15	133

In University (Group 1) – Frequency Multiplied by the Rating Score (to calculate mean)

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Mean
1. My parents/family were not supportive of me going to university	96	24	30	36	30	1.62
2. My friends influenced me against going to university because they were not going	96	32	30	28	20	1.55
3. I was worried about the tuition fees and being in debt	43	42	63	156	45	2.62
4. I did not want to travel far to go to university	44	60	63	108	55	2.48
5. I was worried that I won't be able to find a job after graduating	95	36	30	28	15	1.53
6. The application form was difficult to fill out	47	60	63	116	30	2.38
7. I did not have enough information and guidance on courses/universities	39	60	69	80	105	2.65
8. I was not sure what course/university to take, so was indecisive whether I should go to university	52	72	57	72	40	2.20
9. I did not have enough confidence to go to university	61	64	60	72	10	2.01
10. I was not sure what university life would be like	33	64	81	104	75	2.68

Not in University (Group 2) – Frequency

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Total
1. My parents/family were not supportive of me going to university	28	12	3	5	3	51
2. My friends influenced me against going to university because they were not going	32	8	9	2	0	51
3. I was worried about the tuition fees and being in debt	8	3	8	12	20	51
4. I did not want to travel far to go to university	20	3	7	13	8	51
5. I was worried that I won't be able to find a job after graduating	9	3	7	12	20	51
6. The application form was difficult to fill out	15	4	23	7	2	51
7. I did not have enough information and guidance on courses/universities	10	12	9	12	8	51
8. I was not sure what course/university to take, so was indecisive whether I should go to university	9	8	12	12	10	51
9. I did not have enough confidence to go to university	22	10	8	7	4	51
10. I was not sure what university life would be like	17	7	13	9	5	51

Not in University (Group 2) – Frequency Multiplied by the Rating Score (to calculate mean)

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Mean
1. My parents/family were not supportive of me going to university	28	24	9	20	15	1.88
2. My friends influenced me against going to university because they were not going	32	16	27	8	0	1.63
3. I was worried about the tuition fees and being in debt	8	6	24	48	100	3.65
4. I did not want to travel far to go to university	20	6	21	52	40	2.73
5. I was worried that I won't be able to find a job after graduating	9	6	21	48	100	3.61
6. The application form was difficult to fill out	15	8	69	28	10	2.55
7. I did not have enough information and guidance on courses/universities	10	24	27	48	40	2.92
8. I was not sure what course/university to take, so was indecisive whether I should go to university	9	16	36	48	50	3.12
9. I did not have enough confidence to go to university	22	20	24	28	20	2.24
10. I was not sure what university life would be like	17	14	39	36	25	2.57

Still Deciding (Group 3) – Frequency

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Total
1. My parents/family were not supportive of me going to university	64	12	3	0	3	82
2. My friends influenced me against going to university because they were not going	57	19	2	4	0	82
3. I was worried about the tuition fees and being in debt	20	8	12	25	17	82
4. I did not want to travel far to go to university	30	10	12	22	8	82
5. I was worried that I won't be able to find a job after graduating	35	21	9	9	8	82
6. The application form was difficult to fill out	23	18	14	22	5	82
7. I did not have enough information and guidance on courses/universities	20	23	15	13	11	82
8. I was not sure what course/university to take, so was indecisive whether I should go to university	32	15	9	16	10	82
9. I did not have enough confidence to go to university	43	25	4	3	7	82
10. I was not sure what university life would be like	16	21	24	10	11	82

Still Deciding (Group 3) – Frequency Multiplied by the Rating Score (to calculate mean)

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)	Mean
1. My parents/family were not supportive of me going to university	64	24	9	0	15	1.37
2. My friends influenced me against going to university because they were not going	57	38	6	16	0	1.43
3. I was worried about the tuition fees and being in debt	20	16	36	100	85	3.13
4. I did not want to travel far to go to university	30	20	36	88	40	2.61
5. I was worried that I won't be able to find a job after graduating	35	42	27	36	40	2.20
6. The application form was difficult to fill out	23	36	42	88	25	2.61
7. I did not have enough information and guidance on courses/universities	20	46	45	52	55	2.66
8. I was not sure what course/university to take, so was indecisive whether I should go to university	32	30	27	64	50	2.48
9. I did not have enough confidence to go to university	43	50	12	12	35	1.85
10. I was not sure what university life would be like	16	42	72	40	55	2.74

Appendix C.7

Study Three: Detailed Analysis of Technologies to Overcome the Barriers Reported

Theme: Future Career Prospects/Jobs

Factor 1: 'To build a career' and Factor 7: 'I was worried that I won't be able to find a job after graduating'

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. PathSource (App) 7. A career search and education tool students. By asking the right questions it matches the student to their ideal career and education path that suits their interests and personality.	8. 1.1 Career assessment – by taking the assessment the user gets matched with the exact career or college. 1.2 Ecosystem of In-Depth Data – access comprehensive descriptions of every career. User can find out the university degree and work experience required for each job	Smart Phone to download app – available on App Store and Google Play	9. • (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test that will measure their skill set. The test will then give users recommendations on what they should do. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. PathSource offers information about the career opportunities after the user has taken a career assessment. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests, qualifications and skills.

			• (BJ and PSD) Suggestion – Users are given suggestion of what careers they can go for and which jobs they can apply to based on their interests. • (PSD) Verifiability – related articles from verified sources and contact information makes the information credible
2. Prospects.co.uk 10. A website that helps users decide what career is ideal for them. The website also gives career advice allowing users to see what jobs they can apply for with a particular degree, how they can apply for the jobs and help with CV and cover letter writing and preparing for interviews.	11. 2.1 Users can take a quiz to see which job would suit them best. By taking the quiz the users' skill set and personality is matched against more than 400 job profiles, giving users a clearer idea of what jobs they should go for, and what the requirements are to get into that career pathway. 2.2 Graduates are able to see what jobs they can apply for with their degree. 2.3 CV check – users can upload their CVs to have it checked by an advisor 2.4 Social Media - Users can get in touch with any queries through Facebook, Twitter, LinkedIn and YouTube.	Website – to access information Social Media – to post any questions	12. • (BJ and PSD) Tunnelling – Users are guided to see what jobs they can apply for depending on their degree, experience and skills. • (BJ and PSD) Tailoring / (RC) Personalising – Users can have their CV checked by an advisor. • (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and personality. The test will then give users recommendations on what they should do based on their personality and skill set.
3. Buzz Quiz by UCAS 13. A quiz developed for individuals to find out what they are like and what they could do based on their personality. There	15. 3.1 UCAS encourages individuals who are not sure of what career they can get into take the Buzz Quiz. The users answers a number		16. • (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which

are 16 possible personality types and each one is linked with an animal. 14.	of questions. Once completed, they are presented with what their personality type is, which other famous celebrities have the same personality type, what percentage of UK population is of this personality type, and what jobs or career are most suited for this personality type. 3.2 There are links to see additional information on the work and careers they can get into.	Website – to take the quiz	they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (C) Liking – Users can see which famous celebrity matches their personality. They are more likely to think they have those strengths and weaknesses mentioned in the quiz because a celebrity who they like has the same qualities. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. Buzz Quiz offers information about the career opportunities after the user has taken the quiz. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality. They are also presented with famous celebrities who • (PSD) Verifiability – related articles from verified sources and contact information makes the information credible

4. <u>Youth@Work game of career learning</u> 17. A study conducted by Welten Institute, University of Iceland, and University of the West of Scotland, to see the effects of a game based approach to career learning for youth. Young participants aged 14-18 years were recruited for this study.	18. 4.1 An adventure like game in which the player (user) embarks on a career journey and travel across an island in search of the holy grail (which is their career advice). A total of 9 mini-games are played by the player in which they meet different characters who ask them about their strengths, weaknesses and interests. In the end they are presented with a diary by the King of the island, in which he recommends the careers the player can go for based on his/her interests.	Website – to play the game. Social Actors – Player meets different characters in the game	19. • (RC) Recognition / (PSD) Praise – Players are praised by the King of the island at the end of the game. • (RC) Recommendation/ (PSD) Suggestion – Players are presented with a diary at the end of the game with recommendation of what careers they can go for based on their interests. 20.
5. <u>Enhance your Careers and Employability Skills MOOC –</u> 21. A Project started by the University of London, using a range of technology supported employability services and products to help students decide on their career pathway.	22. 5.1 A range of employability webinars accessed by students whenever and wherever they like. Additional features such as video lectures, interactive quizzes and peer graded assessments are used to decide what their interests are. 5.2 Students can connect with instructors (via forums) to discuss their future career prospects.	Website – to watch videos, take part in interactive quizzes, and access the forums (after registering)	23. • (C) Social Proof / (PSD) Normative Influence – Users can share and compare information with other users (via the forum) about career pathways etc.
6. <u>UCAS – Explore Jobs and Career Advice</u>	25.		27.

24. https://www.ucas.com/careers-advice UCAS website gives students careers advice and the option to explore different careers and pathways to those careers.	6.1 Students can search for particular jobs, or browse through a list of jobs, and see the skills and education required for that job profile. 6.2 Social Media - Students can contact UCAS with their messages directly via Facebook or Twitter 26.	Website – to explore different careers Email – Students can sign up for a newsletter for notifications and updates Social Media – to ask questions	• (BJ and PSD) Reduction – Complex behaviour of researching the different careers, and what skills and qualification are required for that career is made simple by presenting them all on one page. The user can click on one career and view all the information related to it. They do not have to do any additional research. • (PSD) Real World Feel – Users can contact UCAS advisers via social media.
7. Realising Opportunities (RO) - 28. A national programme designed for students in Year 12 and 13 to gain increased access to some of the leading universities. The website is filtered depending on whether you are a student, parent/carer, a professional or are from a school/college. The information is tailored accordingly.	7.1 A launch event 7.2 Skills4uni – an online study skills module which helps develop planning and independence research skills 7.3 A dedicated e-mentor who university student will guide the student through an interactive support program and e-mentoring portal.	Website – Interactive support program - E mentoring portal - Online study skills module	29. • (BJ and PSD) Tailoring / (RC) Personalising - Users are given a dedicated e-mentor who will help guide them throughout the program • (C) Social Proof / (PSD) Normative Influence – Users can share and compare information with other users through the portal. They also get to meet these students at the national student conference.

	7.4 A national student conference for all students taking part in RO and a wide range of activities and event for students		
8. <u>National Careers Service</u> 30. A website that helps provide information, advice and guidance to help individuals to make decisions on learning, training and work.	31. 8.1 Individuals can upload their CVs for a CV check, search for courses and learning providers 8.2 Skills Health Check – Individuals can take an assessment to find out what job is for them 8.3 Contact an Advisor – advice on looking for courses and job hunting	Website – to register and use the services	32. • (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a skills health test that measures their skill set. The test will then give users recommendations on what they should do. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. The website offers information about the career opportunities after the user has taken a career assessment. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests, qualifications and skills. They can also contact an advisor to get additional help and guidance. • (BJ and PSD) Suggestion – Users are given suggestion of what careers they can go for and which jobs they can apply to based on their interests.

9. <u>Compass: Young Carers</u> 33. An online resource programme for Year 10 and 11 students with caring responsibilities in Oxfordshire, Buckinghamshire and Milton Keynes, aiming to raise aspirations and attainment to make students aware of their post-16 options (Oxford, 2015)	9.1 A free tool-kit includes interactive quizzes, lesson plans, information and links designed to help young carers to make an informed decision about their future education and careers. Also gives them confidence to communicate and pursue their ideas.	Website to download the Tool kit – Students can use their laptops/desktops to work with the tool.	• (BJ and PSD) Tunnelling – Students are guided to be able to make a university application, write a cover letter and start writing their CV by completing a set of interactive quizzes.
10. <u>LSAll Project</u> 34. A web-based portal where students develop a timeline to help them look into the future	a. Students do this for a limited time, until they are sure of what they want to do for their future. Students are given hope that they can still achieve what they want to for their future. They can see which options to take if they want to reach a certain goal.	Website – to access the web portal	• (BJ and PSD) Tunnelling – Students are guided through a timeline so that they are able to decide what they want to do for their future.

Technologies used to help reinforce how HE can help with 'self-growth'

Theme: Self Growth

Factor 2: 'For self-growth and to further educate myself'

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. Forum - The Student Room – 35. A forum with the worlds largest student community. The students help each other with studies and all other HE related information.	1.1 Students can post on the forum to seek help from other students. They can get help regarding university course/content, seek advice on every issues, university life, current affairs etc.	Website – To register to the online forum	• (C) Social Proof / (PSD) Normative Influence – Users can ask any kind of HE related questions, share HE related content via this online forum. Users are able to get in touch with other students who are very similar to them. • (PSD) Social Learning – Students motivate each other and share their experiences via the forum – this allows prospective students to perform the same behaviour as they can see the outcomes of the behaviour through other students. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others

2. <u>Taster Week –</u> 36. Students who are predicted five GCSEs at grades 6 to 9 (previously A* to B), receive free school meals, have parents who haven't attended university, and come from a social group that is underrepresented in HE are eligible to apply (City, 2015)	2.1 The programme gives students the chance to take part in lectures, group discussion and practical work as if they were a university student. All applications are made online. 37.	Website - Online application; Students need to apply online to sign up.	38. • (PSD) Real World Feel – Students are able to contact the university if they have any queries.
3. <u>Snapshot Programme-</u> 39. A mix of practical and academic workshops giving the student an understanding of HE.	The programme consists of: 3.1 Insight into the university to gain a clear picture of what to expect. 3.2 Hear inspirational stories from current students and graduates working in their chosen field. Learn how to write a successful university application by talking to admission tutors.	Website - Online application; Students need to apply online to sign up.	• (PSD) Real World Feel – Students are able to contact the university if they have any queries.
4. <u>What Uni - Website</u> https://www.whatuni.com 40. What Uni is partnered with UCAS, HESA (Higher Education Statistics Agency), Havas Education, and Nyumbani UK & Hotcourses Foundation to give prospective students information and guidance on universities and courses.	41. With What Uni, prospective students can: 4.1 Read blogs and watch inspirational videos. 4.2 Read other students reviews about their university experience	Website – to access the information	• (C) Social Proof / (PSD) Normative Influence – Users can read reviews from students who have already been to the university.

Technologies Used to help reinforce/show 'University Life'

Theme: *University Life*

Factor 3: 'To experience university life'

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
5. <u>Leeds Arts University – Virtual Tour</u> 42. Allows prospective student to take a virtual reality tour of their fashion design studios.	5.1 The virtual reality tour is supported with Samsung Gear and Google cardboard. Users can download the VR app, look at a 360 view of the design studio, and also move to different locations by looking at a blue spot.	Smartphone VR App and headset – Students download the app to take a VR tour. Compatible with Samsung Gear and Google Cardboard.	43. • (BJ and PSD) Reduction – Users ability to move to a different location is simplified – they can move by looking at a blue spot.

6. <u>University of Sussex – ‘HP Reveal’ App using augmented reality</u> 44. The university used augmented reality on a series of posters (within the university) to present a history of their university, supported by videos. Available on Apple and Google Play Store	6.1 Users download the HP Reveal App and point the apps camera in front of a poster. This would then play a video on their phone of the historic facts of the place shown in the poster.	Smartphone - to download app and experience augmented reality–	45. • (BJ and PSD) Reduction – Users are able to know history about the university by just pointing their phone to a poster. They do not have to do any research themselves. • (C) Social Proof / (PSD) Normative Influence – Users can see other people performing the same behaviour so will want to do the same.
7. <u>Simpson College – ‘Aurasma’ App using augmented reality</u> 46. The college places a banner in a busy nearby mall. People were prompted to download the app to view the banners embedded ‘aura’ (augmented reality experience). Available on Apple and Google Play Store	7.1 Using the app people could point their smartphone at a trigger image on the banner and a video would begin to play on their phone screen outlining what a students experience attending Simpson College might be like. 47.	Smartphone - to download app and experience augmented reality–	48. • (BJ and PSD) Reduction – Users can see what Simpson college students experience is like without having to visit or research about the college. • (C) Social Proof / (PSD) Normative Influence – Users can see other people performing the same behaviour so will want to do the same.
8. <u>#Salfie Campaign –</u> 49. University of Salford built awareness and engagement around Cleaning Day and decided to launch a highly visual social media campaign. The campaign was based around the #Salfie frames hanging around the campus.	8.1 Students were encouraged to take a picture of themselves in the frame and tweet it using the #salfie hashtag. - All pictures were collected and shared in the university Instagram feed. There was an award for the best photo.	Social Media – Twitter and Instagram (App) – To share pictures with the hashtag	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour of going to university and seeing what the outcome is.

	- This creative campaign helped spread positive messages about the university life		• (C) Unity – The students are able to identify themselves with others, increasing the chance of them being influenced by these others
9. <u>Arts University Bournemouth – ‘AUB AR’ app using augmented reality.</u> 50. The university gives information about their campus and a 360 video through their augmented reality app. Available on Apple and Google Play Store	9.1 Users can download the app and point on an image (available on their website). This is the ‘marker’ or university campus and user can see the different campus buildings, click on them to view additional information and even view a 360 video of the inside of the building.	Smartphone - to download app and experience augmented reality–	51. • (BJ and PSD) Reduction – Users can see what Simpson college students experience is like without having to visit or research about the college.
10. <u>What Uni on Snapchat –</u> 52. The marketing outreach officers for What uni have created a snapchat account for What Uni.	10.1 The outreach officers share university adventures, fun stories, competitions and offer advice via Snap Chat. 10.2 They also do ‘takeovers’, where a university student takes over their snapchat story for the day showing their followers a day in their university life.	Social Media – Snapchat (App) – To share content, advice and take overs by university students.	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour of going to university and seeing what the outcome is. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others.

11. <u>Ohio State University – Instagram</u> 53. The university posts contests on their Instagram feed. The creativity of the social media challenges makes the universities page go viral and impress a range of individuals.	54. 11.1 Their recent challenge encouraged students to spell out the word 'OHIO' using their bodies. The challenge inspired 16,000 user created images and even earned itself a page on the university's website.	Social Media – Instagram (App) – To post creative challenges to attract users to their university.	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour of going to university and seeing what the outcome is. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others. • (RC and PSD) Competition – Users are motivated to take part in the challenge as they are being challenged • (PSD) Rewards – The best image goes on the university page.
12. <u>Salford Virtual Open Day</u> 55. University of Salford gives a 360 degree tour of their university on their website.	56. 12.1 Prospective students can experience a 360 degree tour via their website. They can explore the Student Union Bar and also take a trip to the new accommodation blocks.	Website – To experience the 360 degree video	• (BJ and PSD) Reduction – Users ability to move to a different location is simplified – they can move by clicking on a hotspot on the university's map.

13. <u>MIT – Twitter</u> 57. The university tweets fascinating scientific discoveries and campus traditions. Their twitter page nearly has 1 millions followers.	13.1 The precision makes their Tweets different. Each Twitter post includes a gorgeous, high quality image, well-crafted or fun gif. 13.2 They also sometime Tweet old newspaper articles or shutouts to famous alumni.	Social Media – Twitter – To promote university	58. • (PSD) Social Learning – Prospective students are able to view Tweets from other famous alumni. This gives them a chance to related themselves to them and think that they could end up like them too. • (PSD) Reminders - The Tweets are aimed to remind prospective students of the fun campus life by telling them about the events and other useful facts about the university. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others
14. <u>University of California - Instagram</u> 59. The university makes the most out of their campus architecture.	14.1 The Instagram fee is pictures of their campus. They post a constant reminder on their Instagram feed of why this university attracts students from all over the world.	Social Media – Instagram – To promote university campus	60. • (PSD) Reminders - The Instagram feeds are aimed to remind prospective students of why their university attracts students from all over the world.

15. <u>Princeton University - Snapchat</u> 61. Princeton started a contest to boost its student generated content to engage its student body.	15.1 Students were given a chance to submit snaps of themselves packing for the fall semester. 15.2 Princeton shared some of their favourite student snaps, and also dedicated an entire Facebook album to these snaps.	Social Media – Snapchat and Facebook– To share snaps of themselves packing for the fall semester.	62. • (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour of going to university and seeing what the outcome is • (RC and PSD) Competition – The best snaps were shared by the university. • (C) Unity – The students are able to identify themselves with others, increasing the chance of them being influenced by these others
16. <u>UCA – Virtual tour of the campus</u> 63. Students can experience a 360 viewing of the campus and facilities of UCA (University of Creative Arts)	16.1 The tour is supported with any virtual reality headset. Users can experience a 360 view of the campus, and also move to different locations by holding a red circle over a red target (representing the different facilities)	Smartphone and VR headset – Students use the website to view the 360 tours.	• (BJ and PSD) Reduction – Users ability to move to a different location is simplified – they can move by holding a red circle over a red target.
17. <u>#LboroughOpenDay Snapchat Geofilter</u> – 64. Loughborough University aimed to promote its campus during special events and graduation ceremony with the use of Snapchats Geofilter.	17.1 Current and prospective students are encouraged to share their campus life and other university events with their friends instantly on snapchat using the geofilter.	Social Media – Snapchat (App) – To share pictures with the universities geofilter	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour

			of going to university and seeing what the outcome is. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others
18. <u>Forum - The Student Room</u> 65. A forum with the worlds largest student community. The students help each other with studies and all other HE related information.	18.1 Students can post on the forum to seek help from other students. They can get help regarding university course/content, seek advice on every issues, university life, current affairs etc.	Website – To register to the online forum	• (C) Social Proof / (PSD) Normative Influence – Users can ask any kind of HE related questions, share HE related content via this online forum. Users are able to get in touch with other students who are very similar to them. • (PSD) Social Learning – Students motivate each other and share their experiences via the forum – this allows prospective students to perform the same behaviour as they can see the outcomes of the behaviour through other students. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others
19. <u>Pinterest presence</u> 66. Universities use Pinterest to promote their campus, city, events, achievements and information about student life. Michigan University uses location based	67. 19.1 By using the location based Pinterest pins, prospective students can map out their campus visit before they visit the university. Every Place pin directs the student to a	Social Media – Pinterest and Foursquare	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see

Pinterest place pins to showcase focal points of their campus. This makes it an easy and quick guide for prospective students wanting to explore the campus.	corresponding FourSquare page where they can check in, find out which of their friends has visited before and gain some valuable tips about the university and surrounding area.		other students performing the behaviour of going to university and seeing what the outcome is. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others
20. <u>Indiana University – Twitter</u> 68. The university tweets fun and serious helpful information onto their Twitter page	20.1 The page contains fun announcements, competitions, and emotion filled messages of solidarity to promote their university. 69.	Social Media – Twitter – To share announcements and university events.	70. • (PSD) Reminders - The university aims to remind prospective students of the fun campus life by telling them about the events and other useful facts about the university.
21. <u>Boston University Facebook Page –</u> 71. The university posts videos targeted to a wide variety of audiences – including parents, prospective students and alumni.	72. 21.1 The Facebook page is used as a useful resource for students in every phase of their education. It features videos, advice and information about the campus.	Social Media - Facebook – To keep current and prospective students informed about university.	• (PSD) Social Learning – Prospective students are able to view other university students. This gives them a chance to see other students performing the behaviour of going to university and seeing what the outcome is. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others

22. <u>Taster Week –</u> 73. Students who are predicted five GCSEs at grades 6 to 9 (previously A* to B), receive free school meals, have parents who haven't attended university, and come from a social group that is underrepresented in HE are eligible to apply (City, 2015)	22.1 The programme gives students the chance to take part in lectures, group discussion and practical work as if they were a university student. All applications are made online. 74.	Website - Online application; Students need to apply online to sign up.	75. • (PSD) Real World Feel – Students are able to contact the university if they have any queries.
23. <u>Snapshot Programme-</u> A mix of practical and academic workshops giving the student an understanding of HE.	The programme consists of: 23.1 Insight into the university to gain a clear picture of what to expect. 23.2 Hear inspirational stories from current students and graduates working in their chosen field. 23.3 Learn how to write a successful university application by talking to admission tutors.	Website - Online application; Students need to apply online to sign up.	• (PSD) Real World Feel – Students are able to contact the university if they have any queries.
24. <u>Masterclasses -</u> A set of classes ranging from Computer Science to Optometry allowing students to experience the subject.	24.1 Students experience a university lecture and experience using equipment's. Students take part in workshops allowing them to build and design their ideas, e.g., they construct building in the Engineering Masterclass.	Website - Online application; Students need to apply online to sign up.	76. • (PSD) Real World Feel – Students are able to contact the university if they have any queries.

Technologies used to help overcome 'negative influence from family and friends'

Theme: Influence and Peer Pressure

Factor 4: 'My parents/ family were not supportive of me going to university' and Factor 5: 'My friends influenced me against going to university because they were not going'

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. <u>UCAS advice for parents and guardians</u> - 77. UCAS offers a range of resources and information for parents/guardians, giving them information so that they support the students applying to university. A guide for international students parents is also included.	78. A range of resources are available for parents/guardians. These include: 1.1 UCAS for parents in under 90 seconds - https://www.ucas.com/undergraduate/applying-university/ucas-undergraduate-advice-parents-and-guardians 79. A series of 90 second videos showing parents how their child can apply, how they can pay their fees and how university can help their child 1.2 A monthly parents email newsletter which they can sign up for - https://web.ucas.com/parents-signup. These contain advice and information from UCAS and other directly relevant organisations, which will enable parents help their child with their higher	Website – for parents to view: the 90 seconds videos, 'Parents Guide', 'Parents Information Tool', read parents blogs, Online Forum - take part in the web chat. Email - to send monthly newsletter	• (BJ and PSD) Reduction – Parents can view useful information and additional resources from the UCAS site. UCAS directs the parents to view these resources by just clicking on a link. Parents do not have to do any extra research themselves. • (PSD) Reminders – Parents are sent newsletters every month via email. Reminding them of the resources available to help support their child. • (C) Social Proof / (PSD) Normative Influence – Parents blogs, web chat option and social media helps

	education options. Some information may also be sent by post. 1.3 An in-depth 'Parents Guide' booklet - https://www.ucas.com/file/101806/download?token=2DHk4PXV. UCAS teamed up with Which?University to create a guide, a PDF document (available in English and Welsh), which includes everything a parents will need to support their child with their higher education choices. It includes information and resources on how they can help plan their future, fill in the UCAS application, pay for uni, budget, and contact a UCAS member for additional guidance. It includes links to useful additional resources. 1.4 Parent information Tool - https://www.ucasdigital.com/widgets/parents_tool/index.html#/home. A webpage which includes all important information in the form of widgets for easy access for parents. The widgets include information about the application process, finance, course search, and an application journey for their child. As all the information is presented on one page, it is easier for parents to access the different resources. 1.5 Read parents blogs on the UCAS website 1.6 Connect with UCAS advisers via Web Chats - https://www.ucas.com/connect/web-chats. These are live Q&A sessions with UCAS advisers on different topics.	Social Media - to view updates and post questions.	parents see and talk to other parents who are similar to them. They are more likely to perform a behaviour of they see others similar to them performing the same behaviour. • (RC) Monitoring and Tracking – By viewing the application journey of their child in the Parent Information Tool, parents are able to track their child progress and see what their next are and how they can help support their child. • (BJ and PSD) Tunnelling – The 'Application Journey' of their child in the Parent Information Tool, takes the parents on a journey, guiding them through a process from start to finish, where the start is their child's application to university and the end is their child acceptance to an offer. • (PSD) Real World Feel – Parents are able to speak to UCAS advisers via social media, web chats or phone call.

	1.7 Parents can call UCAS to speak to an adviser or post a question on one of their social media pages - Facebook, Twitter, YouTube, Instagram, Pinterest, LinkedIn or Google+.		
2. <u>A Level Explorer (by Which?University)-</u> https://university.which.co.uk/exploratory-widgets/a-level-explorer This help parents explore which path their child can take depending on their A Level subjects.	80. .1 A Level explorer is part of Which?University website. Parents can see what degrees, popular careers, average graduate salary and statistics of the percentage of graduates in work or further study there are based on a particular set of A-level subjects. Additional information on the specific degree courses available is also presented so that the parent/guardian can have an idea of what their child can do and which course they can apply for.	Website - to explore the different paths based on A-level subjects.	• (BJ and PSD) Reduction – Parents are able to view the different path depending on A Level subjects on just a click of a few buttons. All course and university information is present on one web page, no additional research is required. • (BJ and PSD) Tunnelling – Parents are guided through a process where they can see what route their child can take if they are currently taking a particular A level subject. • Similarity – Parents are shown the statistics of how many graduates find a job who have completed the same course and what their average salary is. This will show them a possibility of what their child can do and earn if they do the same course.
3. <u>Which?University-</u> https://university.which.co.uk/	82.		

81. The website is packed with information and advice on how parents can support their child during the higher education application process.	From Which?University, parents can: 3.2 Access articles, videos, and an in-depth Parent Guide booklet created with UCAS (explained in 1.3 above). The articles include a ‘time to read’ so that parents know on average how long it will take to read the article. Some articles include short videos and for further explanation. One of the articles includes a ‘budget calculator’ allowing parents to calculate how much their child will need to live at a particular university. 3.3 Sign up to the emailing list to get updates and notification regarding the application at the right time 3.4 Ask questions and keep up to date with essentials by following their Facebook and Twitter social media pages.	Website – for parents to access articles and videos. Email - to send reminders and notifications Social Media - to view updates and post questions.	• (BJ and PSD) Reduction – Parents can view useful information and additional resources from the website. Parents do not have to do any extra research themselves. • (RC) Just-In-Time – Parents are sent emails notifying them of important information and dates at the right time. • (BJ and PSD) Tunnelling – Parents are guided through a process if they want to view their child’s career prospects, or university finance option. • (PSD) Real World Feel – Parents are able to speak to advisers via social media.
4. <u>Unistats</u> - https://unistats.ac.uk/ 83. Unistats is operated by the four UK higher education funding bodies (The Higher Education Funding Council for England (HEFCE), the Department for the Economy in Northern Ireland (DFE), the Higher Education Funding Council for Wales (HEFCW) and the Scottish Funding Council (SFC). Its purpose is to ensure that prospective students and their advisers	84. 4.2 From the website, parent can view each university and college's satisfaction scores in the National Student Survey, jobs and salaries after study. They can also see comments on what other students think of the course, what the fees is and what the teaching is like. 4.3 Parents/advisers can follow their Twitter page to keep up to date with information and statistics.	Website – for parents to access information Social Media - to view updates and post questions.	• (BJ and PSD) Reduction – Parents can view the different course and university related information from the website. This saves them time from going into the different university websites and searching their course information.

have access to reliable and comparable information to help them make informed decisions about what and where to study.			• (BJ and PSD) Tunnelling – Parents are guided through a process, where they can select what their child requirements are to see which courses would suit them best. • (PSD) Real World Feel – Parents are able to speak to advisers via social media.
5. <u>The Linwood Centre – Family Literacy Course</u> 85. This project is run by Charles Keene College and is based on the outskirts of Leicester which has high levels of unemployment. Family literacy courses are designed to develop parents skills by helping them become more involved in their children's education. This will help parents learn about the education system.	86. 5.2 Parents make work and picture books, write stories and read them to their children. 5.3 Parents also learn skills by editing and simplifying school documents. 87.	Website - to download the application form	None
6. <u>Realising Opportunities (RO) -</u> 88. A national programme designed for students in Year 12 and 13 to gain increased access to some of the leading universities. The website is filtered depending on whether you are a student, parent/carer, a professional or are from a school/college. The information is tailored accordingly.	89. Parents are given information on the programme which includes - 6.2 A launch event 6.3 Skills4uni – an online study skills module which helps develop planning and independence research skills	Website – to give information about the programme to parents. And for students to log in to the portal speak to their e-mentor.	90. None

	6.4 A dedicated e-mentor who university student will guide the student through an interactive support program and e-mentoring portal. 6.5 Extended Project Qualification 6.6 A national student conference for all students taking part in RO and a wide range of activities and event for students 6.7 Experiences and support to help students make an informed decision about HE		
7. <u>First Generation Scholars Scheme -</u> 92. University of Sussex Widening Participation website has a section for 'Parents and Guardians', explaining what the scheme is and how they can get support on how to advise their children to make important decisions.	7.1 A range of activities and talks are run to give first generation students information and guidance. Parents are encouraged to attend these events with their child. They are sent invites via post and email. 93.	Website – to register Email - to send event invitation	• (PSD) Reminders – Parents are sent event invites and reminders via email.
8 <u>The Student Room –</u> 94. A forum with the world's largest student community. The students help each other and provide support with HE and personal matters.	8.1 Users can post their questions on a forum to seek support, advice and guidance. By speaking to other peer groups, an individual can be influenced positively. 95.	Website – To register to the forum	• (C) Social Proof / (PSD) Normative Influence – Users can ask any kind of HE related questions, share HE related content via this online forum. Users are able to get in touch with other students who are very similar to them. • (PSD) Social Learning – Students motivate each other and share their experiences via the forum – this allows prospective students to perform the

			same behaviour as they can see the outcomes of the behaviour through other students. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others

Technologies Used to help overcome the fear of 'tuition fees and being in debt'

Theme: *Finance/Money*

Factor 6: *'I was worried about tuition fees and being in debt'*

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. <u>The Student Room – Online forum</u> 96. A forum with the world's largest student community. The students help each other with studies and all other HE related information.	1.1 Users have a 'Student Finance' section on the forum which gives them all the information they need to know about their university fees and funds (depending on their level and mode of study). 1.2 The users can allows post on the forum to ask other students about any student finance related queries.	Website – To register to the forum	• (C) Social Proof / (PSD) Normative Influence – Users can ask any kind of HE related questions, share HE related content via this online forum. Users are able to get in touch with other students who are very similar to them. • (PSD) Social Learning – Students motivate each other and share their experiences via the forum – this allows prospective students to perform the same behaviour as they can see the outcomes of the behaviour through other students. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others

2. UCAS – Finance Advice https://www.ucas.com/undergraduate/student-life/getting-student-support/undergraduate-student-finance-and-support 97. UCAS offers a range of resources and information for students and parents so that they know how to pay for university fees, apply for student loan and when to pay back their loan.	98. A range of resources are available for students and parents. These include: 2.1 A video provided by Student Finance England, explaining the student finance in three easy steps. 2.2 UCAS gives all the information on their website on how to apply for a loan, how its paid back, who is eligible, and other useful links on what other living and maintenance costs they might incur while at university. 2.3 UCAS also redirects their users to the Student Repayment loan site - http://www.studentloanrepayment.co.uk/portal/page?_pageid=93,3866794&_dad=portal&_schema=PORTAL. This allows users to calculate exactly how much they will need to repay, what the interest rate is etc. Users can also contact them by calling them if they have any enquiries. 2.4 Additional funding information is also available on their website. 2.5 Students can connect with UCAS advisers regarding student finance via Web Chats - https://www.ucas.com/connect/web-chats. These are live Q&A sessions with UCAS advisers on different topics.	Website – to read information, calculate their loan repayment figures, and take part in the web chat. Email – Students can sign up to the monthly newsletter Social Media - to view updates and post questions.	• (BJ and PSD) Reduction – Users can view useful information and additional resources from the UCAS site. UCAS directs the users to view these resources by just clicking on a link, they do not have to do any extra research themselves. • (C) Social Proof / (PSD) Normative Influence – The web chat option and social media helps users see and talk to other users who are similar to them. They are more likely to perform a behaviour of they see others similar to them performing the same behaviour. • (BJ and PSD) Tunnelling – The application for student loan takes the users through a process, guiding them along the way on how it is done. • (PSD) Real World Feel – Users are able to speak to UCAS advisers via social media, web chats or phone call.

	2.6 Students can call UCAS to speak to an adviser or post a question on one of their social media pages - Facebook, Twitter, YouTube, Instagram, Pinterest, LinkedIn or Google+.		
3. <u>Which?University-</u> https://university.which.co.uk/ 99. The website contains information for parents and students regarding higher education.	100. From Which?University, users can: 3.1 Access articles and a video (provided by Student Finance England), explaining how the students finance and loan repayment system work. One of the articles includes a 'budget calculator' allowing users to calculate how much they will need to live at a particular university. 3.2 Access the Student Repayment loan site - http://www.studentloanrepayment.co.uk/portal/page?_pageid=93,3866794&_dad=portal&_schema=PORTAL. Which?University website directs users to this site, so that see a detailed breakdown of the interest rates for repayment. This also allows users to calculate exactly how much they will need to repay, what the interest rate is etc. Users can also contact them by calling them if they have any enquiries. 3.3 Sign up to the emailing list to get updates and notification regarding the application at the right time 3.4 Ask questions and keep up to date with essentials by following their Facebook and Twitter social media pages.	Website – for users to access articles and videos. Email - to send reminders and notifications Social Media - to view updates and post questions.	• (BJ and PSD) Reduction – Users can view useful information and additional resources from the website. They do not have to do any extra research themselves. • (RC) Just-In-Time – Users are sent emails notifying them of important information and dates at the right time. • (BJ and PSD) Tunnelling – Users are guided through a process if they want to view their university finance option. • (PSD) Real World Feel – Parents are able to speak to advisers via social media.

4. <u>WhatUni</u> – https://www.whatuni.com/advice/parents/a-parents-guide-to-student-funding/66732/ 101. Provides a parent’s guide on student funding.	102. 4.1 Parents can access articles with useful link giving information on how to help their child apply for student finance, how much they will need to repay etc. 4.2 Students can access articles with useful links to give additional information about finance, budgeting and repaying their loan. 4.3 Parents and students can sign up to the monthly emailing list to get updates and notification regarding student finance.	Website – to access the articles Email – to send monthly mailings. Social Media – to ask any questions	103. • (PSD) Reminders – Parents are sent newsletters every month via email. Reminding them of the resources available to help support their child.
5. <u>Student Finance – Gov.uk</u> https://www.gov.uk/student-finance	104. 5.1 Website provides information on student finance and how to apply.	Website – to view the information	105. 106. None

Technologies Used to help overcome the barrier of 'being indecisive'

Theme: 'Indecisive'

Factor 8: 'I was not sure what course/university to take so was indecisive whether I should go to university'

Projects for Category 1 – Indecisive about course/university options:

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. <u>What Uni App</u> https://www.whatuni.com/whatuni-mobile-app 107. What Uni has build an app for prospective students, so that they are able to search for the university courses which are right for them. It is available for download on App Store and Google Play.	108. With the What Uni app, users can: 1.1 Search for universities and courses according to their interests, qualifications and location. 1.2 Chat with a virtual assistant – HERB (Higher Education Research Bot) -who will match the user with a suitable course and university depending on their qualification and location preference. HERB chats in an informal language and uses emojis and praises in his chat. 1.3 See an overview of a university and its course, including reviews from other	Smart Phone to download App – available on App Store and Google Play Virtual Social Actor - HERB	• (BJ and PSD) Reduction – With just a click of a few button users can view the courses they can start depending on their qualification and location. • (BJ and PSD) Tunnelling – Users are guided through a process of selecting what course is right for them. • (RC) Just-In-Time – Users are sent push notifications and reminders notifying them of important information and dates at the right time. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with course options depending on their qualifications and location preference.

	students who have attended that university. 1.4 Shortlist favourites. Pick the final 5 courses for their UCAS application 1.5 Ask questions and get as much information as possible by emailing the university or requesting a prospectus directly from the app 1.6 The app sends push notifications and reminders so that no important deadlines or information is missed.		• (BJ and PSD) Suggestion – Users are given suggestion of what courses they can go for based on their qualifications. • (PSD) Real World Feel – Users can email the university directly. • (RC) Recognition / (PSD) Praise – The virtual assistant praises the student and encourages them that they can do a lot with the qualifications they already have. • (C) Social Proof / (PSD) Normative Influence – Users can read reviews from students who have already been to the university.
2. <u>What Uni - Website</u> https://www.whatuni.com 109. What Uni is partnered with UCAS, HESA (Higher Education Statistics Agency), Havas Education, and Nyumbani UK & Hotcourses Foundation to give prospective students information and guidance on universities and courses.	110. With What Uni, prospective students can: 2.1 Find the best route to their dream job. If they have a career in mind, then by selecting that career they can see what courses they can do to get that job. 2.2 Find what they can do with their current qualification. If they are not sure what course they can study, then they can see what other students who had the same A levels and grades did, what kind of jobs they can get into, what degrees they can go for, and how much an	Website – to access the information Virtual Social Actor - HERB	• (BJ and PSD) Reduction – With just a click of a few button users can view the courses they can start depending on their qualification and location. • (BJ and PSD) Tunnelling – Users are guided through a process of selecting what course is right for them. • (RC) Just-In-Time – Users are sent push notifications and reminders notifying them of important information and dates at the right time. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with course options depending on their qualifications and location preference.

	average graduate with that degree earns. 2.3 Chat with a virtual assistant – HERB (Higher Education Research Bot) -who will match the user with a suitable course and university depending on their qualification and location preference. HERB chats in an informal language and uses emojis and praises in his chat. Users can also speak to one of the team members on Twitter if there is any specific query. 2.4 Shortlist favourites. Pick the final 5 courses for their UCAS application 2.5 Find open days and save them in their calendar. 2.6 Get key information about unis and order their prospectus 2.7 Read blogs and watch inspirational videos.		• (BJ and PSD) Suggestion – Users are given suggestion of what courses they can go for based on their qualifications. • (PSD) Real World Feel – Users can email the university directly. • (RC) Recognition / (PSD) Praise – The virtual assistant praises the student and encourages them that they can do a lot with the qualifications they already have. • (C) Social Proof / (PSD) Normative Influence – Users can read reviews from students who have already been to the university.
3. PathSource (App) 111. A career search and education tool students. By asking the right questions it matches the student to their ideal career and education path that suits their interests and personality.	With the app, users can: 3.1 Career assessment – by taking the assessment the user gets matched with the exact career or college. 3.2 Ecosystem of In-Depth Data – access comprehensive descriptions of every	Smart Phone to download app – available on App Store and Google Play	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test that will measure their skill set. The test will then give users recommendations on what they should do. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. PathSource offers

	career. User can find out the university degree and work experience required for each job		information about the career opportunities after the user has taken a career assessment. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests, qualifications and skills. • (BJ and PSD) Suggestion – Users are given suggestion of what careers they can go for and which jobs they can apply to based on their interests. • (PSD) Verifiability – related articles from verified sources and contact information makes the information credible
4. Match Made in Salford (App and Website)– 112. Inspired by the popular dating app Tinder, this app enables prospective students select their courses based on their current qualifications and grades.	4.1 For the app, students swipe left or right when presented with a potential course. The courses listed in the app are all University of Salford courses, and are recommendations based on the students' grades, course and career of interest. 113. Once students' finish swiping right or left, they are provided with a shortlist of possible courses with detailed information on the programme, fees and career outlook.	Mobile/Tablet to download the App – Match Made in Salford	• (BJ and PSD) Reduction – Complex behaviour of choosing what course is right for them is made simple by allowing the users to swipe left or right • (BJ and PSD) Tunnelling – Users are guided to what course they should take. The app present them with the courses which would best meet their needs. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with courses based on their grades and career of interest. • (PSD) Real World Feel – Users can speak to an adviser directly.

	4.2 The website has a 'Future Finder' section. Students are presented with a list of courses based on their A Level subjects and grades. The website has additional links and a contact number to speak to an adviser.		
5. The Student Room – 114. A forum with the world's largest student community. The students help each other with studies and all other HE related information.	5.1 Users have a 'Student Finance' section on the forum which gives them all the information they need to know about their university fees and funds (depending on their level and mode of study). The users can allow post on the forum to ask other students about any student finance related queries.	Website (online forum) – To register to the forum	• (C) Social Proof / (PSD) Normative Influence – Users can ask any kind of HE related questions, share HE related content via this online forum. Users are able to get in touch with other students who are very similar to them. • (PSD) Social Learning – Students motivate each other and share their experiences via the forum – this allows prospective students to perform the same behaviour as they can see the outcomes of the behaviour through other students. • (C) Unity – The students are able to identify themselves with other students, increasing the chance of them being influenced by these others
6. Realising Opportunities (RO) – 115. A national programme designed for students in Year 12 and 13 to gain increased access to some of the leading universities. The website is filtered depending on whether you are a student, parent/carer, a professional or are from a	The RO programme consists of - 6.1 A launch event 6.2 Skills4uni – an online study skills module which helps develop planning and independence research skills	Website – Interactive support program - E mentoring portal	• (BJ and PSD) Tailoring / (RC) Personalising - Users are given a dedicated e-mentor who will help guide them throughout the program • (C) Social Proof / (PSD) Normative Influence – Users can share and compare information with other users through the portal. They also get to meet these students at the national student conference.

school/college. The information is tailored accordingly.	6.3 A dedicated e-mentor who university student will guide the student through an interactive support program and e-mentoring portal. 6.4 Extended Project Qualification 6.5 A national student conference for all students taking part in RO and a wide range of activities and event for students 6.6 Experiences and support to help students make an informed decision about HE	- Online study skills module	
7. <u>Pathways to the Professions –</u> 116. Provides advice and guidance to local state school students interested in applying for Medicine, Law, Veterinary Medicine or Architecture (Edinburgh, 2015).	7.1 Phone/email to give advice – school students can speak to admin team directly and are in touch with other students in university to ask for any guidance or help.	Website – to register Email – to seek advice.	• (C) Social Proof / (PSD) Normative Influence – Students can get in touch with other university students to get additional information and advice. They are more like to perform a behaviour if they see someone very similar to them performing the behaviour. • (BJ and PSD) Tailoring / (RC) Personalising – Students can get in touch with the admin team directly and get any information/guidance that is tailored to their needs.
8. <u>Prospects.co.uk</u> 117. A website that helps provide career advice such as what a student can do with their degree, what jobs they can get and how to prepare for interviews.	8.1 Students are able to see what jobs they can apply for with a particular degree, what skills and work experience will be needed for that job. 8.2 CV check – students can upload their CVs to have it checked by an advisor	Website – to access information Social Media – to post any questions	• (BJ and PSD) Tunnelling – Students are guided to see what jobs they can apply for depending on their degree, experience and skills. • (BJ and PSD) Tailoring / (RC) Personalising – Students can have their CV checked by an advisor.

9. <u>Compass: Young Carers</u> 118. An online resource programme for Year 10 and 11 students with caring responsibilities in Oxfordshire, Buckinghamshire and Milton Keynes, aiming to raise aspirations and attainment to make students aware of their post-16 options (Oxford, 2015)	9.1 A free tool-kit includes interactive quizzes, lesson plans, information and links designed to help young carers to make an informed decision about their future education and careers. Also gives them confidence to communicate and pursue their ideas.	Website – to download the tool kit Students can use their laptops/desktops to work with the tool.	(BJ and PSD) Tunnelling – Students are guided to be able to make a university application, write a cover letter and start writing their CV by completing a set of interactive quizzes.
10. <u>Target Lancaster Mentoring Programme</u> 119. Year 12 students (mentees) from WP backgrounds work with current Lancaster students (mentor) on a number of school/college sessions based around the questions and issues students have about university.	10.1 The mentors and mentees are matched through shared areas of academic interest. The mentee must attend at least two mentoring sessions and a final day visit to Lancaster to receive a 'guaranteed offer' at the university at standard level for most subject areas.	Email – mentee and mentor keep in contact via email.	• (BJ and PSD) Tailoring / (RC) Personalising – Students keep in contact with their mentor to get advice and guidance tailored to their needs.

Projects for Category 2 – Indecisive about future career prospects:

Project / Study / Website Name	Activities Run for the Project / Things to do in App or Website	Technology Used	Persuasive Design Principle (BJ Fogg = BJ, Ran Cheng = RC, Harry Oinas = PSD, Cialdini = C)
1. <u>Buzz Quiz by UCAS</u> 120. A quiz developed for individuals to find out what they are like and what they could do based on their personality. There are 16 possible personality types and each one is linked with an animal.	1.1 UCAS encourages individuals who are not sure of what career they can get into take the Buzz Quiz. - The user answers a number of questions. Once completed, they are presented with what their personality type is, which other famous celebrities have the same personality type, what percentage of UK population is of this personality type, and what jobs or career are most suited for this personality type. 121. There are links to see additional information on the work and careers they can get into.	Website – to take the quiz	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (C) Liking – Users can see which famous celebrity matches their personality. They are more likely to think they have those strengths and weaknesses mentioned in the quiz because a celebrity who they like has the same qualities. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. Buzz Quiz offers information about the career opportunities after the user has taken the quiz. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career

			suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality. They are also presented with famous celebrities who • (PSD) Verifiability – related articles from verified sources and contact information makes the information credible
2. <u>MeTycoon – Online game</u> 122. A web based 2-D environment game in which students are encouraged to build their own virtual life where their decision directly affect their achievements, prosperity and happiness.	2.1 The game relies on character development and collection of points which opens up new jobs and resources in the game. The game is cartoon like with animated characters but has embedded video interview of people from different occupations to engage users. The game also emphasises on the social skills required, including household costs, qualifications and skills required for getting a higher paid job.	Website – to play the game Social Actors – player makes virtual friends	• (BJ and PSD) Tunnelling – Players are guided to build their virtual characters by enrolling them into courses and voluntary jobs to build their skills. • (PSD) Rewards – Players are awarded points which open up new jobs and resources in the game.

3. <u>Career Quiz</u> http://www.mycareerquizzes.com/job-quiz 123. A quiz developed for individuals to find out what their dream job can be	3.1 User answers a total of 16 multiple choice questions. Once completed, they are presented with what their dream job should be based on their personality. 3.2 Users can share their results with Facebook and Twitter friends.	Website – to take the quiz Social Media – to share their results with friends	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best career for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (BJ and PSD) Tunnelling – Users are guided to what career they should go for by answering a number of questions. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with career suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality. • (PSD) Normative Influence – Users are motivated to do the quiz of their friends are completing the quiz.
4. <u>UCAS – Explore Jobs and Career Advice</u> 124. https://www.ucas.com/careers-advice 125. UCAS website gives students careers advice and the option to explore different careers and pathways to those careers.	4.1 Students can search for particular jobs, or browse through a list of jobs, and see the skills and education required for that job profile.	Website – to explore different careers and watch 360 videos	• (BJ and PSD) Reduction – Complex behaviour of researching the different careers, and what skills and qualification are required for that career is made simple by presenting them all on one page. The user can click on one career and view all the

	4.2 Students can watch videos including 360-degree videos of some university campuses 4.3 Students can contact UCAS with their messages directly via Facebook or Twitter	Online forums- to speak to other students and advisers Email – sign up to receive notifications and updates Social Media – to ask questions	information related to it. They do not have to do any additional research. • (PSD) Real World Feel – Users can contact UCAS advisers via social media.
5. <u>Play Buzz</u> 126. A quiz developed for individuals to find out what future career they should go for.	5.1 User answers a total of 10 multiple choice questions. Each question has general career pictures in front of them. Once completed, they are presented with what career they should go for based on their personality. 5.2 Users can encouraged to share their results with Facebook, Twitter and Pinterest friends and are encouraged to tell their friends about the quiz too so that it can help them decide their options too. 127.	Website – to take the quiz Social Media – to share their results with friends	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best career for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (BJ and PSD) Tunnelling – Users are guided to what career they should go for by answering a number of questions. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with career suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and

			which jobs they can apply to based on their interest and personality. • (PSD) Normative Influence – Users are motivated to do the quiz of their friends are completing the quiz.
6. <u>Career Aptitude Test</u> - https://www.whatcareisrightforme.com/career-aptitude-test.php 128. A 4-step online career test which gives individuals recommendations of their career options based on their answers.	6.1 Individuals take the quiz by rating a number of statements related to their skills, interests, work styles and values. Based on their answers they are presented with a list of careers they can go into, and browse jobs to apply for that career. They can also view different courses provided in order to get into that career.	Website – to take the quiz Social Media – to share the test results via Facebook	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (BJ and PSD) Tunnelling – Users are guided through a series of questions to determine what career they should opt for. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality. • (PSD) Real World Feel – Users are able to browse jobs and apply for them straight away (via Indeed which opens in a new tab if the user clicks on the 'Browse Jobs' option).

7. <u>What Uni - Website</u> https://www.whatuni.com 129. What Uni is partnered with UCAS, HESA (Higher Education Statistics Agency), Havas Education, and Nyumbani UK & Hotcourses Foundation to give prospective students information and guidance on what they should do if they have a career in mind.	With What Uni, prospective students can: 7.1 Find the best route to their dream job. If they have a career in mind, then by selecting that career they can see what courses they can do to get that job. 7.2 Read blogs and watch inspirational videos.	Website – to access the information	• (BJ and PSD) Reduction – With just a click of a few button users can view the courses they can do to get that dream job • (BJ and PSD) Tunnelling – Users are guided through a process of selecting what is right for them. • (RC) Just-In-Time – Users are sent push notifications and reminders notifying them of important information and dates at the right time. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with course options depending on their career interests. • (BJ and PSD) Suggestion – Users are given suggestion of what courses they can go for based on their career interests. • (PSD) Real World Feel – Users can email the university directly. • (C) Social Proof / (PSD) Normative Influence – Users can read reviews from students who wanted to go for the same career.
8. <u>Youth@Work game of career learning</u> 130. A study conducted by Welten Institute, University of Iceland, and University of the West of Scotland, to see the effects of a game based approach to career learning for youth. Young	8.1 An adventure like game in which the player (user) embarks on a career journey and travel across an island in search of the holy grail (which is their career advice). A total of 9 mini-games are	Website – to play the game.	• (RC) Recognition / (PSD) Praise – Players are praised by the King of the island at the end of the game. • (RC) Recommendation/ (PSD) Suggestion – Players are presented with a diary at the end of the game

participants aged 14-18 years were recruited for this study.	played by the player in which they meet different characters who ask them about their strengths, weaknesses and interests. In the end they are presented with a diary by the King of the island, in which he recommends the careers the player can go for based on his/her interests.	Social Actors – Player meets different characters in the game	with recommendation of what careers they can go for based on their interests.
9. <u>Metarasa Personality Quiz</u> - https://www.metarasa.com/ 131. A quiz that uses the Myers and Briggs eight styles of behaviour to identify an individual's personality and style of thinking and behaving. Users are presented with an online report. The full report has to be purchased.	9.1 Individuals take the quiz by rating a number of statements. Based on their answers they are presented with an online 'Personality Report' which breaks down their personality in terms of style of thinking, behaviour, skills. The last page of the online report presents them with the top 10 best career matches based on their personality.	Website – to take the quiz	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users recommendations on what they should do based on their personality. • (BJ and PSD) Tunnelling – Users are guided through a series of questions to determine what their personality is and what career they should opt for. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests and personality.

			• (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality.
10. 365 Tests 132. https://365tests.com/job-tests/career-assessment-test/ 133. A quiz that allows individuals to see what career they should go for based on their personality.	10.1 Individuals answer 25 multiple choice questions. Based on their answers they are presented with one career they should go for. Each question has an image presented in front of it related to the question. 10.2 Users can share their results via Facebook and Twitter.	Website – to take the quiz Social Media – to share their quiz results	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a test (in which they click a button to choose an answer from a set of multiple choice questions) that will measure their skill set and determine their personality. The test will then give users a recommendation on what career they should go for (based on their personality). • (BJ and PSD) Tunnelling – Users are guided through a series of questions to determine what their personality is and what career they should opt for. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests and personality. • (BJ and PSD) Suggestion – Users are given suggestions of what careers they can go for and which jobs they can apply to based on their interest and personality.
11. PathSource (App) 134. A career search and education tool students. By asking the right questions it			• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made

matches the student to their ideal career and education path that suits their interests and personality.	With the app, users can: 11.1 Career assessment – by taking the assessment the user gets matched with the exact career or college. 11.2 Ecosystem of In-Depth Data – access comprehensive descriptions of every career. User can find out the university degree and work experience required for each job	Smart Phone to download app – available on App Store and Google Play	simple by allowing the users to take a test that will measure their skill set. The test will then give users recommendations on what they should do. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. PathSource offers information about the career opportunities after the user has taken a career assessment. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests, qualifications and skills. • (BJ and PSD) Suggestion – Users are given suggestion of what careers they can go for and which jobs they can apply to based on their interests. • (PSD) Verifiability – related articles from verified sources and contact information makes the information credible
12. Who am I? Self-Assessment Game– http://careers.yorku.ca/the-who-am-i-self-assessment-game/ 135. Developed by the York University Career Centre in 2007 to provide a fun and interactive method of self-assessment for students and alumni wishing to explore their career options.	12.1 The game involves a game board, marker, dice, a set of cards, career profile template and a facilitator’s guide. 136. It is played in groups of 3-4 players. All players share one marker and take turns rolling the die to move the marker around the board. During a turn, a player	Board Game	None

	lands on a space on the board and follows the direction(s) indicated on the space. A space on the board may ask a player to select a game card, answer a question about themselves aloud, or reflect on information and share their thoughts with the group.		
13. <u>Enhance your Careers and Employability Skills MOOC</u> 137. A Project started by the University of London, using a range of technology supported employability services and products to help students decide on their career pathway.	13.1 A range of employability webinars accessed by students whenever and wherever they like. Additional features such as video lectures, interactive quizzes and peer graded assessments are used to decide what their interests are. 13.2 Students can connect with instructors (via forums) to discuss their future career prospects.	Website – to watch videos, take part in interactive quizzes, and access the forums (after registering)	• (C) Social Proof / (PSD) Normative Influence – Users can share and compare information with other users (via the forum) about career pathways etc.
14. <u>National Careers Service</u> 138. A website that helps provide information, advice and guidance to help individuals to make decisions on learning, training and work.	14.1 Individuals can upload their CVs for a CV check, search for courses and learning providers 14.2 Skills Health Check – Individuals can take an assessment to find out what job is for them. 14.3 Contact an Advisor – advice on looking for courses and job hunting	Website – to register and use the services	• (BJ and PSD) Reduction – Complex behaviour of choosing what is the best path for them is made simple by allowing the users to take a skills health test that measures their skill set. The test will then give users recommendations on what they should do. • (BJ and PSD) Tunnelling – Users are guided to what career they should opt for. The website offers

			information about the career opportunities after the user has taken a career assessment. • (BJ and PSD) Tailoring / (RC) Personalising - Users are presented with job opportunities and career suggestion depending on their interests, qualifications and skills. They can also contact an advisor to get additional help and guidance. • (BJ and PSD) Suggestion – Users are given suggestion of what careers they can go for and which jobs they can apply to based on their interests.
15. Pathways to Property Project 139. Led by the Reading Real Estate Foundation (RREF) at the University of Reading, this programme is for Year 12 students in UK state school and colleges who would like to find out more about a career in the property sector.	15.1 Activities include: Talks in schools throughout the year, work experience placements, e-mentoring and an online Pathways to Property course. 15.2 The online course is completed using videos, activities and online discussion boards.	Website – to register Online forum – to access the discussion board Online portal – to contact the e-mentor	• (C) Social Proof / (PSD) Normative Influence (PSD)– Students can get in touch with other university students via the online discussion forum. They are more likely to perform a behaviour if they see others like them performing the same behaviour.

16. <u>LSAll Project</u> 140. A web-based portal where students develop a timeline to help them look into the future	16.1 Students do this for a limited time, until they are sure of what they want to do for their future. Students are given hope that they can still achieve what they want to do for their future. They can see which options to take if they want to reach a certain goal.	Website – to access the web portal	• (BJ and PSD) Tunnelling – Students are guided through a timeline so that they are able to decide what they want to do for their future.

Appendix D: Study Four

Appendix D.1

Study Four: Ethics Form

Ethics application

Risks

R1) Does the project have funding?

No

R2) Does the project involve human participants?

Yes

R3) Will the researcher be located outside of the UK during the conduct of the research?

No

R4) Will any part of the project be carried out under the auspices of an external organisation, involve collaboration between institutions, or involve data collection at an external organisation?

Yes

R5) Does your project involve access to, or use of, material that could be classified as security sensitive?

No

R6) Does the project involve the use of live animals?

No

R7) Does the project involve the use of animal tissue?

No

R8) Does the project involve accessing obscene materials?

No

R9) Does the project involve access to confidential business data (e.g. commercially sensitive data, trade secrets, minutes of internal meetings)?

No

R10) Does the project involve access to personal data (e.g. personnel records) not in the public domain?

No

R11) Does the project involve deviation from standard or routine clinical practice, outside of current guidelines?

No

R12) Will the project involve the potential for adverse impact on employment, social or financial standing?

No

R13) Will the project involve the potential for psychological distress, anxiety, humiliation or pain greater

than that of normal life for the participant?

No

R15) Will the project involve research into illegal or criminal activity where there is a risk that the researcher will be placed in physical danger or in legal jeopardy?

No

R16) Will the project specifically recruit individuals who may be involved in illegal or criminal activity?

No

R17) Will the project involve engaging individuals who may be involved in terrorism, radicalisation, extremism or violent activity and other activity that falls within the Counter- Terrorism and Security Act (2015)?

No

Applicant & research team

T1) Principal Applicant Name

[Aamna Toor](#)

T2) Co-Applicant(s) at City T3) External Co-Applicant(s)

T4) Supervisor(s)

[Prof Stephanie Wilson](#)

[Dr Simone Stumpf](#)

T5) Do any of the investigators have direct personal involvement in the organisations sponsoring or funding the research that may give rise to a possible conflict of interest? No

T6) Will any of the investigators receive any personal benefits or incentives, including payment above normal salary, from undertaking the research or from the results of the research above those normally associated with scholarly activity?

No

T7) List anyone else involved in the project.

Project details

P1) Project title

Using Technology to make Decisions about Higher Education

P1.1) Short project title

P2) Provide a lay summary of the background and aims of the research, including the research questions (max 400 words).

The aim of this study is to investigate whether technology can be used as a solution to mitigate peer pressure within

adolescents when it comes to deciding about higher education. Many individuals choose to go to university because all their friends are going, or not go because their friends are not going. As they are highly influenced by their friends, they do not make an informed decision about their future. It will therefore be explored whether persuasive technology can help mitigate the influence of friends when deciding to enter higher education.

To address the aim of the study, an interactive story game has been designed and built as a persuasive technology to help overcome peer pressure within adolescents. This game is classified as 'persuasive' because certain persuasive design principles have been incorporated within the game. Therefore the aim of this study is to investigate the effectiveness of this persuasive technology; whether it helps to mitigate peer pressure amongst adolescents (sixth form students) when it comes to considering higher education as an option for them.

This study will contribute in answering four research questions:

- RQ1 – Can persuasive technology mitigate negative influence of friends when considering higher education?
- RQ2 - Can persuasive technology raise awareness about the impact of negative peer pressure from friends when considering higher education?
- RQ3 – Which of the persuasive design principles implemented are more effective in mitigating negative influence when considering higher education?
- RQ4 - Which of the persuasive design principles implemented are more effective in raising awareness about the impact of negative peer pressure when considering higher education?

P4) Provide a summary and brief explanation of the research design, method, and data analysis.

For this study, sixth form students who are 18 years old will be asked to play an interactive game which will help them make a decision about higher education. They will also be asked to complete two questionnaires and take part in an informal semi structured interview. As primary data will be collected from the participants, this study will be an empirical research. A mixture of qualitative and quantitative methods will be used to collect the data. Pre and post study questionnaires will be used to collect the quantitative data and an informal semi structured interview will be conducted to collect qualitative data.

The study will be conducted in two parts, and for both parts the researcher will meet the participant for a face to face session. The Participant Information Sheet and Recruitment Flyer will be forwarded onto sixth form students for them to read and decide if they want to take part in the study.

Participants who will be recruited directly from schools, will have the Participant Information Sheet and Recruitment Flyer forwarded onto them by the teacher in charge. The teacher will email the Information Sheet and Recruitment Flyer to potential students making it clear that their participation is voluntary. Participants recruited by the researcher directly (outside the school) will be forwarded the Participant Information Sheet and Recruitment Flyer by the researcher.

On deciding to take part, the researcher will meet the participant to conduct the first part of the study (Session 1). In this session, the participant will be given a consent form to sign. Once they have signed the consent form, they will be given a Session 1 questionnaire (pre-game) to complete. This session should take about 10 minutes to complete. The date and time to meet for the second session of the study will also be decided. The second session will be conducted one week after the first session.

In the second session, the participant will be asked to play an interactive game and complete it. On arrival, the participant will be given an iPad to play the interactive story game. The game will already be downloaded and running on the iPad. The researcher will not observe the participant playing as observing them may change their behaviour and choices within the game. The researcher will be present in the same room but will not be observing the participant. Next, they will be asked to complete the Session 2 questionnaire (post-game) and take part in an informal semi-structured interview. The interview will help understand why they responded in the way that they did, and help explore which feature of the game effected the way they played. The interview will be audio recorded. This

session will take about 45 minutes to complete.

A mixture of methods will be used to analyse the qualitative and quantitative data. To analyse the difference in the responses for the pre-game and post-game questionnaires (quantitative data), a one tailed Wilcoxon signed ranked test will be used. This test will determine whether there is a statistical difference in the responses of the participants before and after playing the game. To analyse the qualitative data, the interviews will be transcribed and coded to find emerging themes and patterns within the data. A deductive top-down approach will be used for coding the interview transcripts. A set of codes will be pre-defined and the transcripts will be read through and analysed to code data which reflects on these pre-defined codes. After this is done, any additional patterns or themes which emerge in the data will then be grouped and categorised to create new codes.

P4.1) If relevant, please upload your research protocol.

P5) What do you consider are the ethical issues associated with conducting this research and how do you propose to address them?

After taking part in the study, some participants may realise that they are susceptible to peer pressure. Although they will not be given their individual results, they could however recognise that they are susceptible when completing the questionnaire and/or by playing the game. Once they realise this, they may need additional information about peer pressure and ways how they can avoid it. To address this, all the participants will be sent a thank you email after taking part in the study. In this thank you email they will be given more information about what the study was about. It will also include a link to the Creating Awareness for Teen Peer Pressure blog (https://scienceleadership.org/blog/creating_awareness_for_teen_peer_pressure...), which includes a presentation about what peer pressure is, tips on how to avoid peer pressure, and true inspiring stories and advice from other teens who fell for peer pressure. This will help give them additional information about peer pressure.

In addition, this study will protect the privacy of the participants. The only identifiable data collected will be the participants name and email address, which will be used to keep track of the pre and post game questionnaire results, and to send a thank you email to. This information will be de-identified and the participants will be assigned an anonymous participant number when analysing and reporting the results. The participants will be made aware of this before they agree to take part in the study as it will also be included in the Information Sheet. An informed consent will be obtained from the participant before they take part in the study.

P6) Project start date

16 Jan 2019

P7) Anticipated project end date

30 Apr 2019

P8) Where will the research take place?

Those participants who are recruited from schools, will be met for the study within their school. The study will be conducted in a classroom within the school during regular school hours. The two schools which have given permission to run the study are:

1. Oak Wood School Hillingdon
2. Stockley Academy West London

Participants who are not recruited directly from the school will be met either at City, University of London library, or at Slough library at The Curve, whichever is most convenient for them to get to. A meeting/study room will be booked in both these libraries to run the study.

P10) Is this application or any part of this research project being submitted to another ethics committee, or has it previously been submitted to an ethics committee?

No

External organisations

E1) Provide details of the external organisation/institution involved with this project.

Two schools will be involved to help run this study, as some of the participants will be recruited from these schools directly. Convenience sampling was used to select these schools as they were around Hillingdon area. Details of the school are below:

1. Oak Wood School Hillingdon

Address - Sutton Court Road, Hillingdon, Middlesex, UB10 0EX

2. Stockley Academy West London

Address - Park View Road, Hillingdon, Middlesex, UB8 3GA

E2) If applicable, has permission to conduct research in, at or through another institution or organisation been obtained?

Yes

E2.1) Provide details and attach the correspondence.

Both the schools have agreed to run this study in their school, and have given a Letter of Support. Please see that attached. Once I have received ethics approval, I will liaise them with a date for when it is most convenient to run the study.

Human participants: information and participation

The options for the following question are one or more of:

'Under 18'; 'Adults at risk'; 'Adults potentially without the capacity to consent'; 'None of the above'.

H1) Will persons from any of the following groups be participating in the project?

None of the above

H2) How many participants will be recruited?

21

H3) Explain how the sample size has been determined.

The sample size has been determined by following the 'Local standards for sampling size at CHI' paper (Caine, K., 2016, May. Local standards for sample size at CHI. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (pp. 981-992). ACM.).

In this paper the researcher has explored and determined the sample size required to run the different kinds of studies. As this study is using a mixed method approach, involving both qualitative and quantitative data, gathered via questionnaires and an interview, the mean sample size required for this in-person study is 21.

H4) What is the age group of the participants? Lower Upper

18 18

H5) Please specify inclusion and exclusion criteria.

Inclusion criteria for this study is that participants have to be 18 years of age, and be a current sixth form student. The reason for this inclusion criteria is because these individuals are deciding about higher education. As it is difficult to recruit mid-adolescent participants (under the age of 18), it was decided to recruit 18 year old's who are still in school (as they will be influenced by peer pressure) and are in the stage of making a decision about higher education.

H6) What are the potential risks and burdens for research participants and how will you minimise them?

There is no disadvantage or physical risk involved when taking part in this study. The study will be conducted either within the school (for participant recruited directly via school) or at a public space in a library (for participants recruited from outside the school). The first session of the study will take 10 minutes to complete, and the second session will take approximately 45 minutes to complete. Those who are recruited from outside the school will require travel time as well to get to the location where the study is being run. Those who are recruited from the school will not need to travel anywhere as the study will be conducted in their school. They will be allocated a time slot when they have a free lesson so that their studies are not disrupted.

H7) Will you specifically recruit pregnant women, women in labour, or women who have had a recent stillbirth or miscarriage (within the last 12 months)?

No

H8) Will you directly recruit any staff and/or students at City?

None of the above

H8.1) If you intend to contact staff/students directly for recruitment purpose, please upload a letter of approval from the respective School(s)/Department(s).

H9) How are participants to be identified, approached and recruited, and by whom? Participants will be recruited directly from the two schools, and from outside those two schools (via friends and contacts) using convenience sampling.

To recruit participants from the school, the teacher in charge will forward the recruitment flyer and Participant Information Sheet given by the researcher, to potential participants who are sixth form students and are 18 years of age. They will also clarify to the students that their participation is voluntary. Students who decide to take part in the study will let their teacher know. The teacher will then send the researcher a list of the students who are interested to take part in the study and what day/time they are available to meet for the first session of the study.

To recruit participants outside the two schools, a call for participants will be sent out via social media, email, and Whatsapp. These channels will be used to contact friends and family so that if they can forward the Participant Information Sheet and Recruitment Flyer to anyone who is an 18 year old sixth form student, who will be interested in taking part in the study. An email will also be sent to the HCID mailing list at City, University of London asking them to forward on the researchers details if they know anyone who could be a potential participant. Any participant who contacts the researcher and shows interest in taking part in the study will be liaised with (via email) to agree when and where it would be best to meet them for the first session to undertake the study. These participants will be met either at City, University of London library, or at Slough library at The Curve, whichever is most convenient for them to get to.

H10) Please upload your participant information sheets and consent form.

H11) If appropriate, please upload a copy of the advertisement, including recruitment emails, flyers or letter.

H12) Describe the procedure that will be used when seeking and obtaining consent, including when consent will be obtained.

The potential participants will be emailed the Participant Information Sheet and Recruitment Flyer so that they can read about what the study is about and decide whether they wish to take part. If they do decide to take part, they can let the researcher or their teacher know (if the teacher forwarded the study details to them) so that they are booked for their session. On arrival of the first session, the participants will be given a Consent form to sign. A copy of the signed consent form will be given to the participant too. Once their consent is obtained, they will then be given the Session 1 questionnaire to complete. The meeting date and time for the second session of the study will also be agreed in this session.

H13) Are there any pressures that may make it difficult for participants to refuse to take part in the project?

Yes

H13.1) Please provide details and describe how you propose to address these.

Participants who are recruited from schools must not be pressurised by the school to take part in the study. Participation in this study is voluntary and this will be made clear in the Participation Information Sheet and Recruitment Flyer. The teacher in charge will also be made aware not to pressurise any student to take part in the study, their participation is voluntary.

H14) Is any part of the research being conducted with participants outside the UK?

No

Human participants: method

The options for the following question are one or more of:

'Invasive procedures (for example medical or surgical)'; 'Intrusive procedures (for example psychological or social)';

'Potentially harmful procedures of any kind'; 'Drugs, placebos, or other substances administered to participants';

'None of the above'.

M1) Will any of the following methods be involved in the project:

None of the above

M2) Does the project involve any deceptive or covert research practices?

No

M3) Is there a possibility for over-research of participants?

No

M4) Please upload copies of any questionnaires, topic guides for interviews or focus groups, or equivalent research materials.

M5) Will participants be provided with the findings or outcomes of the project?

No

M6) If the research is intended to benefit the participants, third parties or the local community, please give details.

This research will help individuals to be able to make an informed decision about their future and not just follow what their peers are doing.

M7) Are you offering any incentives for participating?

No

M8) Does the research involve clinical trial/intervention testing that does not require Health Research Authority or MHRA approval?

No

M9) Will the project involve the collection of human tissue or other biological samples that does not fall under the Human Tissue Act (2004) that does not require Health Research Authority Research Ethics Service approval?

No

M10) Will the project involve potentially sensitive topics, such as participants' sexual behaviour, their legal or political behaviour, their experience of violence?

No

M11) Will the project involve activities that may lead to 'labelling' either by the researcher (e.g. categorisation) or by the participant (e.g. 'I'm stupid', 'I'm not normal')?

No

Data

D1) Indicate which of the following you will be using to collect your data.

Questionnaire Interviews

Audio/digital recording interviewees or events

D2) How will the the privacy of the participants be protected?

De-identified samples or data

D3) Will the research involve use of direct quotes?

Yes

D5) Where/how do you intend to store your data?

Data and identifiers to be kept in separate, locked filing cabinets Password protected computer files

Storage on encrypted device (e.g. laptop, hard drive, USB Storage at City

D6) Will personal data collected be shared with other organisations?

No

D7) Will the data be accessed by people other than the named researcher, supervisors or examiners?

No

D8) Is the data intended or required (e.g. by funding body) to be published for reuse or to be shared as part of longitudinal research or a different/wider research project now or in the future?

No

D10) How long are you intending to keep the research data generated by the study?

10 years

D11) How long will personal data be stored or accessed after the study has ended?

10 years

D12) How are you intending to destroy the personal data after this period?

Consent forms and the pre and post game questionnaires will be stored in separate secure locked cabinets. Only the researcher and research supervisors will have access to this data.

The audio recording of the interviews will be transcribed and stored in a password protected laptop. Once transcribed, the audio recording will be deleted permanently.

All data is de-identified and only referenced with a unique participant number.

Health & safety

HS1) Are there any health and safety risks to the researchers over and above that of their normal working life?

No

HS3) Are there hazards associated with undertaking this project where a formal risk assessment would be required?

No

Appendix D.2

Study Four: Consent Form

Title of Study: *Using Technology to make Decisions about Higher Education*

Please initial box

1	I confirm that I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records. I understand this will involve: • Attending two face to face sessions with the researcher. The second session will be conducted one week after the first session. • Completing a questionnaire <i>before</i> playing the game (in the first session) • Playing an interactive storytelling game on the researchers iPad and completing the game (in the second session) • Completing a questionnaire <i>after</i> playing the game (in the second session) • Participating in an interview which will be audio recorded (in the second session)	
2	This information will be held by City as data controller and processed for the following purpose(s): To collect data for Aamna Toor's PhD study for analysis, and to report results in publications in de-identified form. Public Task: The legal basis for processing your personal data will be that this research is a task in the public interest, that is City, University of London considers the lawful basis for processing personal data to fall under Article 6(1)(e) of GDPR (public task) as the processing of research participant data is necessary for learning and teaching purposes and all research with human participants by staff and students has to be scrutinised and approved by one of City's Research Ethics Committees.	
3	I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation.	
4	I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.	
5	I agree to City recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on City complying with its duties and obligations under the General Data Protection Regulation (GDPR).	
6.	I agree to the arrangements for data storage, archiving, sharing.	
7	I agree to the use of anonymised quotes in publication.	
8	I agree to take part in the above study.	

Name of Participant _____ Signature _____ Date _____

Name of Researcher _____ Signature _____ Date _____

When completed, 1 copy for participant; 1 copy for researcher file

Appendix D.3

Study Four: Participant Information Sheet

Title of study: *Using Technology to make Decisions about Higher Education*

Name of principal investigator: Aamna Toor, Prof Stephanie Wilson (First Supervisor), Dr Simone Stumpf (Second Supervisor)

I would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The purpose of this study is to investigate whether technology can be used to help students make decisions about higher education. This study is undertaken as part of my PhD research.

Why have I been invited?

You have been invited to take part in this study because you fulfil the inclusion criteria set for this research. This means that you are a current sixth form student and are 18 years old.

Do I have to take part?

Participation in the study is voluntary, and you can choose not to participate in all or part of the study. You can withdraw at any stage of the study without being penalised or disadvantaged in any way. You can also avoid answering questions that you feel are too personal or intrusive.

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?

If you take part in the study, you will be asked to attend two face to face sessions with the researcher. The second session will be conducted one week after your first session.

In the first session you will be asked to do the following:

1. Sign a consent form
2. Complete the first questionnaire

In the second session you will be asked to do the following:

1. Play an interactive storytelling game on the researchers iPad and complete the game
2. Complete the second questionnaire (after completing the game)
3. Answer a few questions about your experience with the game

The first session will take no longer than 10 minutes to complete, and the second session will take approximately 45 minutes to complete. The interview will be audio recorded.

If you are being recruited from your school, then the study will take place in a classroom in your school during regular school hours. Alternatively, if you are being recruited by the researcher directly, then the study will take place either at City, University of London or at Slough library at The Curve, whichever is most convenient for you to get to.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks involved when taking part in this study.

What are the possible benefits of taking part?

By taking part in this research, you will contribute useful information to the wider community, helping students be able to make informed decisions about their future with the use of technology.

What will happen when the research study stops?

We will retain the data for 10 years. The consent form and questionnaires will be stored in a locked drawer at City University London, and the audio recording will be stored electronically in an encrypted and password protected location. After this, the data will be destroyed and deleted. The questionnaires and consent forms will be shredded, and the audio recording of the interview will be deleted permanently.

Will my taking part in the study be kept confidential?

All data held about you will be kept confidential. The only people who will have access to your data other than myself will be the research supervisors and examiners. The only identifiable data collected from you will be your name and email address. This data will be de-identified and you will be assigned an anonymous participant number when reporting the results for this study.

The questionnaires and consent forms will be kept in a locked drawer at City, University of London, and your interviews audio recording will be stored on an encrypted device. The audio data will be transcribed for analysis and reporting in the thesis or any publication. This transcribed data will be stored in a password protected laptop. The consent form and the questionnaires will be stored separate in different locked drawers at City University. This will keep your identity separate to the data gathered. All data will be retained for 10 years and then securely destroyed.

What should I do if I want to take part?

If you would like to take part in this research, first ensure you have read this information thoroughly, and then you can contact me on aamana.toor.1@city.ac.uk. If you were given this Information Sheet by your teacher, you can let your teacher know that you are interested in taking part.

What will happen to results of the research study?

The results of the study will be used to inform future work about the role of technology in helping students making informed decisions about their future. Findings will be published in the PhD thesis and conference publications. The data will be de-identified so that your identity is not known. All information you contributed will be generalised in the thesis to maintain anonymity.

What will happen if I do not want to carry on with the study?

Your participation is voluntary, you are free to withdraw from the study at any time without giving a reason.

Who has reviewed the study?

This study has been approved by City, University of London Computer Science Research Ethics Committee

Further information and contact details

For any further inquiries please contact me, the researcher of this study at:
Email: aamana.toor.1@city.ac.uk

Data Protection Privacy Notice: What are my rights under the data protection legislation?

City, University of London is the data controller for the personal data collected for this research project. Your personal data will be processed for the purposes outlined in this notice. The legal basis for processing your personal data will be that this research is a task in the public interest, that is City, University of London considers the lawful basis for

processing personal data to fall under Article 6(1)(e) of GDPR (public task) as the processing of research participant data is necessary for learning and teaching purposes and all research with human participants by staff and students has to be scrutinised and approved by one of City's Research Ethics Committees.

The rights you have under the data protection legislation are listed below, but not all of the rights will be apply to the personal data collected in each research project.

- right to be informed
- right of access
- right to rectification
- right to erasure
- right to restrict processing
- right to object to data processing
- right to data portability
- right to object
- rights in relation to automated decision making and profiling

For more information, please visit www.city.ac.uk/about/city-information/legal

What if I have concerns about how my personal data will be used after I have participated in the research?

In the first instance you should raise any concerns with the research team, but if you are dissatisfied with the response, you may contact the Information Compliance Team at dataprotection@city.ac.uk or phone 0207 040 4000, who will liaise with City's Data Protection Officer Dr William Jordan to answer your query.

If you are dissatisfied with City's response you may also complain to the Information Commissioner's Office at www.ico.org.uk

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through City's complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: 'Using Technology to make Decisions about Higher Education'

You could also write to the Secretary at:

Anna Ramberg
Research Integrity Manager
Research & Enterprise
City, University of London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Thank you for taking the time to read this information sheet.

Date: 14th December 2018

Appendix D.4

Study Four: Recruitment Flyer (Within School)

**Centre for *Human Computer Interaction Design*
(HCID) City, University of London**

**PARTICIPANTS NEEDED FOR
AN EXCITING PHD RESEARCH STUDY IN
COMPUTER SCIENCE**

We are looking for volunteers to take part in a PhD study -
Using Technology to make Decisions about Higher Education

As a participant in this study, you will be asked to: *play an interactive game,
complete two questionnaires, and take part in an informal interview*

Your participation will involve 2 face to face sessions with the researcher.
The first session will take 10 minutes, and the second session will take
approximately 45 minutes to complete

The study will take place in a classroom in your school during regular
school hours

To take part in the study, you need to be a sixth form student and be 18
years old

You participation in this study is voluntary. By taking part, you will
contribute useful information to the wider community, helping students
make informed decisions about their future!

For more information about this study, or to volunteer for this study,
please contact me, Aamna Toor at aamana.toor.1@city.ac.uk

Feel free to distribute this to others who might be interested in taking part

Thank you!

This study has been reviewed by, and received ethics clearance through the
Computer Science Research Ethics Committee, City, University of
London

Study Four: Recruitment Flyer (Outside School)

**Centre for *Human Computer Interaction Design*
(HCID) City, University of London**

**PARTICIPANTS NEEDED FOR
AN EXCITING PHD RESEARCH STUDY IN
COMPUTER SCIENCE**

We are looking for volunteers to take part in a PhD study -
Using Technology to make Decisions about Higher Education

As a participant in this study, you will be asked to: *play an interactive game,
complete two questionnaires, and take part in an informal interview*

Your participation will involve 2 face to face sessions with the researcher.
The first session will take 10 minutes, and the second session will take
approximately 45 minutes to complete

The study will take place at either City, University of London, or at Slough
Library at The Curve, whichever is most convenient for you to get to

To take part in the study, you need to be a sixth form student and be 18
years old

You participation in this study is voluntary. By taking part, you will
contribute useful information to the wider community, helping students
make informed decisions about their future!

For more information about this study, or to volunteer for this study,
please contact me, Aamna Toor at aamana.toor.1@city.ac.uk

Feel free to distribute this to others who might be interested in taking part

Thank you!

This study has been reviewed by, and received ethics clearance
through the Computer Science Research Ethics Committee, City, University of
London.

Appendix D.5
Study Four: Letter of Support (Oak Wood School)



Oak Wood School
Post 16

Clifton Gardens, Hillingdon
Middlesex, UB10 0EX
E: post16@oakwoodhillington.org.uk
T: 01895 237350

7th November 2018

Re: PhD Research at Oak Wood

Dear Aamna

I am pleased to confirm that we are able to assist you in running your PhD research about persuasive technology.

As agreed, only the sixth form students will take part in the research. Could you please confirm the date for the research to be conducted.

Please do not hesitate to contact me if you need further information.

Kind regards

Stephen Priestley
Head of Post 16
Ext: 161

Study Four: Letter of Support (Stockley Academy)



2nd November 2018

Dear Aamna Toor

As discussed, we are happy for the study to be conducted at our school.

For compliance purposes to help run your study, we will provide the following onsite IT services such as:

- School filtered WiFi SSID
- School dedicated Apple and Google email ID

As we will have to arrange the pupils involved in the study, please ensure that you give us a week notice in advance so we can arrange the session.

Yours sincerely

Chris Bailey
Head of ICT

Park View Road Hillingdon Middlesex UB8 3GA T: 01895 430066 F: 01895 430062

E: info@stockleyacademy.com www.stockleyacademy.com

At Stockley Academy we are committed to safeguarding children

Stockley Academy (A company limited by guarantee registered in England & Wales) Company No. 4302474
Registered office: Park View Road Hillingdon Middlesex UB8 3GA



Learning transforms lives

Appendix D.6

Study Four: First Questionnaire (Pre Study)

Session 1: Questionnaire

Name: _____ Email: _____

Part 1

Here are some *PAIRS* of *STATEMENTS* describing friends' influence. For each pair, *READ* both statements and decide whether friends mostly encourage you to do the one on the *LEFT* or the one on the *RIGHT*. Then, *MARK AN "X"* in one of the boxes on the side toward the statement you choose, depending on *HOW MUCH* your friends encourage you to do that ("*A Little*", "*Somewhat*" or "*A Lot*"). If you think there's *no* influence from your friends to do *either* statement, mark the middle ("*No Influence*") box.

Remember, mark *just ONE* "X" for *each* pair of statements.

HOW STRONG is the influence from your FRIENDS to:	LOT	SOMEWHAT	LITTLE	NO INFLUENCE	LITTLE	SOMEWHAT	LOT	Or to:
Speak to the career advisor in school about future options	3	2	1		-1	-2	-3	NOT speak to the career advisor in school about future options
Take the UCAS introduction classes	3	2	1		-1	-2	-3	NOT take the UCAS introduction classes
Finish sixth form	3	2	1		-1	-2	-3	Drop out of sixth form
NOT think and research about your future options after sixth form	-3	-2	-1		1	2	3	Think and research about your future options after sixth form
Research the different courses you can do at university	3	2	1		-1	-2	-3	NOT research the different courses you can do at university
NOT make the same decision as them about higher education	3	2	1		-1	-2	-3	Make the same decision as them about higher education
Consult friends to see what choices they are making about higher education	3	2	1		-1	-2	-3	NOT consult friends to see what choices they are making about higher education
NOT be confident in your decision about higher education	-3	-2	-1		1	2	3	Be confident in your decision about higher education

Appendix D.7
Study Four: Second Questionnaire (Post Study)

Session 2: Questionnaire

Please complete both parts of this questionnaire.

Name: _____ Email: _____

Part 1

Here are some *PAIRS of STATEMENTS* describing friends' influence. For each pair, *READ* both statements and decide whether friends mostly encourage you to do the one on the *LEFT* or the one on the *RIGHT*. Then, *MARK AN "X"* in one of the boxes on the side toward the statement you choose, depending on *HOW MUCH* your friends encourage you to do that ("*A Little*", "*Somewhat*" or "*A Lot*"). If you think there's *no* influence from your friends to do *either* statement, mark the middle ("*No Influence*") box.

Remember, mark just ONE "X" for each pair of statements.

HOW STRONG is the influence from your FRIENDS to:	LOT	SOMEWHAT	LITTLE	NO INFLUENCE	LITTLE	SOMEWHAT	LOT	Or to:
Speak to the career advisor in school about future options	3	2	1		-1	-2	-3	NOT speak to the career advisor in school about future options
Take the UCAS introduction classes	3	2	1		-1	-2	-3	NOT take the UCAS introduction classes
Finish sixth form	3	2	1		-1	-2	-3	Drop out of sixth form
NOT think and research about your future options after sixth form	-3	-2	-1		1	2	3	Think and research about your future options after sixth form
Research the different courses you can do at university	3	2	1		-1	-2	-3	NOT research the different courses you can do at university
NOT make the same decision as them about higher education	3	2	1		-1	-2	-3	Make the same decision as them about higher education
Consult friends to see what choices they are making about higher education	3	2	1		-1	-2	-3	NOT consult friends to see what choices they are making about higher education
NOT be confident in your decision about higher education	-3	-2	-1		1	2	3	Be confident in your decision about higher education

Part 2 – Experience of the Game

For each of the statements below, please rate how you felt about the game.

1. I wanted to complete the game to see how my choices affected my avatars future

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

2. I could relate to the choices my avatar had to make

Not at all	1	2	3	4	5	6	7	Definitely

3. The praises encouraged me to make better choices for my avatar

Never	1	2	3	4	5	6	7	Every time

4. The prompts suggesting me to make a different and better choice for my avatar were useful

Useful	1	2	3	4	5	6	7	Useless

5. Reading the real statistics made me reconsider my decisions

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

6. The true stories were useful in helping me understand the consequences of friends influence

Useful	1	2	3	4	5	6	7	Useless

7. It was important for me to verify where the statistics and true stories were referenced from

Not Important	1	2	3	4	5	6	7	Very Important

8. Having the researchers' information displayed made me trust the game

Not at all	1	2	3	4	5	6	7	Definitely

9. I wanted to play the game because 'Episodes' is popular amongst my friends and family

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

Appendix D.8

Study Four: Interview Questions

1. What did you think of the game?
2. What do you think was the goal of the game?
3. Is there anything that you will do differently after playing the game?
4. What did you like and dislike about the game?
5. Please comment on how you felt about the following features of the game:
 1. Seeing how your avatars fate changes with your choices
 2. Making higher education related choices for your avatar
 3. The praises you were offered in the game
 4. The prompts which suggested you to make a different choice
 5. The statistics presented prompting you to make a different choice
 6. The true stories presented at the end of the game
 7. Seeing the source of where statistics and facts were referenced from
 8. Being able to see the contact information of the researcher of the study
 9. Seeing how popular this game is because of the high rating
6. After playing the game, has it change your approach on how you will decide about going into higher education?
 - Which part of the game made you feel this way?
7. After playing the game, did you learn anything new about the consequences of friends influence?
 - Which part of the game made you feel this way?
8. Is there anything you would like to comment on about the game?
9. Have you applied to university?
 - How did you make your decision?

Appendix D.9

Reliability Check

Reliability Check for Study 4 – Using Technology to make Decisions about Higher Education

Step 1 - Please find below a list of codes along with their definitions identified for this study. There are a total of 5 main codes, each having a number of sub-codes. Please read through and familiarise yourself with the sub-codes and definitions.

Step 2 – You are given two transcribed interviews; Transcript 1 is on page 2, and transcript 2 is on page 5. These are transcripts from the interviews conducted for this study. Please read through the transcripts and identify the parts which are related to the sub-codes defined. You can re-read the transcripts multiple times if you wish. Mark (or code) the interview transcript by underlining the complete statement and writing down (beside the statement) which sub-code you think it is related to. For example, if a participant mentioned – *“The game has helped me understand that friends can have a big influence”*, then this can be marked as sub-code ‘*Raised Awareness*’.

Codes	Definition
1. Mitigated Peer Pressure	Participants mentioning that the game has helped change their behaviour, so that they are now less susceptible to peer pressure from friends
2. Did not mitigate Peer Pressure	Participants mentioning that the game did not help in changing their behaviour, or that the game could have influenced them to listen to their friends
3. Raised Awareness	Participants revealing that the game helped raise their awareness about the consequences of peer pressure from friends
4. Did not raise Awareness	Participants revealing that the game did not increase their awareness
5. Research	Statements revealing that the participant will now research his/her future options (after playing the game)
6. Rethink Friends Choice	Statements revealing that the participant will now rethink their friends choice (after playing the game)
7. Be prepared for negative people	Statements revealing that the game has helped the participant to be better prepared on how to deal with negative people
8. Liked about the game	Statements revealing what the participants liked about the game
9. Did not like about the game	Statements revealing what the participants did not like about the game

Transcribed Interview 1

Researcher: Hi Participant 1. Thank you for taking part in my research. So first of all what did you think of the game.

Participant 1: Well I like that it was a game and I liked the way it was set up, like it was fun to do.

Researcher: Okay. Did you finish all the way till the end?

Participant 1: Yeah.

Researcher: Did you see the end sign from the narrator?

Participant 1: Yes I did.

Researcher: Okay. And did you go back to change your decisions?

Participant 1: No.

Researcher: What do you think the goal of the game was?

Participant 1: I think it was to understand what choices you would make as a person in a situation like that, in deciding to go uni.

Researcher: Okay in deciding to go uni. Is there anything you will do differently after playing the game?

Participant 1: I think my character, the way I picked my answers were quite close to what I would do in real life. So...

Researcher: Okay so there wouldn't really be anything different you would do?

Participant 1: No.

Researcher: Okay. What did you like about the game in particular?

Participant 1: What. Oh at one part I liked was when the teacher spoke and the character it kind of like agreed with what my character said about going to uni.

Researcher: Oh okay. So the statistics that came up? And was anything you disliked about the game in particular?

Participant 1: Um well I didn't like was that all her friends didn't want to go uni. There could have been like other people that wanted to go as well just to see the balance between.

Researcher: Okay so you said that you wanted to go uni in the game?

Participant 1: Yeah.

Researcher: Right. So I'll just ask you a few things in particular about the game I just want you to comment on how you felt about those features of the game. So the first one is seeing how your avatars fate changes with your choices. How do you feel about that.

Participant 1: I liked it but I think the game could include some kind of like the future bit as well. So the consequences of the character's actions okay decisions kind of thing.

Researcher: So as in like where they end up, whether they end up in uni and how they are?

Participant 1: Exactly yeah.

Researcher: Okay. And then the praises you were offered in the games that you made your own decision or if you followed your own instincts you got a praise aswell.

Participant 1: Yeah. That was good.

Researcher: Okay good. And then you had different prompts as well suggesting to make different choices about friends or not following friends or following your instincts. How did you feel about that?

Participant 1: That was good because I think that's something that would happen in in school environment with your friends.

Researcher: Okay so do you think in real life you have to make these kind of decisions as well?

Participant 1: I think yes but it depends on your circumstance as well. So if you are like mature and you go to...it depends on the school you go to as well to be honest.

Researcher: Okay. The next one is the statistics presented so it's what the techer was saying. You commented that you really like that feature?

Participant 1: Yeah because that character agreed with me.

Researcher: Okay. Then the true story presented at the end of the game. Did it have any impact on you?

Participant 1: I think my character wanted to go uni anyways so it's kind of like...But I think it would resonate with someone who didn't go to uni.

Researcher: Yeah because you have already resisted peer pressure.

Participant 1: Exactly.

Researcher: And its showing you the story that someone is resisting peer pressure too.

Participant 1: Yeah.

Researcher: Okay. And then obviously playing the game on episode because episode is quite a popular app. Did it kind of influence your decisions too or not? It was you know you're playing on something that's quite popular.

Participant 1: I think it's a smart choice to play on episode because then you reach more young people that are actually into that kind of stuff.

Researcher: All right. So the next question would be after playing the game has it changed your approach on how you will decide about going to uni.

Participant 1: I think I went into the game already with the set idea that I want to go, so it didn't really change my opinion. But I guess if there were characters like me in the game more maybe you would have made a big difference.

Researcher: Okay. How do you think it would have made a difference.

Participant 1: So lets say there was a character from uni that the person knew for example that went to uni and says their experience, maybe I would have had a different approach but it's because all the other characters were my age and they're telling me don't go uni don't go, but I already wanna go

Researcher: Okay. And then after playing the game. Did you learn anything new about the consequences of following friends? So negative peer pressure or negative influence?

Participant 1: Yeah the ending was quite good. The ending was like good in telling you about like peer pressure and consequences of your actions.

Researcher: By the ending do you mean the true story?

Participant 1: The true story, yeah.

Researcher: Okay. And in general would you have any other comments about the game?

Participant 1: I think the only comment I would make is maybe bring in some characters from university.

Researcher: Okay, so people telling you about uni?

Participant 1: Yeah. Like maybe a sister or like a family or something like that. So then you'd have more approaches and more different points of views about university.

Researcher: OK that's a good point. That's fine. And one last question you said you've started applying to uni?

Participant 1: Yeah I have.

Researcher: How did you make your decision?

Participant 1: Well I've always wanted to go to uni. That was my end goal anyways. Its kind of the parents and me thinking about my future anyways. And I don't think friends would have much influence. Maybe if they told me like apprenticeship is better or something I would consider it.

Researcher: And what about parents influence?

Participant 1: Yeah I think parents influence is big. Like if they tell you university is a good option to go to I think you would listen to them.

Researcher: Okay that's perfect. Thank you for taking part. That's the end of this session. Thank you.

Transcribed Interview 2

Researcher: Hi Participant 2, thank you for taking part in my research.

Participant 2: Hi.

Researcher: So you just played the game and I am going to ask you a few questions now in regards to the game. So firstly what choice did you make? Did you say you were going to go...

Participant 2: I made a choice of not going uni.

Researcher: Not going uni, okay. And did you play all the way till the end?

Participant 2: Yes I did.

Researcher: So what happened in the end?

Participant 2:] There was a true story about a guy who didn't go uni and he was happy with his decision of doing apprenticeship.

Researcher: Okay thats good. And did you go back to your options?

Participant 2: No I didn't.

Researcher: Okay so what do you think the overall goal of the game was?

Participant 2: I think the overall goal of the game was to...how to make choice of like going uni or not.

Researcher: Okay, thats fine. Is anything you will do differently after playing the game?

Participant 2: No I will still stick to my decision.

Researcher: Okay. Was there anything you likes or dislikes about the game? Anything in particular?

Participant 2: I think everything was good about the game, its just like there was less options about the avatar like the colour of the eyes.

Researcher: Oh the customizing of the avatar?

Participant 2: Yeah customizing of the avatar.

Researcher: Okay. Alright that's fine. Did you customize your avatar?

Participant 2: Yes a little bit.

Researcher: Okay. Did you take some time customizing?

Participant 2: No I didn't take that long.

Researcher: Okay that's fine. I'm just going to tell you about a few features of the game, if you can just comment on these features, just whatever you felt about these features.

Participant 2: Yeah.

Researcher: So the first one is customizing your avatar. Did It change your perspective of the game?

Participant 2: Yes it did.

Researcher: It did? So imagine if that option wasnt there, would you have answered differently then?

Participant 2: Yes I would have answered differently yeah.

Researcher: Why do you think so?

Participant 2: Because it was like more options, so thats why. So why help me that's fine.

Researcher: And seeing how your avatars future changes with your choices, how did you feel about that?

Participant 2: It felt really real. It felt like it was really real in my case...It actually felt that I was doing it in my real life as in I was in my school and all the characters were like very similar

Researcher: Okay. So you had to make higher education choices related to the decisions you make for your avatar is not it?

Participant 2: Yes.

Researcher: So you just said that they were real, as in you make the similar kind of decision?

Participant 2: Yes, I made a similar kind of decision as well.

Researcher: Okay. Do you think it had any influence with the choices you made. Because you have already made these kind of choices.

Participant 2: Yes it had influenced.

Researcher: Okay thats fine. And then what about the praises you were offered in the game?

Participant 2: I was happy about it because it did encouraged to make my decision stronger.

Researcher: Okay that's fine. And then the statistics presented prompting you to make different choices and stuff.

Participant 2: Yeah the statistics. The teacher was very good looking so it made my decsion even more stronger.

Researcher: Oh okay. Because he was good looking?

Participant 2: He was very good looking.

Researcher: So if he was an ugly character do you think you would have believed him?

Participant 2: Yeah I think it wouldnt change a little bit but yeah. But he did influence me because I find him very attractive.

Researcher: Oh okay! What about the true story presented at the end of the game?

Participant 2: The true story at the end was quite positive as well because that influenced my decision as well because that guy who didn't go uni and he was happy with his apprenticeship, so I think uni is not always the option you can do other things aswell.

Researcher: Okay thats good. And then because you played the game on episode which is already quite popular, did it make you trust the game more?

Participant 2: Yes it did because I have seen that game a lot on social media, they are always advertising this game, so it was really good.

Researcher: So after playing the game has it changed your approach and how you will decide about going or not going into higher education?

Participant 2: Yes it has changed because it showed me things outside the box which show that I can have other options as well about uni.

Researcher: Okay, which part of the game made you feel this way?

Participant 2: The last bit where the true story was described about a guy who didnt go uni and he done his apprenticeship. So it made more positive impact because uni is not always the option, so I am happy with my choice

Researcher: So you think you can go for other choices aswell?

Participant 2: Yeah I can go for other choices yeah.

Researcher: Okay. And then after playing the game did you learn anything new about the consequences of following friends?

Participant 2: Yeah. I could have...umm it was okay, I'm happy with my options. I'm happy with my choice

Researcher: Okay. And any other comments you would like to make about the game?

Participant 2: Yeah the game was pretty good and I really like enjoyed playing the game and the characters were like really similar to my school.

Researcher: Okay that's good. So do you think that's why you liked the game more?

Participant 2: Yeah, that was the reason I liked the game more because I could.. it felt really real.

Researcher: [00:05:46] That's the end of the interview. Thank you for taking part in my research Participant 2.

Participant 2: [00:05:48] Thank you very much.

Researcher: [00:05:48] Thanks

Appendix D.10

Pre and Post Questionnaire Results (Susceptibility to Peer Pressure Score)

		S1	S2	S3	S4	S5	S6	S7	S8	Average
Participant 1	Pre-Score	-2	-3	3	2	1	-3	2	-3	-0.375
	Post-Score	-1	-1	3	2	-1	-1	-1	2	0.25
Participant 2	Pre-Score	-1	0	0	3	2	-1	3	0	0.75
	Post-Score	-1	0	0	1	1	0	2	0	0.375
Participant 3	Pre-Score	1	2	3	-2	1	2	3	-1	1.125
	Post-Score	0	1	3	-1	2	0	0	-1	0.5
Participant 4	Pre-Score	0	-1	0	0	1	0	-1	2	0.125
	Post-Score	0	1	0	0	2	1	2	0	0.75
Participant 5	Pre-Score	1	0	0	1	1	3	1	1	1
	Post-Score	1	0	0	0	1	1	2	0	0.625
Participant 6	Pre-Score	1	0	3	2	-1	1	-1	-1	0.5
	Post-Score	0	0	3	1	-1	0	-2	0	0.125
Participant 7	Pre-Score	-2	-1	0	-1	0	-1	2	-2	-0.625
	Post-Score	-1	-1	0	0	2	0	2	-1	0.125
Participant 8	Pre-Score	1	0	0	2	-1	-1	0	-3	-0.25
	Post-Score	0	0	0	1	-2	0	0	0	-0.125
Participant 9	Pre-Score	-2	1	3	-1	1	-2	-1	3	0.25
	Post-Score	-1	1	3	0	3	-1	-1	2	0.75
Participant 10	Pre-Score	-1	-1	2	1	3	0	1	1	0.75
	Post-Score	-3	-1	2	0	2	1	0	1	0.25
Participant 11	Pre-Score	-1	-1	3	2	1	2	1	2	1.125
	Post-Score	0	-1	3	0	0	1	0	1	0.5
Participant 12	Pre-Score	-2	-1	0	3	-2	1	-2	1	-0.25
	Post-Score	-1	0	0	1	0	0	-3	0	-0.375
Participant 13	Pre-Score	2	-1	3	-1	2	-1	2	-1	0.625
	Post-Score	1	0	3	0	0	0	0	0	0.5
Participant 14	Pre-Score	-1	1	0	2	2	-2	3	-1	0.5
	Post-Score	0	0	0	1	0	-1	2	0	0.25
Participant 15	Pre-Score	2	0	3	-1	1	-1	3	-1	0.75
	Post-Score	0	0	3	0	2	0	2	0	0.875
Participant 16	Pre-Score	1	1	3	0	0	0	1	-2	0.5
	Post-Score	1	0	3	3	-2	-2	0	-1	0.25
Participant 17	Pre-Score	0	1	3	1	2	1	-1	0	0.875
	Post-Score	0	3	3	3	1	0	0	-1	1.125
Participant 18	Pre-Score	0	-1	0	0	2	-2	3	1	0.375
	Post-Score	1	-2	0	2	1	0	1	2	0.625

Participant 19	Pre-Score	2	0	0	1	-2	-1	2	-1	0.125
	Post-Score	1	-1	0	2	0	-1	0	-1	0
Participant 20	Pre-Score	1	1	0	0	2	0	3	0	0.875
	Post-Score	2	1	0	0	1	1	0	0	0.625
Participant 21	Pre-Score	1	0	0	2	-2	-1	2	1	0.375
	Post-Score	0	1	0	2	-1	-1	0	1	0.25

Appendix D.11

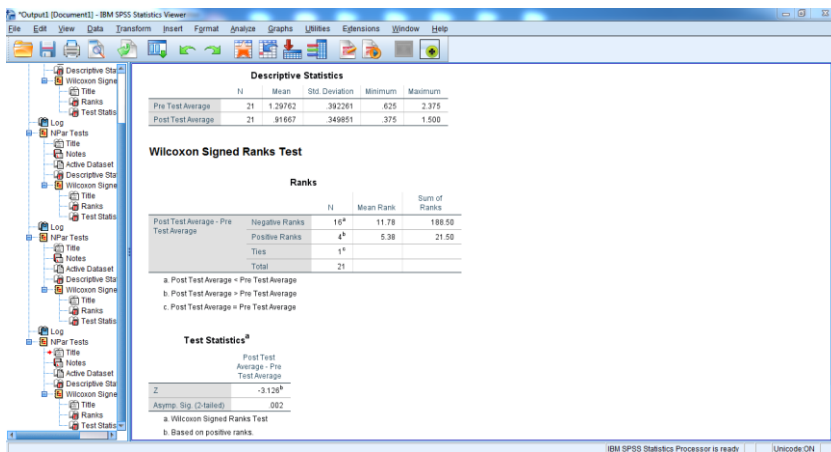
Susceptibility to Peer Pressure Score (Absolute) – Used for Wilcoxon Signed Rank Test

		S1	S2	S3	S4	S5	S6	S7	S8	Average
Participant 1	Pre-Score	2	3	3	2	1	3	2	3	2.375
	Post-Score	1	1	3	2	1	1	1	2	1.5
Participant 2	Pre-Score	1	0	0	3	2	1	3	0	1.25
	Post-Score	1	0	0	1	1	0	2	0	0.625
Participant 3	Pre-Score	1	2	3	2	1	2	3	1	1.875
	Post-Score	0	1	3	1	2	0	0	1	1
Participant 4	Pre-Score	0	1	0	0	1	0	1	2	0.625
	Post-Score	0	1	0	0	2	1	2	0	0.75
Participant 5	Pre-Score	1	0	0	1	1	3	1	1	1
	Post-Score	1	0	0	0	1	1	2	0	0.625
Participant 6	Pre-Score	1	0	3	2	1	1	1	1	1.25
	Post-Score	0	0	3	1	1	0	2	0	0.875
Participant 7	Pre-Score	2	1	0	1	0	1	2	2	1.125
	Post-Score	1	1	0	0	2	0	2	1	0.875
Participant 8	Pre-Score	1	0	0	2	1	1	0	3	1
	Post-Score	0	0	0	1	2	0	0	0	0.375
Participant 9	Pre-Score	2	1	3	1	1	2	1	3	1.75
	Post-Score	1	1	3	0	3	1	1	2	1.5
Participant 10	Pre-Score	1	1	2	1	3	0	1	1	1.25
	Post-Score	3	1	2	0	2	1	0	0	1.125
Participant 11	Pre-Score	1	1	3	2	1	2	1	2	1.625
	Post-Score	0	1	3	0	0	1	0	1	0.75
Participant 12	Pre-Score	0	1	0	3	2	1	2	0	1.125
	Post-Score	1	0	3	1	0	0	3	2	1.25
Participant 13	Pre-Score	2	1	3	1	2	1	2	1	1.625
	Post-Score	1	0	3	0	0	0	0	0	0.5
Participant 14	Pre-Score	1	1	0	2	2	2	3	1	1.5

	Post-Score	0	0	0	1	0	1	2	0	0.5
Participant 15	Pre-Score	2	0	3	1	1	1	3	1	1.5
	Post-Score	0	0	3	0	2	0	2	0	0.875
Participant 16	Pre-Score	1	1	3	0	0	0	1	2	1
	Post-Score	1	0	3	3	2	2	0	1	1.5
Participant 17	Pre-Score	0	1	3	1	2	1	1	0	1.125
	Post-Score	0	3	3	3	1	0	0	1	1.375
Participant 18	Pre-Score	0	1	0	0	2	2	3	1	1.125
	Post-Score	1	2	0	2	1	0	1	2	1.125
Participant 19	Pre-Score	2	0	0	1	2	1	2	1	1.125
	Post-Score	1	1	0	2	0	1	0	1	0.75
Participant 20	Pre-Score	1	1	0	0	2	0	3	0	0.875
	Post-Score	2	1	0	0	1	1	0	0	0.625
Participant 21	Pre-Score	1	0	0	2	2	1	2	1	1.125
	Post-Score	0	1	0	2	1	1	0	1	0.75

Appendix D.12

Wilcoxon Signed Rank Test Results (SPSS Screenshot)



Appendix E: Persuasive Technologies in other Domains

Appendix E.1: Application of Persuasive Technology - Healthcare

Application	Type of Technology	Fogg Behaviour Grid	Fogg Behaviour Model	Design Principles
1. College smoking-cessation using cell phone text messaging.	- Mobile Technology: Instant messaging. - Web Technology: Website.	 BLACK PATH Stop behavior from now on Users are motivated to quit smoking.	<i>Spark</i> as Trigger - To increase motivation of users to quit smoking, '<i>Spark</i>' as a Trigger is designed in the form of texts. - Motivator #2: <i>Hope</i>. The modules offered to users give them the anticipation of something good happening.	<i>Tunnelling</i> – the program guides users through the process of quitting. <i>Tailoring</i> – the text messages are tailored according to every individual needs. <i>Personalisation</i>- the assessment tools offers personalised content to users, such as modules and feedback. <i>Self-Monitoring</i> – the website allows users to track how many cigarettes they have smoked. <i>Suggestions</i>- the website provides modules to users on topics such as withdrawals. <i>Simulation</i> – the website allows users to view a graph comparing how many cigarettes they have had since they started the program.
2. Computer tailored physical activity and dietary counselling	Web Technology.	 PURPLE PATH Increase behavior from now on Users are motivated to eat healthier and carry out physical activities from now on.	<i>Facilitator</i> as Trigger - the interactive content and personalised text (as part of the counselling) is to trigger the behaviour of the users (to eat healthy and carry out physical activity) and making the behaviour easy to do, by giving suggestions. <i>Physical Effort (Ability)</i> – the computerised counselling allows user to seek advice from the comfort of their home. They do not need to travel to go seek for help/advice.	<i>Reduction</i> – computer tailored counselling reduces the effort users expend, as they do not have to physically travel and find the right counsellor for them. This may aid in increasing the behaviour, as they will be motivated to eat healthier. <i>Tunnelling</i> - the counselling offered guide's users to carry out the intended behaviour of eating healthy and carrying out physical activities. <i>Tailoring and Personalisation</i> – the counselling offered to each user is tailored and personalised to their potential needs, interests and personalities and resources available. <i>Suggestion</i> – suggestions for better eating options and what activities could be carried out are given to the user

3. 'Chick Clique' application combined with pedometer belt.	• Interactive Device • Wearable Technology - Belt	 GREEN PATH Do new behavior from now on Teenage girls are encouraged to work together with their group of friends to exercise.	• Motivator #3: <i>Social Acceptance</i>. Every member of the group will feel the need to exercise more so that they feel a sense of belonging within their friends, especially in the case of reaching individual and group goals. She would not want to let the group down (during group activities). • <i>Signal as Trigger</i> – messages are sent to the groups at the right time to help remind them of any milestones they haven't reached so that the girls are motivated to exercise. • <i>Just-in-Time</i> – Messages are sent to the girls reminding them who out of the group has not been exercising, and is letting the whole group down. Messages of praise and reminders and also sent that act as a signal to motivate the girls to exercise. • <i>Personalisation</i> – The application gives feedback, suggestions and comments that is personalised to every friends group. • <i>Self-monitoring</i> – Each group member can track how the amount of steps taken together as a group, and also individually. This allows every member to be able to compare their steps to their friends. • <i>Praise</i> – the mobile application aims to motivate teenagers to exercise by sending automated text-messages for reaching individual goals. • <i>Reminders</i> – Automated messages are sent to the groups reminding them of the goals they need to reach. • <i>Social Comparison</i> – the application allows each friend to view the number of steps taken by their friends within the group, allowing her to make comparisons. • <i>Normative Influence</i> – the application allows friend to create a group so that they can all reach a goal together. this way friend who have the same goal (of exercising more) will carry out the behaviour together, leveraging normative influence and increasing the chance of them performing the behaviour, • <i>Competition</i> – the application offers goals to the teenagers which they have to achieve, both individually and as a group. • <i>Similarity</i> – Slang names, such as 'slacker', are used in the application which motivates teenagers to exercise.

4. FireFly toothbrush.	• Tangible technology - toothbrush with bright LED light that flashes for 60 seconds.	 BLUE PATH Maintain behavior from now on Children are persuaded to brush longer to improve their oral health.	• <i>Spark</i> as Trigger – the LED light is used to increase the motivation of the children to brush their teeth for longer. The LED light is a spark designed to reflect a motivational element for the children. • <i>Non-Routine Ability</i> – as children are persuaded to brush for a longer period of time, as they grow older this behaviour of theirs will be undertaken as a routine action. Within a span of time this behaviour of brushing teeth will be looked upon as an everyday routine act.	• <i>Tailoring</i> – the LED light acts as a spark, an element that is eye catching and fascinating for children. This technique may not be necessary work for adults. • <i>Self-monitoring</i> – the child and/or the parent of the child is able to monitor whether he/she has brushed their teeth for 60 seconds (1minute).
5. 'Houston' mobile application for sharing step count with friends.	• Mobile Technology- Application • Wearable Technology- Pedometer is worn as a wristband.	 PURPLE PATH Increase behavior from now on Users are encouraged to increase the number of steps they take each day to stay active and fight obesity.	• Motivator #3: <i>Social Acceptance</i>. Users are aware that any one of their buddies can see their progress in terms of reaching their goal. Their buddies can also request their step count. This peer pressure motivates the user to take more steps and be more active. Buddies can also comment on the users' progress. • <i>Spark</i> as Trigger – Users can view comments written by buddies about their progress, these comments may develop a motivational element within them.	• <i>Reduction</i> – Houston calculates every individuals average step count for the week in order to set goals for the future. This reduces the effort of the user to work out how many steps they need to take to be able to stay active. • <i>Tunnelling</i> – the goals set automatically per individual allows the application to guide the user with how many steps they need to take to be able to carry out the target behaviour – stay active. • <i>Tailoring</i>- Houston calculates the average step count that an individual takes in order to set a goal for the future. • <i>Self-monitoring</i>- users are able to view a history of their step count and make comparisons, either with their past step count, or with buddies. • <i>Praise</i> – if a user reaches his goal, an automated message is sent to the user praising them for their achievement. Buddies are also notified about the achievement. • <i>Social learning</i> – A shared application allows users to view their buddies progress. • <i>Social comparison</i> – users can share, request and compare their step count and goal achievement with their buddies. • <i>Social facilitation</i> – users of Houston are able to view their buddies progress and comments. This makes them confident that there are other user who are performing the same behaviour along with them, they are not alone.

				• <i>Recognition</i> – the application sends a notification to all buddies if a user achieves their goal.
6. Withings Wi-Fi enabled scale along with Health Mate app.	• Tangible technology: Weighing scale • Mobile Technology: Application.	 GREEN SPAN Do behavior for a period of time The app works along with the weighing scale to set weight goals and weekly targets for the user to achieve.	• <i>Signal</i> as Trigger – relevant tips and reminders are sent to the user to keep them focused. • Motivator #2: <i>Hope</i>. Users are given the impression that they are being trained by a coach who is guiding them so that they achieve their weight goal. It gives them a hope, an anticipation that something good is happening.	• <i>Reduction</i> – Health Mate app will break down the set weight goals into weekly targets that are achievable. It reduces the effort of the user to calculate/set their targets themselves. • <i>Tunnelling</i> – the weekly targets and reminders and tips help guide the user so that he stays focused to achieving his goal. • <i>Tailoring</i>- Health Mate app calculates and sets individual goals based on their current weight and goal. • <i>Personalisation</i> – Reminders and tips are sent to users to help them achieved their goal. • <i>Self-monitoring</i>- users are able to track and view their history and progress. • <i>Praise</i> – if a user achieves his weekly target, an automated message is sent to the user praising them for their achievement. • <i>Reminders</i> – messages are sent to users to remind them about their weekly target and also to give any tips to help them achieve their target. • <i>Social Role</i> – the application plays the role of a coach. Thus the tips, reminders and motivation sent to the user via messages are written in a similar style to how a coach would speak to his/her student in real life. • <i>Recognition</i> – users can share their progress with friends via Facebook and twitter.

Appendix E.2: Application of Persuasive Technology - Environment

Application	Type of Technology	Fogg Behaviour Grid	Fogg Behaviour Model	Design Principles
1. OPOWER, promoting energy efficiency.	Interactive Device – Bill can be viewed online via mobile phone or laptop/PC.	 BLACK PATH Stop behavior from now on Users are motivated to stop consuming as much energy as they do, promoting reduced energy consumption.	- Motivator #3: <i>Social Acceptance/Reject</i>. As all the neighbours are able to view a user's energy consumption, this public display will make the users feel they need to consume less in order to be socially accepted. They will try get a 'smiley face' so that they are recognised amongst the neighbours for being energy efficient. <i>Non-Routine Ability</i> – as users are persuaded to consume less energy so that they are socially accepted, with time this habit of theirs will become a routine behaviour. The users will no longer feel the need to consume the extra energy (like how they were before implementing OPOWER).	<i>Recognition/ Praise</i> – the user with the least energy consumption out of their neighbours receives a 'Smiley Face' near their name on the bill. <i>Social comparison</i> – all neighbours are able to view and compare their energy consumption level with their neighbours. <i>Social Facilitation</i> – houses within the neighbourhood are more likely to consume less energy when they know that their neighbours are performing the same behaviour along with them,
2. Hybrid car displays	Display technology: Cars dashboard screen	 GREEN PATH Do new behavior from now on Drivers are persuaded to change the way how they drive,	<i>Signal as Trigger</i> – The dashboard display give people information on how to improve their gas mileage at exactly the moment when they are empowered to do something about it: while driving. - Motivator #1: <i>Pleasure/Pain</i>. Ford Fusion causes a digital plant to live or die based on the person driving efficiency. This display of a living thing (plant) on the dashboard screen gives a sensation to the driver, allowing him/her to feel pleasure when the plant lives or pain when it dies	<i>Tailoring</i> – a person's driving efficiency is displayed on the cars dashboard screen at that moment in time. <i>Simulation</i> – Ford Fusion allows the driver to observe the link between his driving efficiency and the environment. He can straightway see what the effect will be on a plant (live or die) due to his driving style (cause). <i>Suggestion</i> – the dashboard displays give people information on how to improve their gas mileage at exactly the moment when they are empowered to do something about it: while driving. The driver will be able to perform the behaviour as it will be simpler for him to perform. The current energy consumption display is a well-timed

		so that it is efficient.	as they feel responsible of the plants state. • <i>Non-Routine Ability</i> – drivers are given suggestions on how to improve their gas mileage to drive efficiently. As the person would not drive in such a way normally, the suggestion will act as a motivate making the behaviour simpler for the driver to perform.	decision point for the driver, suggesting the driver how to improve their gas mileage at that point. • <i>Just-in-time Messaging</i> – drivers are displayed with their current driving efficiency at the exact time when they have the power to control it, i.e. drive more efficiently.
3. 'I am Green' Facebook app	• Social networking site: Facebook	 BLUE PATH Maintain behavior from now on Users are encouraged to practice green behaviour.	• Motivator #3: <i>Social Acceptance/Reject</i>. As you earn a leaf for every green behaviour that you do, your friends on Facebook can see how many leaves you have received, in other words, how much you care for the environment. This public display will put some peer pressure on the users, he/she will do his best to feel a sense of belonging within his friends circle. • <i>Spark as Trigger</i> – messages like '4 of your friends recycle' are sent to the users which raise a motivational element within the user so that he follows what his friends do.	• <i>Self-monitoring</i> – the users is able to view how many leaves he/she has achieved and for what green behaviour too. • <i>Praise and Recognition</i> – users are awarded with a leaf with every green behaviour that they do. This shows other application users how eco-friendly you are. A popular behaviour will also be advertised to all application users. • <i>Reminders</i> – I am Green application sends messages to the user reminding and keeping them up to date about their friends behaviour. E.g. '4 of your friends recycle'. • <i>Social Learning</i> – the user can observe the behaviour of their friends who are using the application too. • <i>Social Comparison</i> – the user is able to compare how many leaves he/she has with their friends. This will signify who out of the two is more eco-friendly. • <i>Social Facilitation</i> – as the user is able to view what green behaviour their friends are doing, the user is also more likely to perform the behaviour along with them. Messages like '4 of your friends recycle' will persuade the user to recycle too. • <i>Virtual Environment</i> – the users receives a virtual leaf in the application which represent a green behaviour they performed in real life.

4. Dormitory Energy Competition at Oberlin College	Interactive Device Display	 The participants were required to reduce energy consumption for a period of time.	<i>Signal as Trigger</i> – one of the dorm users had access to view their current energy consumption on an interactive display in the lobby of the building. This display acts as trigger reminded them and kept them up to date of their current consumption and that they were in a competition.	<i>Reduction</i> – the interactive displays in the lobby made it easier for the users to view their energy consumption. This display also acted as a reminder that they were in a competition, persuading the users to carry out the behaviour (reducing energy consumption) more often. <i>Self-monitoring</i> – the interactive displays allowed users to monitor their energy consumption level at any point during the competition. <i>Rewards</i> – the dormitory that used the least energy during the competing was claimed the winner and won a prize. <i>Reminder</i> – the interactive display was set in the lobby of the building, this is a place where every individual will pass through when they enter the building. This positioning of the interactive device was set so that it act as a reminder, so that whenever the user saw the display they would remember that they are in a competition and they need to consume less energy.

Appendix E.3: Application of Persuasive Technology – Safety and Security

Application	Type of Technology	Fogg Behaviour Grid	Fogg Behaviour Model	Design Principles
1. SMART, persuading drivers to reduce their speeds.	Display Technology: Trailer with an LED display	 Drivers are persuaded to decrease their behaviour of over speeding from now on.	<i>Signal as Trigger</i> – The LED display on the trailer give drivers an alert about their driving speed at exactly the moment when they are empowered to do something about it: while driving.	<i>Just-in-time Messaging</i> – drivers are displayed with their current driving speed at the exact time when they have the power to control it, they can reduce their speed straight away. <i>Suggestion</i> – the current speed limit and alert is a well-timed decision point for the driver, suggesting the driver to slow down.

Appendix E.4: Application of Persuasive Technology – Sales and Marketing

Application	Type of Technology	Fogg Behaviour Grid	Fogg Behaviour Model	Design Principles
1. Amazon.com – one click shopping	Website	 PURPLE PATH Increase behavior from now on Shoppers are persuaded to come back and shop more from Amazon.	• <i>Brain Cycle Ability</i> – the one click strategy is aimed to make the task of making an online purchase simpler for the Amazon shopper. It makes the target behaviour (of purchasing) easier to do perform as the user does not have to think hard in performing it.	• <i>Reduction</i> – the complex behaviour is simplified with this strategy of one click shopping, and so it reduces the effort put by the user to perform the behaviour. • <i>Personalisation</i> – the shoppers card details, address etc. are already stored (from their previous shopping history), the shopper does not have to enter his details again. The process of purchasing is simplified. • <i>Suggestion</i> – shoppers are presented with items that are similar to what they are purchasing, to persuade him/her to buy more.
2. Onsale.com- Virtual bidding site.	Website	 GREEN DOT Do a new behavior one time The objective is to get people to register and make a purchase.	• <i>Spark as Trigger</i> – The users are motivated to make a bidding as it is treated as a game. Persuading users with the fantastic value and bargains they can get are the key elements.	• <i>Reduction</i> – all live auction updates are presented to the user. • <i>Tunnelling</i> – the website presents tailored content to the user according to his/hers likes and interests. • <i>Personalisation</i> – the user registers with the website. • <i>Virtual World</i> – the website offers a virtual auction space for the user to try. • <i>Recognition</i> – user who buys is treated like a winner. • <i>Liking</i> – the website has proved to use technology to give users an enhanced experience.

Appendix E.5: Application of Persuasive Technology – Education

Application	Type of Technology	Fogg Behaviour Grid	Fogg Behaviour Model	Design Principles
1. MASNSLE Project	Social Media – Social networking and blogs	 GREEN SPAN <i>Do behavior for a period of time</i> The project works for as long as the student goes to university.	Ability – Non Routine – This project allows students to search for researches so that they are more used to and build their ‘research’ skills.	Social Facilitation – students are more likely to participate and comment on researches if their peers are doing so.
2. Professor Fluffy’s Primary roadshow	Web Technology - Interactive Website	 GREEN DOT <i>Do a new behavior one time</i> The objective of this website is to get people to children to see what university life will be like	Trigger – Spark Children are shown motivational videos which give them hope and an inspiration to go to university.	Similarity – Professor Fluffy is a well-known character amongst the children.

3. ELP Project	Web Technology - E-portfolio (Pebblepad) – students are encouraged to think about university and reflect their skills and abilities	 GREEN SPAN <i>Do behavior for a period of time</i> The project works for as long as the student goes to university.	• Motivator – Hope Students are given hope and are told that they can enter HE with the skills and abilities they have currently. • Ability – Non Routine – This project allows students to search for universities and think about whether they wish to enter them.	• Social Facilitation – students are more likely to participate if they discern via the e-portfolio that their friends and peers are also using an e-portfolio to understand the skills they possess.
4. File-Pass Project	Web Technology - E-portfolio (Pebblepad) – students are encouraged to blog and write down their thoughts to help their understanding	 GREEN SPAN <i>Do behavior for a period of time</i> The project works for as long as the student goes to university.	• Motivator – Hope Students are given hope and are told that they can enter HE with the skills and abilities they have currently. • Ability – Non Routine – This project allows students to search for universities and think about whether they wish to enter them.	• Social Facilitation – students are more likely to participate if they discern via the e-portfolio that their friends and peers are also using e-portfolios to understand the skills they possess.
5. L\$All Project	Web Technology - Web based portal- students developed a timeline to help them look into the future	 GREEN SPAN <i>Do behavior for a period of time</i> Students do this for a limited time, until they are sure of what they want to do for their future	• Motivator – Hope Students are given hope that they can still achieve what they want to for their future. They can see which options to take if they want to reach a certain goal.	• Social Facilitation – students are more likely to participate if they discern via the timeline that their friends and peers are also using timelines to think of their future. • Tailoring – A mentor/teacher provides information and guidance to the student that is tailored to his/her potential needs and interests.

6. Realising Opportunities (RO) Project	Web Technology - E-mentor	 GREEN SPAN <i>Do behavior for a period of time</i> Students take guidance from the e-mentor until they have decided what their future career plan is	• Trigger – Facilitator The e-mentor acts as a facilitator who motivates students and shows them hope that they can achieve their goals by following a certain path.	• Tailoring – the e-mentor provides information and guidance to the student that is tailored to his/her potential needs and interests.

