



## City Research Online

### City, University of London Institutional Repository

---

**Citation:** Surgenor, D., Hollywood, L., Furey, S., Lavelle, F., McGowan, L., Spence, M., Raats, M., McCloat, A., Mooney, E., Caraher, M. & et al (2017). The impact of video technology on learning: A cooking skills experiment. *Appetite*, 114, pp. 306-312. doi: 10.1016/j.appet.2017.03.037

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

---

**Permanent repository link:** <https://openaccess.city.ac.uk/id/eprint/17312/>

**Link to published version:** <https://doi.org/10.1016/j.appet.2017.03.037>

**Copyright:** City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

**Reuse:** Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.



**Title: The impact of video technology on cooking skills**

**Authors:** Dawn Surgenor<sup>a</sup>, Lynsey Hollywood<sup>b</sup>, Sinéad Furey<sup>c</sup>, Fiona Lavelle<sup>d</sup>, Laura McGowan<sup>e</sup>, Michelle Spence<sup>f</sup>, Monique Raats<sup>g</sup>, Amanda McCloat<sup>h</sup>, Elaine Mooney<sup>i</sup>, Martin Caraher<sup>j</sup> and Moira Dean<sup>k</sup>.

<sup>a,b,c</sup>School of Hospitality & Tourism Management, Ulster University (Coleraine campus), BT52 1SA, United Kingdom.

<sup>d,e,f,k</sup>Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, UK.

<sup>g</sup>Food, Consumer Behaviour and Health Research Centre, School of Psychology, University of Surrey, UK.

<sup>h,i</sup> Home Economics Department, St. Angela's College, Sligo, Ireland

<sup>j</sup>Department of Sociology, School of Arts and Social Sciences, City University London, UK

**Email addresses:** Dawn Surgeoner ([d.mcdowell@ulster.ac.uk](mailto:d.mcdowell@ulster.ac.uk)); Lynsey Hollywood ([l.hollywood@ulster.ac.uk](mailto:l.hollywood@ulster.ac.uk)); Sinéad Furey ([ms.furey@ulster.ac.uk](mailto:ms.furey@ulster.ac.uk)); Laura McGowan ([laura.mcgowan@qub.ac.uk](mailto:laura.mcgowan@qub.ac.uk)); Michelle Spence ([m.s.spence@qub.ac.uk](mailto:m.s.spence@qub.ac.uk)); Fiona Lavelle ([flavelle01@qub.ac.uk](mailto:flavelle01@qub.ac.uk)); Monique Raats ([m.raats@surrey.ac.uk](mailto:m.raats@surrey.ac.uk)); Amanda McCloat ([amccloat@stangelas.nuigalway.ie](mailto:amccloat@stangelas.nuigalway.ie)); Elaine Mooney ([emooney@stangelas.nuigalway.ie](mailto:emooney@stangelas.nuigalway.ie)); Martin Caraher ([M.caraher@city.ac.uk](mailto:M.caraher@city.ac.uk)) and Moira Dean ([moira.dean@qub.ac.uk](mailto:moira.dean@qub.ac.uk)).

22 Author Note: Correspondence concerning this article should be addressed to Dawn Surgenor,  
23 Ulster University Business School, Department of Hospitality and Tourism Management,  
24 Coleraine, County Londonderry, BT52 1SA.

25 Contact: [mcdowell-d10@email.ulster.ac.uk](mailto:mcdowell-d10@email.ulster.ac.uk)

26

27

28

29

30

31

32

33

34

35

36

37

## **Abstract**

With the decrease of cooking from scratch in the domestic setting and the increasing use of broadcasting technologies to promote cooking, this study seeks to examine the role of video technology in assisting the cooking process in the home. The study explored the views of 141 female participants on their perceptions of video technology as assisting the cooking specific food and recipes. Participants took part in a cooking experiment to assess the most effective methods of learning for low-skilled cooks across four experimental conditions (recipe card only; recipe card plus video demonstration; recipe card plus video demonstration segments, conducted in stages; and recipe card plus video demonstration 'free access video demonstrations'). Focus group discussion followed immediately after the cooking task wherein participants reflected on their use of video technology to assist the cooking process. Findings revealed that video technology promoted the cooking process in the following ways: (1) visualisation of the cooking process; (2) reassurance during the process; (3) replication; of the process (4) flexibility to work at your own pace; and (5) selective access to the video where required. Key learnings across all four conditions identified that individuals perceived video technology to be most effective when: (1) experiencing a new cooking skill and (2) reinforcing a more advanced technical skill. These findings display the potential for video technology to enhance cooking skills among low-skilled individuals wishing to cook a meal from scratch using fresh ingredients.

## **Key Words**

Cooking skills, cooking confidence, technology, mobile digital technology, video, cooking demonstration.



## **1.0 Introduction**

Research indicates that video's facility to listen repeatedly to information is likely to be a mediating factor in reinforcing learning through increased motivation and engagement (McKinney et al., 2009). Video provides individuals with the opportunity to control the speed and the pace of information being presented, allowing them to process the content more effectively, before more information is presented and lost (Walls et al., 2009). Although there has been extensive research around technology and skills development, to date there are few studies on the impact of video technology on cooking skills development and engagement in the domestic environment .

## **1.2 Societal Changes in Domestic Cooking**

Convenience has emerged as a key factor in consumer food choice, and many social and environmental factors have contributed to a decline in time spent in the kitchen (Jackson and Viehoff, 2016, Pula et al., 2014, Caraher and Lang, 1999) Industrialisation, urbanisation, commercialisation and social change have converted the social and economic landscape globally and in the UK where financial and lifestyle changes have resulted in changing eating patterns (Utter et al., 2016). There is evidence of a changes in traditional eating habits, a greater availability of high energy, ready-made convenience foods, and eating outside the home more often, with resulting over consumption (Jackson and Viehoff, 2016). Correspondingly/concomitantly there has been an escalation of consumer spending in the convenience food sector correlating with a lack of cooking skills (Mintel, 2010; Mintel, 2016; Jabs and Devine, 2006), where lower end-cost, pre-packaged convenience meals are generally energy-dense, high in fat and salt and low in micronutrients and fibre which inevitably contribute to dietary inequalities and ill-health. In recent decades the focus of

policy makers and health promotion professionals has been the conservation of domestic cooking skills through health campaigns to promote awareness and the facilitation of community cooking interventions to develop knowledge and skills albeit without an adequate or robust evidence base to support such initiatives (Reiks et al., 2014; Rees et al., 2012). Cooking skills interventions have become a popular tactic used to improve diet quality among the general population. In addition, policy debate has promoted the merits of cooking skills interventions to deliver wider public health policy solutions (Garcia et al., 2014; Condrasky and Helger, 2010). However, upon a review of the literature to date on cooking skills interventions, few studies have incorporated the use of digital technologies to support the development of individual cooking skills.

## **2.2 The Use of Digital Technology in Promoting Domestic Cooking Skills**

Research into the effectiveness of video in enhancing learning has revealed wide ranging benefits in terms of cost as well as meeting the learning requirements of the digital native (Prensky, 2010). Prensky (2010) contends that digital natives are used to receiving information at speed, preferring to parallel and multi-task, therefore the flexibility of video using portable devices may offer more efficient learning (Lim, 2005). Indeed there has been an increased emphasis on the use of digital technology to promote skills development through use of video across social media platforms and smart phone Apps (Comiskey, 2010; Whatley and Ahmed, 2007). Videoed cooking demonstrations and those presented on television, have tended to facilitate the full process, step by step, and often with some spoken information on for example the sourcing of fresh local ingredients or nutritional facts concerning the dish being created. Current thinking however suggests that as educators, it is necessary not to simply replicate steps and stages of a process but to consider the needs and learning



requirements of the audience in order to fully engage and motivate them. Therefore it is necessary to consider what environmental changes must be introduced to best meet the needs of the intended target audience. Watson (2006) states;

*"We spend a lot of time trying to change people. The thing to do is to change the environment and people will change themselves"*  
(Watson, 2006 p24).

For most individuals, the digital device itself, for example, a smart phone or tablet, is close at hand with rapid internet access; and as more people choose portable devices to access this, the way in which they acquire their information has and continues to change (Ericsson, 2010). Several studies have utilised small screens, such as iPods (Kellems & Morningstar, 2012; Rayner, 2011; Murray and Olcese, 2011) and handheld computers (Cihak, Kessler, and Alberto, 2008) as electronic prompting devices. Regardless of the differences in tasks and materials, video in these studies has been found to be effective in developing a range of skills. Few studies to date have specifically addressed the use of video technology to improve cooking skills.

### **2.3 How Digital Technology Impacts on Learning**

Wishart (2016) contends that visualisation is especially relevant in understanding key concepts, and the visual nature and audible content of video serves as a substantial learning tool. Indeed according to Mayer's (2001) cognitive theory of digital learning, an individual's information processing system is separated by cognitive channels to differentiate visual and auditory stimuli. Learning is accessed by integrating the information from these separate channels suggesting that learners can process only a limited amount of information at any given time. This is highlighted

through empirical research, which found that if a large amount of visual and verbal stimuli are offered simultaneously, the learner experiences cognitive overload and cannot reach maximum understanding of the content (Mayer, 2001). However, because video offers the functions of repeated access and control of the speed and pace of the verbal and visual stimuli offered, cognitive overload is decreased. Therefore, using video technology to teach cooking skills has the potential to improve learning, engage individuals in the cooking process and have a positive influence on diet quality. The aim of this study is to gain greater understanding of individuals' perceptions of using digital technology, specifically video technology, to assist the cooking process.

### **3.0 Research Context: Cooking Skills**

The data presented in this paper is part of a larger study addressing the impact of cooking and skills and the role of technology in the promotion of cooking and their influence on the healthiness of diets in adults aged 20-60 years. Quantitative data was collected via a nationally representative consumer survey to measure cooking and food skills on the IOI and investigate their relationship with socio-demographic and psychological factors. Qualitative techniques (interviews, experiment and focus groups) explored individual behaviours and use of cooking skills. The data reported here is part of larger study involved a mixed methods approach using qualitative and quantitative techniques on the island of Ireland. This paper presents the qualitative findings of the focus groups which followed the cooking experiment.

### **3.1 Sample**

One hundred and sixty participants were recruited to take part in the cooking experiment [40 participants x four experimental conditions]. All were selected using specific recruitment

criteria: (a) female; (b) cook for a family; and (c) consider themselves as low-ability cooks. The final sample consisted of 141 participants across 16 focus groups. A total of 21 participants withdrew from the study for various reasons (e.g. unexpected commitments, non-attendance and illness). The sample size of each experimental condition is described as follows: condition one (n=34); condition two (n=33); condition 3 (n=35) and; condition 4 (n=39).

### **3.2 Methodology**

To explore individual perceptions of video technology on cooking skills, a cooking experiment followed by a focus group discussion was used. Within the experiment participants were asked to prepare a lasagne using fresh ingredients, and were categorised into four experimental conditions. Condition 1 (control group) involved use of a recipe card only. Condition 2 permitted participants to watch a video demonstration of the cooking process in advance (plus use of a recipe card). Condition 3 included video segments of the cooking demonstration, where the full demonstration was divided into steps (plus use of a recipe card). Participants were asked to watch each video segment then enact it, before moving onto the next step. Lastly, Condition 4 involved unrestricted access to the video (plus use of a recipe card) where participants could access the video as and when required. This paper will focus specifically on the results of the focus group discussion wherein participants reflected on their use and perceptions of the video technology used in the experiment. Each focus group discussion was based on the appropriate experimental condition therefore only one experimental condition was discussed in any given focus group.

### **3.2 Procedure**

Data were collected in 16 focus groups facilitated at Ulster University, Coleraine and St. Angela's College, Sligo and facilitated by an experienced moderator (DS). Each focus group began with an ice-breaker activity requesting participants to introduce themselves and state how often they cooked from scratch. The moderator then provided instruction on ground rules of the focus group discussion (e.g. not talking over each other, the importance of confidentiality) before proceeding to a series of guided open-ended topics. Results from the literature review and data from an earlier round of interviews from the larger study informed the development of the focus group topic guide (Table 1). Each focus group was conducted immediately after the cooking experiment, lasted between 50 and 65 minutes and was audio recorded. An assistant moderator (FL) was also present to take notes to help focus the discussion. At the end of each focus group, participants were thanked and an honorarium of £60 (60 Euros) was paid and a free copy of a *safe*food cookbook given to each participant for their time and to remunerate the travel costs of study participation.

**Table 1 Outline of the focus group topic guide**

Topic	Description	Aids/Activities	Duration
Introduction	<ul style="list-style-type: none"> <li>Facilitator introduction</li> <li>Boundaries of the focus group and contracting including recording consent</li> </ul>		5 minutes
Confidence Levels	<ul style="list-style-type: none"> <li>What was your perceived confidence ability in cooking lasagne from scratch prior to the task?</li> <li>Has this confidence changed as a result of the experiment?</li> </ul>	Participants may use pre survey and post self-evaluation sheets	5 minutes
Evaluation of dish	<ul style="list-style-type: none"> <li>Individual perception of taste and appearance of the finished dish - How does it taste?</li> <li>Comparisons with group participants' dishes?</li> <li>Is this what was expected in terms of ability and taste of the finished dish?</li> </ul>	Check dishes in oven and serve Taste testing Participant taste testing evaluation sheet.	20 minutes
Barriers/Facilita	<ul style="list-style-type: none"> <li>How challenging did you find the</li> </ul>	Demonstration	10 minutes

tors to cooking from scratch	<p>task? What were the most/least challenging aspects of the task?</p> <ul style="list-style-type: none"> <li>• What would encourage/discourage you to cook using fresh ingredients at home?</li> <li>• What additional barriers do you consider prevent you from cooking this or a similar dish in the home environment?</li> </ul>	of portion costing card	
Identification of skills used	<ul style="list-style-type: none"> <li>• What skills can you identify in cooking lasagne?</li> <li>• Do you consider these skills achievable in your home?</li> <li>• Which skills did you consider most challenging?</li> <li>• Would you practise these to enable you to cook this or a similar dish at home?</li> </ul>		5 minutes
Use of technology	<ul style="list-style-type: none"> <li>• Do you have home access to the internet?</li> <li>• Do you use the internet to assist with learning practical skills?</li> <li>• Can you think of an example?</li> <li>• Group 1 – Do you consider the task as more/less challenging because of lack of visual demonstration?</li> <li>• Groups 2-4 – How do you consider technology to have assisted/hindered learning?</li> <li>• Groups 2-4 – Are there aspects of this form of learning which you consider particularly useful?</li> <li>• Would you consider using technology to assist with home cooking?</li> <li>• What part do you consider technology can play in promoting cooking from scratch in your own homes?</li> </ul>		10 minutes
Transferability of skills/learning to the home setting	<ul style="list-style-type: none"> <li>• Considering the skills you identified earlier - Can you think of other meals where you might incorporate skills developed today, or different ingredients for example you may like to change or incorporate ingredients to make the dish healthier or more preferable for the family's taste?</li> </ul>		5 minutes
Summary and ending	<ul style="list-style-type: none"> <li>• What would you do differently next time?</li> </ul>		

199

### 200 **3.3 Analysis**

201 All discussions were digitally recorded, professionally transcribed and uploaded to the  
202 qualitative analysis software Nvivo 10 (QSR International Pty Ltd, Victoria, Australia). An  
203 inductive coding approach was used to identify a comprehensive set of evolving codes to: (1)  
204 summarise the raw data and (2) establish links between the research aim and the raw data.  
205 Using a sample of two transcripts initial codes were generated independently by two  
206 researchers (DS and LH) and discussed in a process of triangulation for the purposes of  
207 developing a codebook to be applied to the remainder of the data. To ensure inter-coder  
208 reliability, a further three transcripts were coded and agreed. Codes were then grouped  
209 together to form potential themes in relation to the aim of the study. Verbatim quotes are  
210 displayed with the day, focus group number, experimental condition and the location in  
211 which the focus group was held, respectively, following in parentheses.

212

### 213 **4.0 Results and Discussion**

214 Results are presented using two broad perspectives between and across experimental  
215 conditions.

216

#### 217 **4.1 Condition 1 - control group (recipe card only)**

218 Within this experimental condition participants did not have access to a video demonstration  
219 or images of each stage of the cooking process, only written information on a recipe card  
220 with a small thumbnail picture of the lasagne. The reported outcomes of Condition 1  
221 indicated that the text-only recipe did enable the participants to produce an end product;  
222 however those who had not experienced this process before lacked confidence and expressed  
223 concerns with certain technical (cooking skills) aspects of the recipe.

224

225           *“I suppose, with the white sauce, you think you’re doing it wrong*  
226           *with the recipe card. I’ve not made it before so I lobbed the milk in*  
227           *too quickly. If you’d seen it being done first you’d know you were*  
228           *doing it wrong before you went ahead. Yeah, if you want to learn*  
229           *something new, even, it’s good to see how other people do it.” (2, 2,*  
230           *1, R.O.I.)*

231

232   In addition participants discussed their ability to visualise the end product (lasagne) but  
233   struggled to visualise certain steps and stages within the recipe (béchamel sauce).  
234   Subsequently, participants suggested that a sequence of images reflecting each stage of the  
235   process would have been more helpful than written text instruction.

236

237           *“I have made it from scratch but I’ve never made the cheese sauce*  
238           *from scratch, so that was an experience! I kind of found, as I was*  
239           *going through, I hadn’t a clue if I was doing it the right way. I think*  
240           *you’d need to see what the end product is supposed to look like after*  
241           *the meat, then the cheese sauce. Especially through the cheese sauce*  
242           *even if you had pictures.” (2, 1, 1, N.I.)*

243

244   Wishart (2016) contends that visualisation is important in understanding key concepts, and as a result,  
245   emphasised the visual nature of video as a beneficial learning tool. This condition lacked the  
246   visual aspect of outlining the steps involved in the cooking process and participants  
247   highlighted this where they reported a lack of visual expectation in terms of what was  
248   required from them in completing each stage of the task. Results underlined the importance

of visualisation in developing confidence and reassuring the participants that they were following the cooking process correctly.

#### **4.2 Condition 2 - Video demonstration - (watch full video before task + recipe card)**

Within this experimental condition participants watched the video demonstration in advance and had access to the recipe card. The outcome of Condition 2 revealed that the majority of participants positively perceived the video technology, specifically discussing how it improved their technical skills required in béchamel sauce making. While results indicated that viewing the video in its entirety prior to the experiment led to an increased inability to recall all of its content, participants did discuss how they retained specific images in key stages of the experiment. This result was particularly evident during the sauce making process, offering reassurance of following the correct process.

*“I forgot exactly what to do when I came to make it, but I remembered that the sauce was supposed to look really thick to start with, so I knew I did it right.” (3, 2, 2, R.O.I.)*

*“I probably wouldn't have been able to do it unless I'd watched the video first because I would have thought I'd have made a mess of it and given up. ... When you remembered back to the video you realised you were ok.” (3, 1, 2, N.I.)*

The majority of participants within this condition expressed a preference to follow recipe text rather than instruction via video however this may have been due to their prior experience of making a bolognaise sauce consequently not finding this part of the video beneficial.



However, results did highlight the significance of visualisation in the development of cooking skills. In this instance, individuals did consider seeing the demonstration prior to beginning the experiment beneficial for anticipating that certain stages within the cooking process were being completed correctly.

#### **4.3 Condition 3 - Video demonstration (watch each segment then cook + recipe card)**

Within this experimental condition, participants watched a total of five segments of the video demonstration in pre-determined stages while cooking the recipe and had use of the recipe card. The outcome of this condition demonstrated that the majority of participants positively perceived the video in terms of the staged sequencing of the cooking process. Participants were aware of how the consistency of the béchamel sauce should appear once prepared, however were uncertain of what the viscosity should be throughout the stages of the sauce-making process. Watching the video offered them a visual expectation of the cooking process and provided them reassurance that they were following each stage of the cooking process correctly.

*“I can’t remember what it was but I got a video on how to prepare fish because I didn’t know where to start, and you could do it in stages like we did today by stopping and starting it ... You could see exactly what to do, and follow it.” (3, 3, 3, N.I.)*

In addition, results indicated that the step-by-step sequencing reduced the need to recall aspects of the recipe as they simply followed the video in real time.

298                   *“You can pause it where they’re at and catch up, so you're not having*  
299                   *to remember things.” (1, 2, 2, N.I.)*

300

301   Results indicated that this real time step-by-step process also allowed participants to work at  
302   their own pace by stopping and starting the video as and when needed.

303

304                   *“I’d watch it first when I’m trying to figure out what I’m doing.... I’ll,*  
305                   *you know, look and research and, you know, watch it to see if I think I*  
306                   *can do it, and then when I’m doing it I’d, you know, watch it and*  
307                   *pause it as I go along then.” (3,1,2, R.O.I.)*

308

309   While this condition did show an overall positive effect of technology on cooking skills and  
310   practices, results revealed some negative reactions to its use. Participants who had previous  
311   experience in making a bolognaise sauce found viewing some of the steps within the process  
312   time-consuming and off-putting.

313

314                   *“It was a pain having to watch the rest of it though...it made me run*  
315                   *out of time.” (1, 1, 3, N.I.)*

316

317   Participants also discussed how the step-by-step video instruction illustrated the amount and  
318   speed at which ingredients should be incorporated throughout each step of the cooking  
319   process.

320

321                   *“It gave me more guidance, as you’re saying, with each step; now*  
322                   *have I done this right or am I adding the milk at the right times, you*  
323                   *know, or am I adding too much milk too quickly?” (1, 1, 3, R.O.I.)*

324  
325   This condition offered visualisation and reassurance of the cooking process in real-time  
326   through watching the steps of the video in sequence. Watching the video in stages helped to  
327   prevent cognitive overload (Mayer, 2001). In addition, participants considered that the skills  
328   demonstrated in the video made it easier for them to replicate during the experiment.  
329   However, the ability to replicate key skills was only viewed as valuable when undertaking a  
330   new skill for the first time (e.g. sauce-making) or a more complex skill which typically they  
331   did not practise on a routine basis.

#### 332 333   **4.4 Condition 4 - Video demonstration (watch video segments as required + recipe card)**

334   Within this experimental condition, participants watched the segmented video cooking  
335   demonstration and had use of the recipe card as and when required. Results displayed similar  
336   findings to those of Conditions 2 and 3 in relation to the use of technology for the purposes of  
337   visualisation. However, by allowing participants the flexibility of selecting which steps to  
338   view as and when required, as many times as they required (selectivity), this resulted in  
339   participants utilising the video to meet their individual needs.

340  
341                   *“You can rewind it, you can just put it on pause; I like dipping in and*  
342                   *out when I need it.” (1, 2, 4, N.I.)*

343  
344                   *“I’d probably have it running in the background as an audio while I*  
345                   *do something else, and just listen to what I need.” (2, 3, 4, N.I.)*

346

347 Results showed that the majority of participants were familiar with making the bolognaise  
348 sauce so chose not to watch the steps relating to this stage in the recipe. However, this did not  
349 apply when undertaking the steps relating to the sauce-making. Walls et al. (2009) contend  
350 that an important learning aspect of video technology is the facility to pause, rewind and  
351 repeat. This ensures that participants may process video content more effectively, before  
352 more information is presented and lost. Indeed according to Mc Kinney et al. (2009) the  
353 ability to repeatedly watch and listen to video reinforces learning, promoting further  
354 motivation and engagement. Some participants discussed how they viewed only the steps  
355 relating to the sauce-making and that they viewed these steps more than once to ensure a  
356 successful outcome. Individuals highlighted that, in terms of learning a new skill, the visual  
357 nature of the video together with the facility to reinforce key aspects of sauce-making served  
358 to reassure and engage them in the process.

359

360 *“I was able ... I just wanted to see what my cheese sauce looked like*  
361 *compared to the girl's in the video. I just used one bit of that video,*  
362 *the sauce really, because I make spaghetti all the time and didn't*  
363 *need the video then.” (1, 2, 4, N.I.)*

364

365 Again, findings or accounts from respondents were similar to Conditions 2 and 3 whereby  
366 technology was beneficial to those carrying out a new skill for the first time (sauce-making).  
367 Similarly, results revealed that participants who had no experience of preparing a béchamel  
368 sauce suggested that the visual impact of the video was important in terms of anticipating  
369 what the sauce should look like at each step of the process, as well as reassuring them that  
370 they had replicated an acceptable consistency.

371

372 Condition 4 demonstrated the importance of visualisation, flexibility and selectivity in using  
373 technology while cooking. It is now recognised that simply replicating the steps and stages of  
374 a process is not sufficient to engage the target audience. Consideration should be given to the  
375 learning needs and requirements of a range of individuals within that target audience.  
376 Therefore in order to meet these needs, as educators, it is necessary to make changes to the  
377 learning environment (Watson, 2006). Results suggested participants experienced the benefit  
378 of having the freedom to view the segments of the demonstration they needed as often as they  
379 needed throughout the experiment. Therefore in order to engage and motivate the audience to  
380 develop and learn new cooking skills, perhaps it is more beneficial to offer individuals the  
381 option to select relevant parts of the process of which they are unfamiliar, as a result  
382 promoting self-determination, empowerment and a person-centred approach to learning.

383

#### 384 **4.5 Summary of experimental conditions**

385 Findings highlighted that the majority of individuals perceived the video technology  
386 positively in aiding the cooking process, in particular where new or more technical cooking  
387 skills was required.

388

389 Focus group results suggested that technology assisted the cooking process in the following  
390 ways: (1) visualisation of the process and final product; (2) real-time reassurance of  
391 individual progress; (3) replications of cooking skills; (4) flexibility to work at your own  
392 pace; and (5) selective access to the video as and when required. While visualisation and  
393 reassurance were deemed important to the control group these were not discussed specifically  
394 in relation to the video technology used within the experimental task but rather imagery (or  
395 photographs) of the stages within the recipe. In contrast however, Condition 4 demonstrated

that all the benefits considered helpful in the cooking process were present in Condition 4. All five benefits are summarised across each experimental condition in Table 2.

**Table 2 Benefits of technical assisted cooking across experimental conditions**

Identified Benefit	Condition 1	Condition 2	Condition 3	Condition 4
Visualisation				
Real-time reassurance				
Replication				
Flexibility				
Selectivity				

Key learnings across all four conditions identified that individuals perceived the video technology to be most effective when: (1) learning or applying a new cooking skill; and (2) reinforcing a more advanced technical skill. More specifically, this occurred when participants were asked to make a béchamel sauce with which they were unfamiliar meaning the majority of participants relied on the use of the video technology to assist them. Table 3

displays the stages of the sauce-making process shown in both the text and video demonstration and describes how the visual nature of the video supports skills development.

**Table 3 Stages of sauce-making**

Stage of Process	Text instruction on recipe	Additional visual actions as seen in the video – not available on recipe card
1	Melt the fat	<ul style="list-style-type: none"> <li>No stirring, fat not bubbling and fat becomes transparent</li> </ul>
2	Add the flour and cook for 1 minute	<ul style="list-style-type: none"> <li>Visualisation of the expected texture of flour and fat mixture</li> <li>Visualize the speed at which flour was added</li> </ul>
3	Take off the heat, place on a pot stand and stir in the milk slowly	<ul style="list-style-type: none"> <li>Visualisation of the gradual addition of milk</li> <li>Reassurance of the dense, gloopy almost “doughy” consistency</li> <li>After all the milk is added the appearance is like thin custard</li> </ul>
4	Return to the heat and bring to the boil	<ul style="list-style-type: none"> <li>Visualisation of vigorous stirring to a smooth consistency</li> </ul>
5	Reduce to simmer until the sauce coats the back of the wooden spoon	<ul style="list-style-type: none"> <li>Visualisation of a smooth consistency; no lumps</li> <li>The demonstrator lifts spoon out of sauce to leave a trail, coating the back of the wooden spoon</li> </ul>

For the majority of participants, sauce-making was deemed a new skill. A number of participants suggested that, without the video, they would have disposed of the sauce at the stage when the flour was added to the fat and cooked.

*“That’s my first time making the sauce, so if I hadn’t seen the video, mine would have been thrown in the bin at the point before you add the milk because it just looked wrong. I paused it too and did a bit, then it was easier.” (1, 1, 3, N.I.)*

422                   *“No, if it was home I’d have thrown it in the bin, just no: I’d have no*  
423                   *patience. The only thing was the girl on the video made it and I saw*  
424                   *hers was like the way mine was, so I went on ahead with it and it*  
425                   *turned out ok.” (1, 2, 4, N.I.)*

426

427   The “gloopy” consistency (at stage 2) was unfamiliar with the smooth viscosity typical of a  
428   finished béchamel sauce. Therefore through watching the video, participants conceptualised  
429   the thick and “doughy” appearance of the batter and felt reassured to continue cooking. In  
430   contrast, participants from Condition 1 (recipe card only) did not have access to the visual  
431   aspect of the stages in sauce-making and expressed lesser reassurance at this stage of the  
432   process.

433

434                   *“I thought I had made the cheese sauce wrong: when I added the*  
435                   *flour and the butter it just went to mush. I thought no...and then I*  
436                   *started looking over at somebody else’s... you have to add milk yet,*  
437                   *because I thought that was it.” (2, 1, 1, N.I.)*

438

439   These results highlight how video technology assisted participants in visualising the  
440   consistency of the sauce at each stage of the process, which in turn reassured them to  
441   continue the cooking process.

442

443   Where more technical skills were introduced into the cooking process, or where the end  
444   product would be adversely affected by mistakes and trial and error would be unacceptable,  
445   video technology was described as helpful. Therefore adapting the learning environment  
446   (Watson, 2006) empowered individuals by promoting self-determination in selecting the



sections of the video most important to them, and this subsequently encouraged confidence, motivation and engagement. For example, the majority of participants throughout Conditions 2, 3 and 4 discussed how they used the video technology to assist them in the sauce-making process.

## **5.0 Conclusion**

It is clear that video technology has a place in supporting some people to cook from scratch. Video technology, due to its flexibility and the ability to utilise at one's own discretion (selectivity), further served to reassure and reinforce the key cooking skills required to achieve a successful meal outcome. The results from this study provide evidence of the potential to rely on the scalability of video technology to redress the current cooking skills imbalance among the general population.

## References

Caraher, M. and Lang, T. (1999) Can't cook, won't cook: A review of cooking skills and their relevance to health promotion. *International Journal of Health Promotion and Education*, 37(3), 89-100.

Cihak, D.F., Kessler, K. and Alberto, P.A. (2008) Use of a handheld prompting system to transition independently through vocational tasks for students with moderate and severe intellectual disabilities. *Education and Training in Developmental Disabilities*, 1(1), 102-110.

Comiskey, D. (2011) Construct Online: Using video and screen casting to bring the construction site into the classroom. in: *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2011*. Lisbon, Portugal 27<sup>th</sup> June – 1<sup>st</sup> July 2011.

Condrasky, M. & Helger, M. (2010) How Culinary Nutrition Can Save the Health of Nation. *Journal of Extension*, 48, 2(2), 22-39.

Garcia, A.L., Vargas, E., Lam, P.S., Shennan, D.B., Smith, F. and Parrett, A., (2014) Evaluation of a cooking skills programme in parents of young children—a longitudinal study. *Public health nutrition*, 17(5), 1013-1021.

Jabs, J. and Devine, C. (2006) Time Scarcity and Food Choices. *Appetite*, 47(2), 196-204

Jackson, P. and Viehoff, V. (2016) Reframing convenience. *Appetite*, 98(1), 1-11.

Kellems, R.O. and Morningstar, M.E., 2012. Using video modeling delivered through iPods to teach vocational tasks to young adults with autism spectrum disorders. *Career Development and Transition for Exceptional Individuals*, 35(3), 155-167.

Lim, K. Y. T. (2006) *Exploring podcasting as a tool in geography education*, in: GTAQ Conference/IGLI CSE 23 March 2006 Symposium, Brisbane, Australia.

Mintel, U. K. (2010). *Chilled and frozen ready meals*. (May 2010). Available From: <http://store.mintel.com/chilled-and-frozen-ready-meals-uk-may-2010> [Accessed 1 March 2016].

Mintel, U. K. (2013). *Prepared meals*. Available From: <http://store.mintel.com/prepared-meals-uk-may-2013> [Accessed 1 March 2016].

Murray, O.T. and Olcese, N.R., 2011. Teaching and learning with iPads, ready or not? *TechTrends*, 55(6), 42-48.

Prensky, M. (2001) Digital natives, digital immigrants part 1. *On the Horizon*, 9(5), 1-6.

Rayner, G., Treefrog Developments, Inc., 2013. *Headphone adapter for a case for an electronic device*. U.S. Patent D685, 327.

Thomas, D. (2003) *A general inductive approach for qualitative data analysis*. : Available from:<http://www.frankumstein.com/PDF/Psychology/Inductive%20Content%20Analysis.pdf> Accessed 5/6/15

Mayer, R.E., (2001). *Multimedia learning*. Cambridge University Press, Cambridge, UK.

McKinney, D., Dyck, J., and Lubet, E. (2009) iTunes University and the Classroom: Can Podcasts Replace Professors? *Computers and Education*, 52(3), 617-623.

Pula, K., Parks, C.D. and Ross, C.F. (2014) Regulatory focus and food choice motives. Prevention orientation associated with mood, convenience, and familiarity. *Appetite*, 78, 15-22.

Rees, R., Hinds, K., Dickson, K., O' Mara-Eves, A., and Thomas, J. (2012) *Communities That Cook: A Systematic Review of the Effectiveness and Appropriateness of Interventions to Introduce Adults to Home Cooking*. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London

Reicks, M., Trofholz, A., Stang, J., Laska, M. (2014) Impact of cooking and home preparation interventions among adults: Outcomes and implications for future programs. *Journal of Nutrition and Educational Behaviour*, 46(1), 1-54

539 Utter, J., Fay, A.P. and Denny, S., 2016. Child and Youth Cooking Programs: More Than  
540 Good Nutrition? *Journal of Hunger & Environmental Nutrition*, 1(1).1-27.

541 Walls, S., Kucsca, J., Walker, J., Taylor, W., Mc Vaugh, N. and Robinson, D. (2009)  
542 Podcasting in Education: Are Students as Ready and Eager as We Think They Are?  
543 *Computers and Education*, 54 (201), 371-378.

544

545 Watson, G. (2006) Technology, Professional development: Long-term effects on teacher self-  
546 efficacy, *Journal of Technology and Teacher Education*, 14(1), 151-166.

547

548 Whatley, J. and Ahmad, A., 2007. Using video to record summary lectures to aid students'  
549 revision. *Interdisciplinary Journal of Knowledge and Learning Objects*, 3(1), 185-196.

550

551 Wishart, J. (2016) Using the Cameras on Mobile Phones, iPads and Digital Cameras to  
552 Create Animations in Science Teaching and Learning *Mobile Learning and STEM: Case*  
553 *Studies in Practice*, 17(1), 18-26.

554

555