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# Creativity in Older People Designing Digital Devices

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## ABSTRACT

Digital devices, such as mobile phones, are often hard for older people to use, and uptake of such devices amongst the older population is currently low. Our aim is to increase understanding of the way in which older people can be more involved in designing digital devices to suit their own needs. We describe a creative process involving designers and older people in completing cultural probes and participating in creative workshops. We analyse the creative process based on our observations of stimuli and blocks to creative thinking during the workshops. Our results indicate that the most productive way to involve older people in the design of digital devices for the older population may be to have older people working alongside designers during the creative design process.

## Categories and Subject Descriptors

D.2.10 Design – methodologies; K4.2. Social issues – special needs

## General terms

Design, Human Factors

## Keywords

Older people, creativity, creative process, creative stimuli, creative blocks

## 1. INTRODUCTION

Older people have to cope in their daily lives with the various ageing and technological challenges that life brings. However digital devices, such as mobile phones, are typically designed for a younger market [5, 4] and are often hard for older people to use. Older people's needs are rarely taken into account, and they may therefore be excluded from using many potentially useful digital technologies. Even products designed specifically for the older population are often designed by middle aged designers who may themselves be using the newest technology, but are not familiar with older peoples' lifestyle, their way of thinking and expectations [5]. This results in the development of inadequate products, which do not take account of either physical or cognitive aspects of ageing [5]. We should therefore not be surprised that uptake of such devices among the older population is currently low.

Healy [5] reports that designers are frustrated by the low uptake of digital technologies by older people. This is entirely understandable, since as the older population grows, it becomes an increasingly attractive target market. However, older people are rarely involved in a standard product design process and if

they are, it is only in focus groups [10] at the beginning of the design process, or in usability tests at the end [3]. Designers and marketing departments believe that older people are not creative [10], and are therefore not capable of greater involvement in the design of devices to suit their own needs. However, a number of studies eg [1,7] suggest that creativity can persist in some people into their late eighties, and even until the end of their lives.

Our aim is to increase understanding of the way in which older people can be more involved in designing digital devices. The work reported here builds on an earlier study reported in [13]. In this paper, we now report the results of a study which sought to identify factors that can both stimulate and block creativity in older people participating in creative workshops aimed at designing digital devices for older people. Greater understanding of these factors will enable future design methods to be tailored more specifically to the requirements and constraints of older people, enabling them to participate more effectively in the design of devices to suit their own needs.

In the rest of this paper, we first review literature relating to stimuli and blocks to creativity (section 2). We then describe the creativity workshops carried out with older people as part of our study (section 3) and the way in which activity during the workshops was analysed in order to understand what stimuli and blocks to creativity were in evidence during the workshops (section 4). In section 5, we present the results of the analysis, and in section 6, we end with some conclusions.

## 2. BACKGROUND

In this section, we present a brief review of factors that have previously been identified as stimuli or blocks to creativity, focussing in particular on the context of group work, of the kind used during our creative workshops.

### 2.1 Factors that stimulate creativity

Several authors have identified general factors that support or increase creative activity. For example, Sosik [12] suggests that encouragement, stimulation, and reward all tend to stimulate creativity, and Loi [8] discusses the use of playful triggers to increase engagement and richness of discussion between group members as a result of better teamwork.

Paulus [9] identified a number of factors that stimulate creativity during group work, including group information exchange leading to the development of more complex ideas; conflict leading to re-evaluation and development of ideas; and the possibility of viewing different options for solving problems.

Numerous authors have proposed the use of particular techniques such as brainstorming, mind-mapping, analogical reasoning and constraint-removal for stimulating creative thinking, and there have been some studies eg [6] that seek to compare the effectiveness of such techniques in generating new ideas.

There has so far been little research on what stimulates creativity in older people. However, work done in a previous study by one of the authors [14] suggests that a source of ideas of particular relevance for older people is their own life experiences.

## 2.2 Factors that inhibit creativity

Davis [2] defines barriers that inhibit creativity as ‘blocks, internal or external, that either inhibit creative thinking and inspiration or else prevent innovative ideas from being accepted and implemented.’ He distinguished between five categories of blocks that inhibit creativity: learning and habit, rules and traditions, perceptual barriers, cultural, emotional and resource barriers. Roger von Oech [15] has also famously identified blocks to creativity such as looking for the ‘right’ answer, feeling a need to be serious rather than playful, and individuals feeling they are not creative.

Paulus [9] identified a number of factors that can inhibit creativity in the context of group work including: premature judgement of ideas; negative conflict; too much or too little similarity in background between group members (leading to lack of interest or lack of understanding); and lack of attention by individuals to their own ideas in comparison to those produced by the group. Some of the other blocks identified by Paulus in relation to social phenomena in a group were later investigated by Warr and O’Neill [17], who investigated ‘production blocking’ whereby one group member blocks others from expressing their ideas, for example by constantly speaking, or holding the only pen; ‘evaluation apprehension’, where members of a group are prevented from voicing their ideas by fear of criticism from others; and ‘free riding’ or ‘social loafing’ where some group members may become lazy, relying on others and not contributing as many ideas as they could.

Once again, there has so far been little research on what might block creativity in older people in particular. However, work done in a previous study by one of the authors [14] suggests that both cognitive limitations, such as increased confusion, and physical limitations such as frequent needs to take refreshment or go to the toilet may impact on older people’s creative activities.

Factors that stimulate and block creativity such as those described in this section were observed in our study during a series of three creative workshops involving older people and designers in the design of digital devices aimed at the older population. In the next section, we describe the way in which the workshops were conducted, and in section 4, we explain more about the creative stimuli and blocks that were observed during the workshops.

## 3. CREATIVE DESIGN PROCESS

The method used in our study for applying a creative process to the design of digital devices for older people was based on a four stage creative process including activities designed to support preparation, incubation, illumination and verification [16]. This section provides an outline of the process; further details can be found in [14].

The method as a whole had two main parts: the first part, intended as preparation, involved the use of cultural probes and was conducted individually. The second part of the process involved group work in creative workshops, and included several sessions each with different activities to support the three remaining stages of incubation, illumination and verification.

Participants in the study included 9 designers (researchers from the Centre for HCI Design and postgraduate students studying human-computer interaction) and 9 older people recruited from the Hackney Silver Surfers Centre, an organisation which provides IT training for older people. The designers were aged between 27 and 48 with a mean age of 35, and older participants were aged between 57 and 78, with a mean age of 66 years.

### 3.1 Cultural probes

During the **preparation stage**, participants worked individually on a package of Cultural Probes for a period of one week.

The main aim of Cultural Probes was to mentally prepare participants for activities in the creative workshop by thinking how, where and when they used a computer, as well as imagining for what other purposes they might want to use one. Therefore, by working through the Probes, participants were asked to complete a workbook and to develop a Mind Map which illustrated their relationship with a computer, then answer a questionnaire and maintain a 7-day diary about how they used their computer. In addition, Mind maps which present the participants’ relationship with their computer.

When participants finished the first part of the study they were invited, in an interview, to explain their work, thoughts, drawings and Mind Maps in the Cultural Probes. At the same time they had a chance to meet the facilitator and see the place where the creative workshop would be held.

### 3.2 Creative workshops

During the creative workshops, which each lasted for one day, participants were asked to build on their thoughts and experiences while completing the cultural probes packages in order to design a digital device for the older population.

Three separate workshops were conducted with different combinations of participants, in order to enable comparison of stimuli and blocks to creativity in both designers and older people in different group contexts. The first workshop (‘designers’ workshop’) involved 6 designers, working together in two groups of 3 (referred to as ‘yellow group’ and ‘red group’). The second workshop, the ‘mixed workshop’, involved 3 designers and 3 older people. These participants also worked together in two groups of 3, where the ‘yellow group’ included one older person and two designers, and the ‘red group’ included two older people and one designer. Finally, the third workshop (‘older people’s workshop’) involved 6 older people, also working in two groups of 3 and referred to as ‘yellow group’ and ‘red group’. All workshops were video recorded in order to allow for later analysis of the creative process as described below.

The **incubation stage** in each workshop was supported by the use of Ice Breaker sessions, where participants were asked to tell others about the most pleasurable experiences with their favourite devices. Participants saw a short presentation about a future device designed for older people, and were then told their main task, which would be to design a digital device to assist older people in everyday activities. Support for this stage involved the use of brainstorming around four key questions (‘What will the device do?’, ‘When will the device be used?’, ‘Where will the device be used?’ and ‘How will the device be used?’), stimulated by use of ‘creative cards’, each containing a concept (eg ‘connection’) and visual image relating to one of the key questions. At the end of this session participants had a chance to

vote for the ‘golden idea’, which was then developed further in the next stage.

In the **illumination stage** participants were asked to develop their ideas in three different ways: visually, using storyboarding techniques - ‘draw it’; as a concrete prototype, using materials from a ‘magic box’ [11] – ‘make it’; or verbally, by recording an oral description or written concept definition - ‘tell me’. This session finished with presentations where participants presented their ideas to each other. Designs produced by the two groups in the mixed workshop are shown in Figure 1 as examples.

Finally, in the **verification stage**, participants were asked to evaluate their own and the other group’s ideas in terms of novelty and appropriateness using a questionnaire.



**Figure 1. Digital device designs produced by the mixed groups: an analogue calendar, produced by the yellow group (1), and an electronic teacher with help for older people managing daily problems, produced by the red group (2, 3).**

#### 4. ANALYSING THE CREATIVE PROCESS

Several different aspects of the creative process were analysed following the workshops described above (see [14] for further information). In this paper, we focus on our observations relating to creative stimuli and blocks as described in section 2, and in this section, we identify and explain what stimuli and blocks were observed during the workshops.

##### 4.1 Factors that stimulated creativity during the workshops

Based on an initial viewing of the video recordings of the workshops, it was decided to investigate a number of different creative stimuli that were in operation during the workshops. First, it appeared that three of the stimuli identified by Paulus (group information exchange leading to the development of more complex ideas; conflict leading to re-evaluation and development of ideas; and the possibility of viewing different options for solving problems) could be easily operationalized and observed during the workshops. Second, it was decided to look at the way in which the key questions used in the incubation stage and the ‘draw it’ and ‘make it’ techniques had stimulated creative thinking. The use of life experiences as a stimulus to creative thinking, which appeared, from a previous study, to be of

particular relevance for older people was also of interest, as was the use of other technologies as examples demonstrating possible features of a future device. These stimuli are listed and explained, with some examples, in Table 1.

**Table 1. Identified factors that stimulated participant’s creativity in the creative workshops**

Name	Explanation/example
<b>Stimuli identified by Paulus (1999)</b>	
Group information exchange	An idea appears as part of the development of a complex idea arising out of group information exchange. <i>Example:</i> An older person asked “How will the device be used?” One designer said that the user would use the wall. The second designer said it could be possible to add information there. The older person asked: “Will person talk to, or write on the calendar?” The first designer said that people would probably rather write more complex things, than learn sophisticated interfaces for entering information by speech. The older person asked: “How will you check that the user person is reacting to the device?” etc.
Positive conflict	An idea develops as a result of difference in views of the different group members. <i>Example:</i> A designer was suggesting different possible interface options that are available on the market and presenting different possibilities of TV use for entering information. An older person said that the device did not need to be that basic. The two older people in the group suggested a touch screen interface and the designer drew a touch screen on the worksheet.
Viewing different options	An idea develops as a result of considering more than one option for solving a problem. <i>Example:</i> A designer started a discussion with the question “What will the device do?” One older person started to talk about a cartoon character who could present information. The second older person suggested a screen for presenting information.
<b>Stimuli from methods used</b>	
Stimulus from key questions	An idea is stimulated by key questions e.g. What the device will do?
Stimulus from ‘draw it’ technique	An idea is stimulated by use of the ‘draw it’ technique
Stimulus from ‘make it’ technique	An idea is stimulated by materials in the “magic box”
<b>Other stimuli</b>	
Stimulus from life experiences	An idea is stimulated by reflection on a participant's life experiences (e.g. experiences with people with dementia).
Stimulus from technology	An idea is stimulated from any kind of past, present or future technology (e.g. iPhone)

## 4.2 Factors that blocked creativity during the workshops

Some of the social phenomena identified by authors such as Warr and O'Neill [17] were difficult to identify in the workshop videos: for example, if an individual was not contributing, it was not clear to an outside observer whether this was due to evaluation apprehension, social loafing, or some other reason. However, it was possible to observe instances of negative conflict, and also factors relating to cognitive and physical limitations in older people. These blocks are listed and explained in Table 2.

**Table 2. Identified factors that inhibit participant's creativity in the creative workshops**

Name	Explanation/example
<b>Block identified by Paulus (1999)</b>	
Negative conflict	Development of ideas is blocked as a result of disagreement between group members
<b>Cognitive limitations</b>	
Confusion	Ideas are not developed due to participants' confusion (e.g. not understanding instructions)
Lack of focus	Ideas relevant to the workshop are not developed because participants discussion moves off topic (e.g. participants talk about TV series, or their flats)
<b>Physical limitations</b>	
Need for toilet breaks	Participant needed to go to the toilet during the creative workshop causing a break in the flow of ideas
Need for refreshments	Participant took some refreshments during the creative workshop causing a break in the flow of ideas

## 5. RESULTS

In this section, we present the results of analysing the videos of each of the three creative workshops in order to identify instances of each of the different kinds of stimuli and blocks to creativity described in the previous section.

### 5.1 Creative stimuli for designers and older people

Overall, as can be seen from Table 3, there is a marked difference between the total numbers of creative stimuli observed in the mixed groups workshop (66 for the red group, and 67 for the yellow group), and the numbers observed in the designers' workshop (28 and 29 in the red and yellow groups respectively) and in the older people's workshop (20 and 34). This difference is apparent when considering Paulus' stimuli, which were observed much more frequently in the mixed workshop than the other two workshops, and the use of technology as a stimulus. It can also, perhaps to a lesser extent, be seen in the use of life experiences as a stimulus to creative thinking. However, there are no clear differences between workshops in the effects of the different methods as creative stimuli.

Looking at each workshop in turn, it seems that the main source of stimuli for the designers were the methods used in the

workshop, especially the key questions and the 'make it' technique. For the two groups working in the older people's workshop, the key questions and 'make it' techniques were also apparently the most effective stimuli, with 'make it' appearing to be particularly successful. In the mixed workshop, Paulus' stimuli appear to have been particularly effective for both groups, with the red group (involving two older people and one designer) also making particular use of the methods, technologies and life experiences as stimuli, and the yellow group (involving one older person and two designers) making particular use of life experiences and technology.

**Table 3. Numbers of stimuli of different types in the three different creative workshops (YG = yellow group, RG = red group)**

Type of stimulus	Designers' workshop		Mixed workshop		Older people's workshop	
	YG	RG	YG	RG	YG	RG
<b>Stimuli identified by Paulus (1999)</b>						
Group information exchange	2	2	12	4	1	0
Positive conflict	0	0	5	8	0	0
Viewing different options	2	5	16	12	0	2
<b>Stimuli from methods used</b>						
Stimulus from key questions	6	10	5	4	8	4
Stimulus from 'draw it' technique	3	1	0	8	0	1
Stimulus from 'make it' technique	11	2	5	10	13	12
<b>Other stimuli</b>						
Stimulus from life experiences	0	3	14	7	4	0
Stimulus from technology	5	5	10	13	8	1
<b>Different types of stimuli</b>	6	7	7	8	5	5
<b>Total number of stimuli</b>	29	28	67	66	34	20

**Table 4. Numbers of blocks of different types in the three different creative workshops (YG = yellow group, RG = red group)**

Type of block	Designers' workshop		Mixed workshop		Older people's workshop	
	YG	RG	YG	RG	YG	RG
<b>Block identified by Paulus (1999)</b>						
Negative conflict	0	0	0	0	5	3
<b>Cognitive limitations</b>						
Confusion	0	0	0	0	7	3
Lack of focus	0	0	0	0	1	6
<b>Physical limitations</b>						
Need for toilet breaks	0	0	0	0	1	3
Need for refreshments	0	0	0	0	1	2
<b>Different types of blocks</b>	0	0	0	0	5	5
<b>Total number of blocks</b>	0	0	0	0	15	17

## 5.2 Creative blocks for designers and older people

As can be seen from Table 4, neither the designers working alone, nor the mixed groups experienced any of the blocks identified above. However, both groups in the older people's workshop experienced each kind of block at least once. The most disruptive blocks were the instances of negative conflict, and those due to the cognitive limitations of confusion and inability to focus. The lack of concentration resulted in more off topic conversations (for example discussing what was on TV the previous evening) in both groups of older people. The older people were easily distracted by the noise from the other group, the workshop assistant, who was taking photographs, and the facilitator, who was providing additional information and explanations. In some cases older people started to talk to the facilitator as they would to a friend rather than as a researcher.

## 6. CONCLUSIONS

A clear finding from this study is that older people working only with other older people in creative workshops suffered the most blocks to creative thinking. This was largely due to confusion and lack of concentration, but also, to a certain extent, due to physical limitations, and the fact that disagreements between group members seemed to have a negative effect (negative conflict) – perhaps due to frustrations caused by other difficulties - rather than acting as a stimulus to creative thought.

However, older people working with designers in the mixed groups workshop suffered no such blocks. In addition, it was in the mixed groups, involving both older people and designers, that the highest numbers of stimuli to creative thinking were observed. Indeed these groups appeared to have much more creative conversations than the designers working only with other designers. Disagreement between individuals in mixed groups seemed to have a positive effect (positive conflict). Many different options were considered, and there was lively information exchange leading to the development of complex ideas. Older people in the mixed groups were able to share their life experiences with designers in such a way that these could be used to generate new ideas, and designers were able to describe and show different technologies that older people may not have been aware of as inspiration for creative thought.

The initial indications from this small-scale study are that it is entirely feasible to involve older people in the creative design of devices to suit the older population's needs, and that the most appropriate way to do this may be to have older people working alongside designers during the creative design process. Techniques used to stimulate creativity in the workshops reported in this paper were quite effective in this context, and potential problems due to cognitive limitations in older people did not cause any difficulty as they were working alongside designers who could help maintain focus and clear up any confusion. The findings reported here suggest that teams of designers and older people working together may be more productive in this context than either designers or older people working alone, and may produce more appropriate products that are more likely to be adopted by the older population. We look forward to further research that can investigate these initial findings in more detail.

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