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"Difficult but Good": enjoying accessible digital creativity

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ABSTRACT

Background: Digital technology is increasingly researched in aphasia rehabilitation but mostly to replicate conventional speech and language therapies. While creative activities are employed in therapy for aphasia, these are not achieved through digital technology and little is known about the impact of digital creativity on people with aphasia.

Aim: To explore how people with aphasia use and experience non-therapeutic creative digital technologies.

Methods & Procedures: We facilitated a series of six community-based workshops for people with aphasia to explore four novel digital creative technologies. Following completion of the workshop series, nine participants were interviewed about their experience of taking part and of engaging with the creative technologies. Interview data were transcribed and analysed using the Framework Method.

Outcomes & Results: Analysis identified two overarching themes addressing creative and technological capability and conceptions of success. Results indicate that creative and accessible digital technologies, presented within the context of a safe, facilitatory social space, fostered experiences of capability and positive challenge for participants.

Conclusions: Engagement with creative and accessible digital technologies for the sake of engagement alone may offer new therapeutic and recreational opportunities for people with aphasia. Results indicate the potential for such activities, when undertaken within a supportive group context, to spark not only enjoyment and stimulation but also to illuminate and underscore capability.

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Introduction

Digital technology is increasingly researched in aphasia rehabilitation. Software applications have been used to remediate a range of skills, including language comprehension (Thompson et al., 2010), word and sentence production (Herbert et al., 2012) and even communicative uses of gesture (Roper et al., 2016). Identified benefits include the opportunities for self-directed practice (Palmer et al., 2019) and compensating for aphasic

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impairments (Caute et al., 2015; Marshall et al., 2018). The potential for remote therapy delivery, e.g., via video conferencing (Pitt et al., 2019; Woolf et al., 2016) or virtual reality platforms (Marshall et al., 2016, 2020) has also been underscored. While many findings are encouraging, a recent systematic review regretted the fact that many uses of digital technology in aphasia rehabilitation effectively replicated conventional therapies (Repetto et al., 2020). Novel and creative uses of technology were rare. To our knowledge, non-therapeutic use of creative digital technologies in aphasia has not been explored and this is the focus of the work reported here.

Alternative uses of technology have the potential to open up new opportunities in aphasia rehabilitation, for example focussing on self-expression and identity. Aphasia has long been recognised as a threat to the sense of self, so much so that Shadden (2005) termed it 'identity theft'. The theoretical concept of biographical disruption has been much used to explain how the re-evaluation of the expected life course associated with chronic disability represents a disruption to biography and sense of self (Bury, 1982). Disruption to identity may not be inevitable, for some, disability is accommodated within the 'biographical flow' of their continuing lives (Faircloth, 2004). Sense of self may be preserved through continuation of aspects of pre-stroke identities. For example, ongoing reciprocal relationships within the family and religious duties (Norris et al., 2012). Self-concept may also depend on development of *new* identities, "self-images crumbling away without the simultaneous development of equally valued new ones" (Charmaz, 1983:168). The communication difficulties associated with aphasia represent a particular challenge both to continuation of pre and post stroke identities (Taubner et al., 2020) and development of new ones. Indeed, the people with aphasia interviewed by Wallace et al. (2017) included the recovery of their pre-stroke identity as a desired therapy goal: "to be seen as the same person as I was before" (p. 1371). Taubner et al. (2020) used interviews with 14 people with aphasia to explore the identity dilemmas defined by Bamberg (2011), as experienced in a digitised society. These included the need to navigate 'between constancy and change' and shifts in the sense of agency. Many examples emerged from their data that resonated with these dilemmas. For example, some individuals still identified with a former working role, while acknowledging that they could not sustain that role since their stroke. Others equated losses in linguistic agility with reduced feelings of agency and voiced concerns about how this made them appear to others.

Rebuilding a sense of self has been identified as a priority for aphasia therapy (see arguments in Pound et al., 2018) and has been addressed through group therapy (Simmons Mackie & Elman, 2011) and personal narrative approaches (Strong & Shadden, 2020). Corsten and colleagues (Corsten et al., 2014, 2015) developed a Biographic Narrative therapy, in which one-to-one interviews and group sessions were used to explore the individual's life story. Across two studies, 27 people with aphasia received Biographical Narrative therapy. Group data showed gains on quality-of-life measures, with some individuals reporting associated benefits in outcome interviews.

Engagement in online communication may be a further means of addressing the identity dilemmas posed by stroke and aphasia. Multiple platforms are now available for creating and sharing personally created digital content. In addition to written outputs, users can share art (e.g., DeviantArt), videos (e.g., YouTube, Vimeo) and photos (e.g., Picasa, Flickr, and Instagram). They can post opinions and reviews (e.g., TripAdvisor), educate or instruct others (wikis, podcasts), sell (e.g., eBay), promote themselves (e.g.,

LinkedIn), or generally participate in entertaining worldwide attractions (e.g., creating personalised mini-videos on Elf Yourself). Approximately 58% of the world's population use social media with average daily use being 2 hours and 27 minutes (see https://www.smartinsights.com/social-media-marketing/social-media-strategy/new-global-social-media-research/). However, navigating, creating, and sharing digital content on any of these platforms is cognitively and linguistically demanding. Users also require a basic proficiency in using hardware, the Internet, and applications. Such demands mean that stroke survivors with aphasia may experience digital inequality, potentially ranging from total exclusion to restricted engagement (see arguments in Elman, 2001 and Menger et al., 2016). Indeed, a recent analysis of Twitter content tagged with #aphasia revealed only 29 users (3.46% of the total) who identified as people with aphasia (Bryant et al., 2021).

Some members of the digital computing community believe that digital inequality can be ameliorated through considered technology policy and design. Lazar and colleagues (2015), for example, argue that enhancing the accessibility of mainstream technologies may not only serve to address issues of digital inequality but also act to convey "to those without disabilities the capabilities of disabled users of technology" (Lazar et al., 2015:54). Aphasia researchers have similarly argued that improving accessibility, for example through environmental adaptations, may reveal competence in people with aphasia (Kagan, 1998). This highlights an intersection between work on accessibility in the domain of human-computer interaction and speech and language therapy. The work reported in this paper arises from a collaboration between these domains. Through processes of co-design, we aimed to design accessible technologies that not only engage people with aphasia but also give them opportunities to reveal their capabilities (Wilson et al., 2015).

In spite of existing digital limitations, people with aphasia are known to use social media (Fotiadou et al., 2014) and the online expression of aphasia has been the focus of research (Moss et al., 2004; Taubner et al., 2017). Such research has shown that online media can be used to present a range of stroke narratives and allow for variation in the degree to which aphasia is revealed. For example, some participants in the Moss et al. study did not wish aphasic characteristics to be edited from their posts, while others only posted material in conventional language, for example by collaborating with people without aphasia during its production. Taubner et al. (2017) examined the postings of nine people with aphasia. They found that all bar two masked their aphasia in online composition, for example by making edited asynchronous postings, or relying on others to make posts. However, they also found that at least some participants were inconsistent, in that they revealed their aphasia in one online context (such as an aphasia website), while concealing it in another (such as a dating platform). This research suggests that people with aphasia can manipulate online communication in order to project different versions of themselves and may make conscious decisions about their representations in online contexts.

Self-expression and the recovery of personal identity may also be promoted through the use of creative activities in therapy. While artistic expression may be affected following stroke and aphasia, it may also be an area of relative preservation. For example, there have been professional artists who continued to paint and musicians who continued to produce (and even read) music despite aphasia (Winner & Von Karoli, 1998). Skill in visual art can also be regained, even to the point of being able to exhibit (Pąchalska & Góral-

Półrola, 2020). The ability to produce and enjoy creative writing is particularly vulnerable to aphasia. However, we have known for some time that people with aphasia can comprehend non-literal uses of language such as metaphor (Winner & Gardner, 1977) and idiom (Van Lancker & Kempler, 1987). With therapy and strategic support some people with aphasia can also re-gain access to a range of written material, including novels and other literary forms (Caute et al., 2019). Thus, even creative uses of language may not be closed off to people with aphasia.

There have been several calls for the inclusion of creative or artistic activities in stroke and aphasia rehabilitation. Some arguments relate to the restorative opportunities for language and communication. For example, Leonardi et al. (2018) propose that singing engages neural circuitry that both overlaps with and extends beyond that involved in speech, and so creates opportunities for post stroke neural re-organisation. In line with this argument, they cite evidence that singing based therapies can make a significant contribution to the recovery of language (Raglio et al., 2016; Van de Meulen et al., 2014). Uses of drawing have also been explored as a compensatory modality for communication, particularly when aphasia is severe (Lyon, 1995; Sacchett et al., 1999). However, creative activities may be employed in rehabilitation for reasons that extend beyond communication. For example, choral singing has been proposed as a method for promoting well-being and social inclusion for people with aphasia (Tamplin et al., 2013; Tarrant et al., 2018, 2021), and stroke survivors' engagement in a visual art programme led to perceived benefits in mood, self-esteem, and other aspects of recovery (Morris et al., 2015). Although not formally researched, uses of drama have been described, with anticipated benefits for self-expression and communicative confidence (Cherney et al., 2011; Osa Garcia et al., 2021). The dramatic performances generated by these activities also seem a powerful medium for raising awareness of aphasia. A qualitative systematic review (Lo et al., 2018) found four reported areas of benefit arising from creative rehabilitation activities following stroke. These were: functional restoration (e.g., of communication), psychological support, social engagement, and spiritual experience, which included enhanced feelings of hope.

Four Creative Technologies

The work reported here focuses on the use of digital technologies for creative expression in aphasia. We present details of and responses to a creative workshop series which explored the use of four novel and accessible creative technologies. The INCA research project (Inclusive Digital Content for People with Aphasia)[1] aimed to empower people with aphasia to create and curate digital content. Working as a collaborative team of technical, human-computer interaction and speech and language therapy researchers, we co-designed four technologies that enable people with aphasia to produce creative outputs and, optionally, post those outputs online (Neate et al., 2019, 2020a & 2020b; Tamburro et al., 2020). The technologies employ a range of media, including written words, images, painting, music and physical objects. They were developed through a process of co-design involving people with aphasia, aiming to ensure usability and acceptability for their target user community.

The four technologies (*MakeWrite, CreaTable, Comic Spin* and *Inker)* use the idea of constrained creativity: they enable the user to create digital content by constraining the

choices that are available whilst still giving the user some control over the constraints. Such constraints aim to reduce cognitive demands and hence create a space to explore capabilities. *MakeWrite* (Neate et al., 2019) is a tablet-based app that supports the creation of short texts. The user chooses an existing text, digitally redacts most of the words and arranges the remaining words to create a new text (see Figure 1). *CreaTable* (Neate et al., 2020a) is a tangible technology for creating and curating multimedia content. It consists of a special table where physical objects, such as printed images and words, are arranged by users. A webcam and visual recognition system detect the type and position of the objects to create an equivalent digital representation. This can then be "played" in a manner similar to a slide show (see Figure 2). Complementary media – such as music – can then be added as desired. *Comic Spin* (Tamburro et al., 2020) is another tablet-based app. It supports the user in creating short comic strips by choosing and assembling pre-defined comic images and captions (see Figure 3). Finally, *Inker* (Neate et al., 2020b) is a web-based app for creating digital visual art by sampling existing images (see Figure 4). All technologies seek to provide an accessible means for creative expression.

The four technologies were trialled in a community workshop series comprising six sessions and involving 10 people with varying severities of aphasia. Workshop session one took place face-to-face and comprised introductory non-digital creative activities. Sessions two to five also took place face-to-face and each involved the introduction of a new technology and the use of that technology within digital creative activities. The final session in the series, which followed the outbreak of the COVID-19 pandemic, took place online and involved discussion about what had been created and the selection of outputs for an exhibition. Following the completion of the six workshops, participants

Figure 1. Example poetry output from *MakeWrite*.

Figure 2. Example still image from *CreaTable* video sequence output.

Figure 3. Example comic strip output from *Comic Spin*.

Figure 4. Example image output from *Inker*.

were invited for a one-to-one interview about their experience with a researcher who had not taken part in the workshop series or technology development.

This paper reports the findings from the one-to-one interviews conducted with nine of the participants after the workshops were completed. A tenth workshop participant opted not to take part in any of the final, online activities associated with the workshop series (i.e., the final workshop and the one-to-one interview). This was due to a preference not to take part in online activities. Interviews focussed on how the technologies were employed, participants' feelings about the workshops and the usability of the technologies. Information regarding the usability of the tools will be reported elsewhere (e.g., see Tamburro et al., 2020 for *Comic Spin* usability outcomes). In this paper, we report findings regarding participants' responses to the workshops. As this was an exploratory study, employing qualitative methods, no hypotheses were developed. Rather we were interested in what themes emerged from the data. Given that the technologies were designed to provide an accessible route to creative expression for people with aphasia, we were particularly interested in whether participants engaged in such expression. Possible wider impacts, for example on participants' sense of self and/or capability, were also a focus of enquiry.

Methods

Ethical approval was granted for this study on 5 February 2020 (ETH 1920-0800) by City, University of London School of Health Sciences Research Ethics Committee. The COREQ standards for reporting qualitative research were followed in preparing this manuscript (Tong et al., 2007).

Participants

Interview participants (7 males, 2 females) ranged in age from 47 – 68 years (see Table 1 where gender neutral pseudonyms have been used to maintain anonymity and for consistency with data presented in Tamburro et al., 2020).

All participants had a diagnosis of aphasia following stroke. All were at least 6 months post stroke. Participants represented a range of aphasia severities, scoring between 7 and 29 on the Frenchay Aphasia Screening Test (FAST) (Enderby et al., 1986). The FAST

Table 1. Community workshop participant characteristics.

Participant name	Age (years) at time of workshops	Overall Score on FAST (max score possible = 30)	AIQ Score (min = 0, max = 84)	Score for tech used in the last month (min = 0, max =18)
Ceri	68	29*	24	7
Jo	47	26	33	14
Hilary	67	28*	20	12
Pat	68	25*	33	14
Dom	55	21	18	12
Alex	47	22	12	13
Dev	56	19	27	8
Robin	53	7	20	11
Jodie	62	24	36	9

* Scored above the bedside aphasia screening cut off score for given age range - indicating milder aphasic deficits in the context of existing chronic aphasia diagnosis.

provides a brief assessment of ability in speaking, understanding of speech, reading, and writing. Developed initially as an acute bedside screening test for acute signs of aphasia following stroke, this assessment has since been used here and elsewhere (Northcott et al., 2021) as a descriptive tool to provide a broad indication of aphasia severity for people with an existing diagnosis of chronic aphasia, where a lower score indicates a greater level of impairment, and a higher score indicates milder aphasia. It should be noted that whilst three participants in this study scored above the bedside aphasia diagnosis cut off for their age group, all had an existing clinical diagnosis of chronic aphasia and reported high level language difficulties that impacted upon their lives. Participants scored between 12-33 out of a maximum possible score of 84 on the Aphasia Impact Questionnaire (AIQ) (Swinburn et al., 2018). Here, a low score means that aphasia has a very limited impact on a person's life, a higher score means aphasia has a greater impact. Participants scored between 7-14 out of a maximum possible score of 18 on an assessment of technology use (Roper et al., 2014). Here, participants are presented with a series of 18 items of technology (nine everyday/ household technologies such as washing machine and television and nine digital technologies such as mobile phone texts and video calling). They are asked to state whether they have used this technology within the previous month and awarded one point for each item they report using. A higher score here indicates recent use of a greater number of technologies.

Community Workshops

The workshop series comprised one session per week for six weeks (Table 2). Sessions were each around two hours long with a 10–15-minute break in the middle. Workshops were scheduled to be carried out in a community setting run by an aphasia charity based in the south-east of England (see Figures 5, Figures 6 and Figures 7). Workshops 1 to 5 took place within this setting, as scheduled. However, due to the events of the COVID-19 pandemic, the final workshop (workshop 6) could not take place in person and was instead undertaken remotely, via Zoom, three weeks after workshop 5. The workshop series aimed to build from the creation of non-digital content through to the creation of digital content. It therefore commenced with familiar, non-digital mark-making activities, using paper, charcoal and watercolour paint in workshop 1 before progressing through to a variety of digital creativity activities using the four creative technologies and drawing upon materials created either physically or digitally within preceding workshops. See Table 2 for further details of session structure and activities.

Interviews

Participants were invited to be interviewed via videoconferencing (Zoom) in their own homes. Eight interviews were conducted within 16 days after the final workshop (workshop 6), and one interview took place 7 weeks after the final workshop (due to the participant's personal circumstances at the time of the other interviews). Family members helped set up the videoconference call where necessary. Participants then conducted the call alone, except for one person who drew on their wife for support for part of the interview. The two interviewers (authors RB and AM) were speech and language therapists with extensive experience of communicating with people with aphasia, and one (RB) was an experienced qualitative researcher. Neither was involved in delivering the

Table 2. Workshop series structure and content.

Setting, goals and schedule	Workshop 1 – Non-digital creation	Workshop 2 - Inker	Workshop 3 - MakeWrite	Workshop 4 - CreaTable	Workshop 5 – Comic Spin	Workshop 6 - Curation
Setting	In person	In person	In person	In person	In person	Online
Goals	For participants to make a range of marks using at least 3 different materials.	For participants to explore mono-printing For participants to explore Inker To gather feedback on Inker	For participants to explore MakeWrite To gather feedback on MakeWrite	For participants to explore CreaTable To gather feedback on CreaTable For participants to revisit Inker and MakeWrite on the tablets	For participants to explore Comic Spin To gather feedback on Comic Spin	For participants to each record a description of one of their pieces of work To curate works from sessions 1-5 for showcase event
Introduction – whole group activity, led by facilitator	Introduction to the project and the day's activities	Recap of the previous week's activities and introduction to the day's activities, including a review of Twitter activity related to tweeted images from the previous session.				Recap of week 5 activities and introduction to the day's activities
Activity 1 - Individual or whole group activity, led by facilitator	Mark-making with charcoal (individual)	Mono-printing (individual)	Group wordplay activity (whole group)	Group sequencing activity (whole group)	Demonstration of Comic Spin (whole group)	Selection of a series of works from preceding workshops (whole group)
Break						
Activity 2 – Individual, small group or whole group activity	Mark making with watercolour (individual: Figure 5)	Use of Inker (individual: Figure 4)	Use of MakeWrite (individual or in pairs: Figure 1)	Use of CreaTable (small group: Figures 2 & 6)	Use of Comic Spin (individual or in pairs: Figures 3 & 7)	Adding titles to works, providing narration (whole group, led by facilitator)
Presentation - whole group activity led by facilitator	Group review of creations made during the session, responses to those creations and discussion of the experience of the session.					Discussion of project experience
Feedback Sheet	Individual completion of five item paper questionnaire rating and commenting on the experience of using the day's target technology. Question-reading and response-writing supported by volunteers as required.					Scheduling interviews

Figure 5. Participants exploring non-digital mark-making activities in workshop 1.

Figure 6. *CreaTable* group creation in progress.

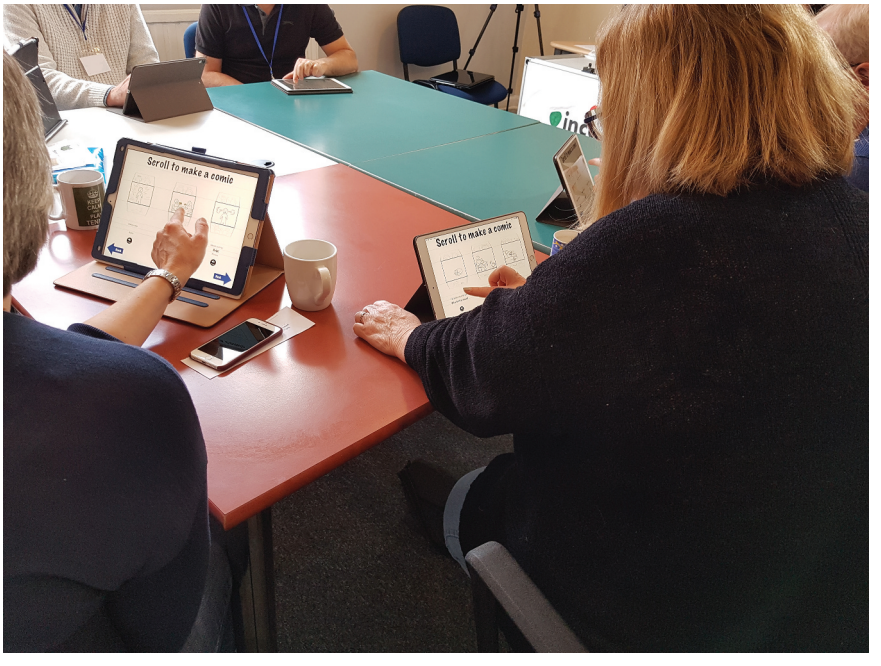

Figure 7. Participants engaging in a tablet-based *Comic Spin* activity.

workshop series. RB conducted four interviews. AM conducted five. The interviewers were briefed by workshop series facilitator AR to fully understand the relevance of the topic guide to the workshop series, to trial techniques for supporting participants to express themselves through video conference, and to enhance consistency of approach (the topic guide is included in Appendix 1). Interviews were informed by the ontological belief that people with aphasia are competent and able to express their perspectives when given appropriate support to do so (Kagan, 1995). Interviews flexibly followed an interview topic guide with questions and prompts and were video recorded. Techniques were used to ensure that the perspectives captured were those of the person with aphasia. These included verbal and non-verbal checks that understanding had been achieved during interviews. Where severe difficulties in verbal expression involved increased co-construction of meaning, this information was attached to the data. Interviews probed participants' experiences of the creative and technological aspects of each individual workshop, perceptions of what was produced, reflections on working in a group and logistics relating to how the workshop series was organised. Mean interview duration was around 61 minutes (range 37-89 minutes). Interview video-recordings were transcribed verbatim, with kinesic and paralinguistic features indicated on the transcripts when required for deciphering verbal meaning, for example thumbs up and down or use of emphatic tone (Wilson & Kim, 2019).

Data Analysis

RB worked with AR to analyse the interview data using the Framework Method, a systematic approach to the analysis of qualitative data involving exploration within

and across cases and themes (Ritchie & Spencer, 1994). The method has been commonly used in health research and is particularly attractive to multidisciplinary research teams using mixed methods approaches (Gale et al., 2013). This is because prescribed steps lead to the creation of thematically organised matrices that retain clear links to individual participants (cases) and the original data. This transparency enables others in the team to understand and question how findings have been derived (Gale et al., 2013). Video recordings were viewed, and transcripts read by RB in order to be become familiar with the data and compile a preliminary thematic index. The index was discussed with the project team and an audit trail recorded adjustments to it based on emerging interpretations (final thematic index included in Appendix 2). RB coded against the index using NVIVO 12. The thematic index was used to create five different matrices, each representing a different theme: For each matrix a number of sub-themes made up the horizontal axis, with participants listed on the vertical axis. This resulted in individual summaries of synthesised information within each cell, tagged to locations in the transcribed data. AR reviewed 20% of coded transcripts. RB and AR independently completed summaries of the sub themes and used these as a basis for discussion and expansion of interpretations. The outcome of this discussion was the creation of two potential over-arching themes and descriptive summaries of the positives and negatives of the different technologies. These descriptive summaries are reported elsewhere alongside usability outcomes (e.g. Tamburro et al., 2020). RB identified the location within the matrices of the data supporting the overarching themes. AR used this information to search charted data of two participants and make independent interpretations which were then discussed. Interpretations made by both researchers were remarkably consistent, minor interpretative differences were discussed. Both researchers returned to the data to further explore patterns and contradictions. For example, data indicated that there appeared to be a dichotomy in how participants discussed pride in outputs, and researchers further interrogated the data to understand more about what constituted success for participants and to further explore those who viewed outputs as successful and those who did not.

Extracts included here were chosen because they clearly and concisely illustrated interpretations derived from analysing the full corpus of data (Thorne, 2016). The perspectives of people with more severe aphasia contributed to interpretative summaries, along with those of the wider group. In the reporting here, we have sought to accurately illustrate the themes established across the data by drawing on direct quotes where appropriate, including direct quotes from people with less expressive skills, supplemented with descriptive reports to ensure the perspectives of all participants are represented.

Rigour

Rigour in the analytic process was achieved through consideration for credibility, transferability, confirmability, and dependability (Lincoln et al., 1985). The primary techniques for enhancing credibility were negative case analysis (exploration of contradictory data), independent second researcher checks and discussion between the two analysts. Perspectives that appeared contradictory were further examined to determine whether they added a new dimension to existing interpretations or should be considered outlying (Rapley and Searle, 2004). Second researcher checks were intended to improve the interpretative process rather than to achieve inter-tester reliability. Interpretative

differences were minor, and consensus was reached on overarching themes through discussion. The potential for findings to be transferred to other settings has been increased by descriptions of participants, the technologies and participant perspectives. Interviewers were distanced from the workshop series reducing the risks of participants overly reporting positive perspectives. Confirmability was additionally increased through active search for contradictory evidence. The analytic processes undertaken were clearly explained, including transparent reporting of how overarching themes were derived, increasing dependability.

Results

The outcomes of the analysis were two overarching themes: Conceptions of Success and Conceptions of Capabilities. They address how success within the community workshops and creative and technological capabilities were conceptualised by participants. The results focus on these inter-related themes, providing understanding for (1) participants' experience of success as an interaction between creating outputs and the participatory experience itself, and (2) for how they conceived their capabilities in creating content.

Theme One: Conceptions of Success

Participants viewed their successes in the workshops both in relation to the content they produced and in relation to the participatory experience. Although some participants reported success in terms of the outputs they were able to create, success was more fully conveyed with additional reference to the processes of production. The following two sub-themes report participant perspectives of success with respect to their satisfaction with individual and group outputs and with respect to their satisfaction with the process of participating in the workshop series as part of a community of people creating and learning together.

Satisfaction with outputs

Participants were overwhelmingly positive about the workshop series as a whole despite variability in the extent to which they enjoyed specific workshops. In the following extract Dom explains how they enjoyed drawing on their 'creative' brain and learning different technologies.

> Opposite the brain and fun and exciting and the technology is fantastic (Dom).

Enjoyment of an activity did not necessarily equate to pride in what people produced individually, and participants sometimes identified more with the outputs of others. Pat was not proud of their work, but liked what others produced and achieved some satisfaction when able to suggest a suitable title for the output of another participant at the curation stage in workshop 6. Participants could be both positive about being involved and disparaging about what they personally produced.

> (My) attitude was always the same. I had fun. Not too proud of what I did which not, not self-deprecation. I think in my opinion it's just um, just a fact (Pat).

Pat's extract illustrates that the concept of pride may be more visible when expressed as *lack* of pride. This understanding of pride through the dichotomy of presence versus

absence can be further explored through Hilary's experience, who recounted strongly negative as well as strongly positive examples of pride. Hilary was so dissatisfied with what they produced in the first workshop that they considered withdrawing. However, their ability to produce a poem with very few words in a later workshop was communicated with pride and influenced their overall positive experience of the workshop series. In this extract they explain how they were able to create a very satisfying piece of poetry with a constrained choice of words by placing the word 'beautiful' at the end.

> I thought what do I do with this beautiful. And then I just put it at the end on its own. It changed the whole dynamic of, to me, what I'd tried to say. That was really satisfying to get that, I got. Oh I get it. That whole thing made sense because of moving the word to the bottom (Hilary).

Facilitators used Twitter to share anonymised outputs beyond the group. The facilitators then used these tweets as a within-group tool to help participants keep track of where they had come from as the workshops built up. Alex reflected that although they were happy for their work to be shared on Twitter, they were not proud of it and did not want to be identified as the originator. They viewed sharing outputs on social media as being for the facilitators' benefit rather than for their own benefit and had no desire to use social media in this way themself.

> "Oh is that you? Oh no, no (. . .) bin it (. . .). You can do it, for you, but I don't want to do anything, I'm crap at all this (Alex).

Most participants did not show their families what they produced in the workshops, some questioning whether they would be interested and others reflecting the challenge of explaining outputs outside of the context in which they were created.

> I had shown them snippets of it, becau . . . I think I took screenshots of things and showed that, but they couldn't really get the context of what, what we were doing without actually showing them the app . . . itself. (Jo)

Following the workshop series, the research team's original intention had been to celebrate success with a public exhibition of work produced by the group. However, the introduction of national lockdown meant that this could not go ahead. The loss of the intended exhibition as a ritual to mark the close of the workshop series reduced the potential for outputs to be shared in a coherent way. This may be particularly important in the presence of aphasia where limitations to expressive language made it difficult for participants to explain what they had been doing to those close to them.[2]

Satisfaction with process

When reflecting on workshop successes, participants tended not to distinguish between creative outputs and broader experiences of working with the group over the six weeks. Levels of satisfaction related to perceptions of group functioning and ways in which facilitators provided support and fostered trust in the process. Group participants represented a new configuration of members from across an aphasia group that met weekly. Some knew each other and others did not. They met at the time they would usually participate in communication related activities in the aphasia group, and it was important to them that the time invested did not represent a loss to attention at this level. All

participants were positive about the group experience and were generally happy that the group composition and size "felt about right" (Jo). The process of participating appeared to be as important to their sense of the success of the workshops as what they created. It was very common for participants to express the tone of the group using terms such as "funny" (Dom) and "so much laugh" (Alex).

> There was a great sense of fun all the time (. . .). It was experiencing something slightly which was new and non-threatening (Pat)

Participants reported feelings of care and connection amongst group members which appeared to arise out of a number of factors. These included shared experience of having aphasia, working with new people within a known context, and the support of facilitators. Even when working individually, participants worked shoulder to shoulder and this experience enhanced social connection in a pleasurable way.

> So, you're doing your own independent work, but you're also commenting on it, on each of them. I think that was nice (Jo)

The support of group members and facilitators created a safe environment in which there was acceptance for not thriving at everything and freedom to be somewhat vulnerable. Participants alluded to their own level of aphasia in relation to others in the group and were empathetic towards those they judged as having greater severity of aphasia. Alex expressed their concern when noticing that people did not appear to be coping:

> Who's embarrassed (. . .), he's nervous, you're nervous over there, you nervous. Oh no! (Alex)

Participating in the group was also associated with stress for some because of language difficulties or negative comparisons with the creative and technological proficiencies of others. Dev expressed their experience of working with the group in positive terms yet also reported sometimes finding the group stressful, comparing their expressive language abilities negatively with others.

> "Sometimes this group, I can sometimes, I get worried (. . .) sometimes I get stressed" (Dev)

Participants felt that facilitators worked hard to support them to use the technologies in creative ways and to ensure everyone understood instructions and could contribute. They created trust that the series would build in a manageable way and that it was a worthwhile use of time. The facilitator role appeared key to successfully leading participants through the series.

> "Fantastic. I thought they were on our wavelength, and, they were open to our ideas, they put you at ease" (Ceri).

Pat reinforced the centrality of the facilitator role to fostering a positive experience around potentially challenging aspects of the workshop series:

> I'm not a creative person by nature (. . .). I tended to be um lost in all sort of art classes and I tended to be much better at sort of doing things like Latin (. . .) but when it came to art, I was, you know, right at the bottom. They really did their best to try and get, get stuff from us (. . .) they discovered my inner child. That was my, the cliche I used, so that was all very positive (Pat).

All participants felt supported by facilitators. However, there were complexities in asking for help. For example, Hilary had trouble grasping one of the apps on the iPad. They found it difficult to keep disturbing their neighbour, yet they were also reluctant to draw facilitators away from helping people with more significant language disabilities. This was a cause of discomfort as they watched their neighbour competently moving ahead.

> She was sort of to me whizzing through it, you know, and I was just sitting and I kept turning to her. Where do I push here? What do I do (. . .) I didn't want to keep bothering her to help me (Hilary)

For most participants, critical comments about individual workshops were framed in relation to more positive experiences with other aspects of the series. Conceptions of success were thus contained within the workshop series as a whole more than in relation to individual workshops. Overall, the experience of exploring creativity and technology within the group in an entertaining way was considered as important as the actual outputs. The next theme explores participants' perspectives of their creative and technological capabilities in working towards these creative outputs.

Theme Two: Conceptions of Capability

Participants were able to articulate which aspects of the workshop series made them feel creatively or technically capable and which did not. The way they discussed their capabilities was revealing of the extent to which perceptions of proficiencies related to their sense of themselves as *being* creative or technically capable people. It appeared important that they should feel capable with some aspect of the workshop series when viewed as a whole. Participants also reflected on opportunities to *become* more capable with respect to the creative and technological components of the workshops. Their perceptions of capability shifted throughout the workshop series in response to creative and technological challenges, learning, and the way in which each workshop built on the previous workshop.

Being creative or technologically capable

Self-evaluations of capability appeared to relate to the extent to which participants had opportunities to demonstrate capability with *something* when reflecting on the full workshop series, as well as to the impact of stroke and aphasia. The workshops involved different types of creative tasks - image based and word based, non-digital and digital - and different types of technology - specifically novel iPad apps and the CreaTable tangible technology. Almost all participants reported ability with some aspect. For example, being good with images but not with words. Thus, although capability limitations with specific creative or technological tasks were commonly reported, most participants were able to conceive of themselves as possessing capabilities. Moreover, participants' reports of capability were often based on multifaceted factors outside of the severity of their aphasia as demonstrated by the nuanced range of participant data across the demographic spectrum reported in the following analysis.

The relationship between how participants reflected on themselves as being creative or otherwise as people, and the creative abilities they could demonstrate in the workshops was not straightforward. Hilary was an appreciative consumer of art exhibited in

galleries but had strongly negative perceptions of their artistic ability originating from feeling ridiculed at school. These perceptions were exacerbated by comparisons with the creations of other group members in the first workshop.

> Some of the others were, really looked like good stuff, you know. And I sort of looked at mine (. . .) I thought I've sat here for sort of two hours and it was nice, playing with the shapes and the charcoal, but when I saw the results, I was more upset, I suppose, than anything else, it was, I sort of thought, oh, do I want to go back? (Hilary).

The negative experience Hilary expressed in relation to art was balanced by a more positive experience in a later workshop when they were able to demonstrate creativity with words. The opportunity to contribute something to the group and show capability was important to their overall sense of satisfaction with the creative outputs. The experience generated a desire to be more creative beyond the workshop series.

> I felt like I was back at school, I felt like this is horrible, and I don't like this, but when I got to this bit with the words (. . .) it was a great feeling to sort of think, Yay! you know, I, I can do this. This is, this is good (Hilary).

Alex also compared themself to others. They were very critical of the poem they were able to produce. Their lack of ability with this task had a negative effect on how they viewed their capability.

> When we had to do a poem I feel a little bit stupid like oh Jesus Christ (. . .) everyone else, [participant name], she was really good, he good, but um, I don't get it (Alex).

However, this did not appear to impact on Alex's sense of being a creative person. They framed their limitations in terms of personal preference "I don't like poems" more than lack of capability and considered themself creative in aspects outside of the series related to their work. Alex also felt very comfortable with the technologies introduced in the workshops. This may have contributed to their overall sense of being capable. This was also the case for Robin who, in the interview, using the fingers on their left hand in increments of zero to five twice over, identified as 10 out of 10 in terms of creative ability and eight out of 10 in relation to technology. Similarly, Dom, who despite being self-deprecating about everything they produced, had a strong sense of themself as a creative and technologically proficient person, based on experiences in employment. In the following extract, Dom describes their poem as useless, but they communicated this with a good-humoured tone. Their perception of lack of capability with creating a poem did not appear to impact them negatively and their enjoyment of the task is evident in their language.

> Poem is strange, but, exciting, but weird and sometimes useless, but exciting (Dom).

Ceri had a strongly creative background but distanced themself from their former art-based career, identifying more with their later career in business. They enjoyed opportunities to express themself in different ways each week and were confident creatively and technologically. However, their satisfaction was closely tied to the group experience, with limited desire to continue to express themself creatively beyond the workshops.

> Whether I might motivate myself separately, alone, I don't know (Ceri).

Having capability in some aspect may have had a balancing effect, contributing to the overall positive experience of the workshops. However, one participant did not consider themself to have demonstrated any creative or technological proficiency. Pat reported a strong sense of themself as uncreative "I had not a creative bone in my body" and as not proficient with technology. They were nonetheless positive about participating. Further exploration of this apparently contradictory case indicated that Pat was comfortable in their identity as a person who is not creative, counterbalanced by a sense of being instead more academic (see earlier extract from Pat illustrating previous theme). The lack of capability Pat reported appeared to reinforce their sense of themself as uncreative in an unproblematic way "just a fact". The benefits they reported related to having fun and enjoying experiencing new things with a group of people.

The type and level of stroke and aphasia affected participants' perceptions of capability, but this related in complex ways to their sense of themselves as creative and technologically proficient. The stroke-associated factors that most affected creativity were associated with weakness and finding written "letters and words difficult" (Jodie). Functional impairments interacted with creative capacity, as illustrated by Ceri when explaining that difficulties drawing on the iPad were both "physical and inspirational". When faced with difficulties getting to grips with the technologies, participants responded in ways that related to their sense of themselves as technologically proficient or otherwise. This did not necessarily relate to stroke, however, the impact of stroke on speed of processing was noted by Hilary, who had previously considered themself quite good with technology. Hilary reflected negatively on the loss of their pre-stroke competence which was revealed by taking longer than others to grasp one of the apps:

> I can just look at it for an hour (. . .) I just don't get what I'm missing (Hilary).

A further stroke-associated factor that impacted on perceptions of the workshop series was fatigue. Although almost all were satisfied with the two-hour duration of each workshop, they commonly reported feeling "tired with fatigue" (Alex) by the end despite the inclusion of breaks in the workshops. When asked about their workshop experience Jodie reported:

> Jodie: Yes. Good. Good. Erm, Erm, computers and things like that, fine. But tiring.
>
> Researcher: It, tiring?
>
> Jodie: a bit, well,
>
> Researcher: What was tiring?
>
> Jodie: Erm, doing erm, er don't know erm. Breaks good.

Becoming capable: 'difficult but good'

Most participants reported some level of challenge with creative or technological aspects of the workshops, which were sometimes reported with expressions of personal self-criticism and, other times, treated lightly. For most, challenge was reported in positive terms, although there were occasions when the 'sweet spot' between challenge and achievability was missed, and this could trigger negative feelings. Participants reflected on factors that facilitated feelings of satisfaction in overcoming constraints and in learning new things. These included factors contained within the previous theme relating to

support from facilitators and other group members and the tone of the group. In this section we explore factors relating to how capability was extended through a structure that built week on week, incorporating varied tasks that tapped into different capabilities.

The workshop series was designed to build gradually, with outputs from earlier workshops providing material for those that followed (Table 2). Several participants reflected on the way this built together as important to their overall experience, helping them to develop capabilities in a managed way. Layering of activities was valued as a means of accomplishing more than would be possible in a single session by a single individual. Jo had been uncertain about the purpose of the first workshop (creating images *without* digital technology). However, this was resolved through subsequent workshops in which facilitators used examples of work already produced and carefully explained how the current workshop would build on it. The process of building gave a sense of satisfaction when looking back over the workshop series:

> I think it was really good, the way that when we did put it all together, it did create something (Jo)

This building process was not clear to participants at the start and a cause of dissatisfaction to some. For example, Jo had found being asked to create something "random" in the first workshop quite challenging. Their satisfaction increased as they were led through the full workshop series and began to see how the weeks built on each other. In the following extract they reflect on the language constraints in one of the tasks (words with *CreaTable*). They explain that despite constraints in individual workshops, the way they built on previous ones resulted in satisfying outputs.

> As I say, it was just restrictive in the language, and the answer. I suppose each element was restrictive in its own way. But you can certainly see how if you built up on that, the availability, um, what people can achieve, it's fantastic (Jo).

The workshop tasks presented a number of challenges, both intrinsic to the tasks themselves and in relation to personal capabilities and the impact of aphasia. Most participants indicated a positive orientation to the challenges they faced. Jodie used the term "difficult but good" to express both their struggle with tasks based around the written word due to their aphasia and the satisfaction they gained from trying out new things. Dev and Dom reported the technologies helped them to do something they had not been able to do before. Alex found the technologies unchallenging, but the challenge lay in retaining energy throughout due to experience of fatigue. Ceri experienced difficulties producing art due to weakness in their dominant hand and found tasks with too many options challenging. However, they appeared to welcome the stretch and benefitted from working through challenges in a supportive group.

> Even the most challenging, you know, I was up for the challenge (Ceri)

Most participants expressed little difficulty in learning to use the technologies introduced during the workshops, however some learning was involved as expressed by Robin:

> Researcher: What did you think of the technology itself, was it easy to use?
>
> Robin: ha ha (thumbs up)

Researcher: Was it easy to use?

Robin: (vocalises with tone of hesitation)

Researcher: Ok, I'm not sure I've got you there, so was it kind of so so (holds hand level). Is that what you're saying. It wasn't easy to use but you could learn it?

Robin: hmmm hmmm (thumbs up).

Several activities limited the number of choices available. This could be both constraining and freeing. For example, Jo felt the challenge of finding a use for unfamiliar words in poetry tasks (within *MakeWrite* and *CreaTable*) freed them to be creative, contributing to their sense of satisfaction. Ceri, similarly, felt that having "some control but limited control" enhanced the meaning of the poem they created and suggested that their performance with another task (*Inker*) would have benefitted from similarly narrow parameters. Others viewed constraints as an impediment to creativity, for example, Pat would have preferred to write a *MakeWrite* poem with a completely free choice of words. They also felt limited by the available wording options in the Comic Spin app. Whilst most participants reported challenge in some aspect of the workshop series, they appeared to welcome it and felt that taking part had been worthwhile.

Overall, most participants strongly expressed satisfaction with the workshop series, in particular valuing the supportive space to try out new things. They were aware of their creative and technological capabilities on entering the group and could reflect on the extent to which these shifted through completion of the workshops.

Discussion

The aim of the work reported here was to explore how people with aphasia used and experienced non-therapeutic creative digital technologies. We found that using creative technologies and engaging in creative tasks gave people with aphasia an experience of capability when viewed as a whole: the process and experience of creating and being together appeared more important and satisfying than the individual discrete creative outputs. Whilst reflection on outputs with or without comparison to the outputs of others sometimes generated negative evaluations, these appeared to be tempered with subsequent experiences of capability with another technology or aspect of a task. Some tasks were more challenging than others, and a range of factors appeared to influence this differently for individuals e.g., fatigue, previous life history and occupation, and perceptions of self as a creative person. There was a sense that the experience was challenging, but largely pitched right or delivering satisfaction, so this challenge was by and large perceived as 'difficult but good'. Succeeding or achieving in the face of challenge appeared positive, worthwhile, and satisfying. The experience was enjoyable for those taking part, with social connection evident, and people highlighted the facilitators' strengths in creating a trusting and accepting safe space. These findings are considered in relation to the literature on accessibility, constrained creativity, flow, and group engagement, with an initial preface about digital content creation.

It was the prime intention in this study to capitalise on the opportunity now afforded by technology as noted by Elman (2001). That is, to explore the use of novel creative technologies with people in community workshops. The technologies were "language-

light" and co-designed to minimise or eliminate the barriers experienced because of the aphasia (Neate et al., 2019, 2020a & 2020b). Thus *MakeWrite, CreaTable, Comic Spin*, and *Inker* made digital content creation accessible for people with aphasia by giving them access to *engage* in creative activities with simple technological designs and interfaces, requiring minimal language ability and heavily underpinned by user experience design. Equally, these technologies enabled *creative expression* by constraining the creative space, for example, traditional creative expression through poems (*MakeWrite*) or storytelling (*Comic Spin*) is supported by various constraints built into the tools such as only presenting a limited number of words with which to create a poetic output in *MakeWrite*. Few people with aphasia expressed difficulties with the technologies, suggesting that the strong co-design phase that underpinned each of the technologies achieved the goal of removing or minimising known barriers for people with aphasia. This high level of accessibility, teamed with facilitator support during workshops, enabled people with aphasia to feel capable and experience a sense of achievement whether it was being creative or mastering the novel technologies. Facilitator support is known to assist with engagement and persistence in technology use by people with aphasia, albeit in therapeutic rehabilitative contexts (Kearns et al., 2021). Similarly, having an opportunity and a supportive, enabling environment as created in this project is important to people with aphasia and contributes to a sense of living well (Manning et al., 2019).

A distinctive factor in this research was the use of creative activity as an end in itself. The aphasia literature includes many instances in which creative activity is used to enhance communication or promote psychological well-being. Examples include the use of drawing for compensatory communication (Sacchett et al., 1999) and applications of art therapy (Pąchalska and Góral-Półrola, 2020), where the expressed aims included the relearning of language and the provision of psychological and social support. In the last decade, choral singing has emerged as a new contributor to aphasia rehabilitation, with anticipated benefits for functional communication, language, participation, and quality of life (Raglio et al., 2015; Tamplin et al., 2013; Tarrant et al., 2021; Zumbansen et al., 2017). In the current study, no hypotheses were developed about the rehabilitative potential of engaging with the technologies. Rather, we were interested in whether the technologies stimulated creativity and how their use would be experienced. The absence of explicit rehabilitative aims was clearly not a problem for the group members. None queried the purpose or value of the workshops. Rather they celebrated the opportunity to work both individually and collectively on creating outputs. It is also striking that they did not frame the benefits of the workshops in terms of progress with their recovery. Possibly the focus on something other than aphasia was welcomed (see also other initiatives i.e., *Drawing for People with aphasia* (https://www.facebook.com/aphasiadrawing/) and *The Art of Conversation with Aphasia* (https://conversationwithaphasia.wordpress.com/) which reflect this emerging field). In line with these arguments, a number of participants flagged the constraints imposed by the technologies as being facilitative. There were, however, also critiques of this aspect, with some participants desiring more options to be made available to users. Future technologies might aim for some degree of flexibility on the constraining factors.

The introduction to this article flagged the threat of aphasia to a person's sense of self and suggested that engagement with creative and artistic activities might help to address this dilemma. It is striking that several interview responses reflected on identity issues,

such as whether or not individuals perceived themselves to be creative. Some of these responses were negative, for example, when individuals expressed dissatisfaction with what they had produced. However, these were often tied to the person's pre-stroke identity, such as Pat's claim of not having a 'creative bone in my body'. There were also a number of responses which recorded a sense of validation and pride arising from the workshop outputs. Our results suggest that use of the technologies invited participants to reflect on who they were, both pre and post stroke. As with any creative activity, using the technologies posed an element of risk. Outputs might fall short of a participant's expectations or may be perceived as poorer than those produced by others. The availability of a range of technologies, employing diverse modalities, was helpful here, in that participants were able to capitalise on different interests and capabilities. Our findings also suggest that using the technologies in a facilitated group context was important. Here participants could benefit from peer and group leader encouragement and feel pride in collective, rather than just individual, outputs.

We identify some indication of *flow* (Csikzentmihaly, 1990) in the findings. Flow is defined as "positive experiences of intense concentration, distorted time passage, and a loss of self-consciousness that result from matching task difficulty to a person's skills level" (Sather et al., 2017, p25). In this study, people were capable, they experienced both a 'difficult but good' level of challenge and a sense of accomplishment. Flow has been only recently discussed in the aphasia literature and is considered beneficial for its generation of positive emotions and wellbeing and the potential to reduce the sense of being communicatively disabled by becoming absorbed in the activity (Sather et al., 2017). The accessible and constrained features of the technologies, with facilitator support, is very likely to have contributed to tasks being pitched at the right level of skill and challenge. Flow may also have been promoted by the absence of explicit rehabilitation context and targets. As noted by Sather and colleagues, environmental factors can be manipulated to create the optimal conditions for flow. However, the extent to which people were intensely attending to and present in the activity and the extent to which they lost track of time through absorption was not overtly apparent in the findings, and deserves further consideration in the future. Further research into the intersection of flow and creativity with people with aphasia is also warranted.

Finally, the level of group engagement in this project is a key finding. It was clear people found the experience enjoyable and fun, there was social connection with others, and trust and safety were established by facilitators. The group was also clearly supportive and nurturing – the experience of doing and learning together was positively viewed by those who attended. It is likely that factors that are known to underpin the success of community aphasia groups - meaningful group activity, employing ritual and structure, and leading and supporting the group (Lanyon et al., 2018) - were also operating in this project. Additionally, several psychological benefits – peer support, social interaction, self-esteem, improved mood - are common outcomes from arts-based interventions (Morris et al., 2015; Tamplin et al., 2013; Tarrant et al., 2021). Interview data suggest all participants, regardless of aphasia severity or other demographic characteristics, experienced feelings of capability within the workshop series. However, not all experiences were positive, and the group context in some ways was exposing or performative wherein comparison with others' outputs led some individuals to negatively evaluate their own creative outputs. To some extent, the constrained nature of the technologies had

a levelling effect, however comparisons were still made. Further exploration of this within workshops and/or probing outside the context could help address this response, as would exploring individual differences and preferences for technologies and levels of challenge.

Limitations

Due to the inclusion of participants with a range of aphasia severities, and the need for a mixture of descriptive reporting alongside the reporting of direct quotes, there is a risk that readers may not always clearly "see" the results from participants with more severe aphasia and that the voice of more articulate participants may be disproportionately represented in the direct quotes. However, where claims are made about group perspectives, the authors searched the data carefully to ensure wider concurrence.

The perspective of people with aphasia is of primary importance in evaluating the success of these workshops, but there are other perspectives (e.g., facilitators) and datasets (e.g., substantial observational data and participants' ratings on each technology) which illustrate *how* and *how well* people with aphasia made creative use of these novel creative technologies that would help explain the capability and success engendered by this project. Such perspectives could be explored further within future investigations. With regard to the breadth of the interview data collected, needing to complete interviews online may have restricted participants' abilities to fully express their views in response to questions, despite the level of communication support provided.

Finally, this work reports findings from a study with nine participants who were based in one geographical area of the UK and who formed part of an established community aphasia group. Whilst this group comprised a range of linguistic profiles, future work may look to explore whether participants with aphasia from different geographical, socio-economic and age backgrounds might experience such workshops differently.

Implications

This study demonstrated that the creative technologies achieved their goal of enabling creative engagement. There are several implications. Firstly, the success of the technologies was dependent on the careful and committed co-design process, informed by a blending of interdisciplinary expertise, through which they were created. This highlights the value of usability work in the development of technological applications for aphasia and demonstrates that partnership working is crucial for future technological expansion in the field of aphasia research and practice. Secondly, success did not arise from participants using a single technology in isolation. It was important that participants had the opportunity to experience a variety of creative opportunities with different technologies and that they did so within a safe, accessible and facilitatory space and a social group context. Delivering the workshops over a period of time likely enhanced engagement, also contributing to success. Future creative activities for people with aphasia, including those that use creative technologies, can learn from this to deliver the activities within a carefully planned context and process. Finally, participants in this study found value in being creative for its own sake. This indicates that creative activities for people with aphasia can be introduced as an end in themselves and do not have to be embedded within rehabilitation or well-being interventions.

Conclusion

The results reported in this paper invite further reflection on the role of technology in aphasia rehabilitation. Conventional speech and language therapy rightly addresses specific communication and/or well-being aims. Such aims are clearly articulated and identified in collaboration with people with aphasia and family members, and various technologies exist to support these broad rehabilitation goals. The work reported here instead offered opportunities for creativity without specified a priori goals, using bespoke technologies developed for the user group. This exemplifies a novel way in which non-therapeutic technology can supplement conventional treatments. Technologies like those developed by the INCA project provide an accessible resource for independent experimentation by people with aphasia or can augment the activities offered by community aphasia groups. They do not attempt to mimic typical therapy tasks but foster creativity for its own sake. Interview responses here show that people with aphasia embraced the technologies. The direct benefits of their use were not explored, but observations suggest that enjoyment and stimulating conversation might be high on the list.

Notes

1 https://blogs.city.ac.uk/inca/
2 An online exhibition has since taken place, subsequent to these interviews.

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Appendix 1: Interview topic guide

Introduction

- Reminder of ethics/Consent/Confidentiality of interview and analysis
- Objective of interview/Structure and duration/Any questions?

Context: Tell me your experience of taking part in the INCA workshops

- What involved/What did/What created or made

Process: I'm interested in hearing about what you liked and didn't like **and why**

- Content [refer to each of the 6 workshops with supporting information]
- Technologies: MakeWrite, CreaTable, Comic app [probe each]
- Length of workshops
- Working with other group members
- Pre and post workshop assessments or questionnaires
- Working with the facilitators: How got on with them/Good/Could be better

Outcome

- Thoughts re what created in the workshops [Refer to earlier answer]
- Did technologies help you do something you couldn't otherwise do? What/How/How much
- Shared what made with family or friends? How/What they said
- New experience using technology/Did already (+ as a person with aphasia)
- New experience being creative/Did already (+ as a person with aphasia)
- Benefits from taking part in INCA (+ as a person with aphasia)
  - Creativity/Expressing self/Feelings
  - Attitudes to technology/Learning about the digital world
  - Talking/Conversation/Social situation
- Anything would add or change? Technologies/Workshops/Staff or facilitators
- Extent workshops addressed things important to you
- Extent would recommend the technologies to others
- Overall was the time and effort expended worth it for the benefit gained?
- Anything else would like to say?

Ending

- Thank participant for their time and information
- A short summary of (group) results will be sent to all participants at the end of the study

Appendix 2: Thematic index

(1) Organisational Factors

(a) Overall perceptions of series
(b) The facilitators
(c) Logistics
(d) Completing questionnaires

(2) Working with a group

(a) Perceptions of group functioning
(b) Impact of disabilities
(c) Working individually (plus 1:1 attention)
(d) Comparing self to others

(3) Personal factors and identities

(a) Emotions, feelings and personal
(b) Being/not being creative or artistic
(c) Being/not being technologically proficient
(d) Approach to challenge
(e) Structure as constraining or freeing
(f) Learning or revisiting

(4) Outputs

(a) Perceptions of what was created
(b) Building week on week
(c) Sharing/discussing outputs with others
(d) Carry over beyond the workshops

(5) Using the technologies

(a) Creating images without technology
(b) Creating images with Inker
(c) Creating words with CreaTable
(d) Creating words with Make Write
(e) Creating words and images with CreaTable
(f) Creating comics with Comic Spin
(g) Creating sequences with CreaTable
(h) Curating through Zoom