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Investigating Familiarity in Older Adults to Facilitate Intuitive Interaction

Simon Lawry*, Vesna Popovic*, and Alethea Blackler*

** Queensland University of Technology, School of Design,*
Brisbane, Australia.
s.lawry@qut.edu.au
v.popovic@qut.edu.au
a.blackler@qut.edu.au

Abstract: This paper discusses how intuitive interaction is a possible way to increase the efficiency and effectiveness of interaction with older adults. It provides insights into existing research on intuitive interaction, and the role of prior experience and familiarity in intuition. An experiment is discussed which investigates differences in familiarity between younger and older adults. A comprehensive coding system has been developed to help analyse the data collected. This research is currently in progress.

Key words: Intuitive Interaction, Older Adults, Familiarity, Prior Experience, Industrial Design, Interaction Design.

1. Introduction

Population trends show that demographics are shifting towards a population distribution with a much higher number and proportion of older adults [14]. All world regions, with the exception of parts of Africa, are experiencing an increase in the percentage of the population aged 65% or older [14]. People interact with a wide array of products on a day-to-day basis, and these products are increasingly electronic, with advanced technology, and more inbuilt functions and services [10, 15]. Global demographics show a shift towards a society which has more older people, yet older adults often have difficulties using contemporary digital devices which are so prevalent in today's societies [5, 6]. This can create frustration, which in turn can flow on to feelings of increased social isolation, a reduction in motivation, and even depression [17]**.**

It is necessary to address this situation, not only to ensure that older people lead a more fulfilled life, but to also amplify their contribution to society. The potential benefits of the effective use of contemporary devices for older individuals are numerous, including improved social integration, higher levels of independence, and improved health management [17]. With increasing product complexity, and a shifting demographic, it is becoming important ethically, socially and economically, to address the issues surrounding the use of contemporary devices and older adults. Contemporary devices are defined as commercially available complex electronic devices, which utilise some form of menu-based navigation to access functions (eg. mobile telephones, fax machines, microwave ovens, and DVD Players).

2. Intuitive Interaction

One way of improving the usability and interaction of contemporary devices is to ensure the user interfaces are intuitive to use. There is no concrete definition of intuition. Blackler [1] has conducted an extensive review of

intuition which resulted in the following definition: "Intuition is a cognitive process that utilises knowledge gained through prior experience…" [2]. Additional properties of intuition identified in Blackler's [1] literature review include an increase in speed, higher levels of efficiency than other cognitive processes, and an unconsciousness regarding what is taking place.

It is important to make a distinction between intuition and intuitive interaction. Intuition is a cognitive process, while intuitive interaction is the use of intuition during an interaction with a product. Blackler states the follow definition:

> *"Intuitive use of products involves utilising knowledge gained through other experience(s) (e.g. use of another product or something else). Intuitive interaction is fast and generally non-conscious, so that people would often be unable to explain how they made their decisions during intuitive interaction"* [1]

Blackler, Popovic and Mahar [3] conducted the first empirical investigations into intuitive interaction. The most relevant conclusions of these investigations show that interface features which are less familiar are used less intuitively, older adults use products significantly less intuitively than younger adults, and performance is affected by experience and familiarity with similar products [1]. Blackler [1] also comments that the area of age and intuitive interaction warrants further investigation based on the findings.

3. Experience and Familiarity

Knowledge and prior experience are central themes in these definitions of intuition and intuitive interaction. Experience is closely related to familiarity. Familiar is defined as "well-known" [9] and experienced is defined as "having become skilful or knowledgeable from extensive participation or observation" [9]. Gefen [8] describes familiarity as "an understanding, often based on previous interactions, experiences and learning…". He continues to describe familiarity as an understanding of the behaviour, function, or action of an individual or an object. In relation to interfaces, familiarity is an awareness based on experience [8]. Every new product makes some reference to previous generations of products in some way, shape or form [13], and users generally rely on their experience with previous products when interacting with a new interface [6]. Products that require new user knowledge, rather than utilising existing knowledge, may face difficulties in use, understanding, and learnability [20, 21].

4. Experiment

The aim of this research is to uncover the differences in experience, and thus familiarity, between younger and older adults, and to investigate how familiar different users were with products they owned. This experiment is designed to investigate familiarity with contemporary devices in older and younger adults, and examine any differences in experience between older and younger. For the purposes of this research, younger adults are defined as 18 – 44, and older adults are defined as 45+. Furthermore, the older adult category is divided into 3 age groups, 45 – 59, 60 – 74, and 75+. 32 participants are required for this experiment, 8 from the younger adults group, and 8 from each of the age groups with the older adult category.

4.1 Experiment Procedure and Analysis of Data

The experiment was conducted in the participant's home. The experiment was split into two parts, with each part addressing a different experiment question. Part A examined what devices participants were familiar with, and their role in every day life; while Part B examined what the differences between description, execution and reflection were for a familiar device. The mixed methods used were semi-structured interviews, observation, and retrospective protocol. Part A utilised a semi-structured interview, to extract information about consumer and home-based devices that the participants used.

Part B utilised the second half of the interview, an observation, and retrospective protocol. Part B focused on the evaluation of participant familiarity. The first stage in Part B involved the participant selecting a device that was familiar. The participant was then asked to describe the steps required to perform a specific activity with that device. The second stage in Part B required the participant to perform the activity. The participants were asked to deliver concurrent verbal protocol while performing the activity. The video captured of the participant performing the activity was then transferred to a laptop computer. The audio was muted, and the video played back to the participant, while the participant delivered retrospective protocol on the interaction. By comparing the steps the participant described to perform the activity, with the steps that the participant actually undertook to execute the task, it is possible to identify the level of familiarity the participant has with the product, and with different parts of the interaction [4, 12].

The coding scheme was developed comprising of six categories. These categories are *(i) Step Description, (ii) Correctness, (iii) Familiarity, (iv) Interaction Concepts, (v) Error Recovery, and (vi) Procedure Identification.* Each category has individual codes. For example, the '*Step Description'* category refers to the accuracy of the description of the activity provided by the participant during the interview. This category compared the description of the activity with the performance of the activity. Every step identified with a code 'Step Description' was also classified in terms of '*Correctness'(eg. correct actions) and 'Familiarity'*.(eg. interaction familiarity).. The *'Interaction Concept'* category was used to classify comments made by participants. The codes were: an understanding of general concepts of interaction, and specific concepts of interaction related to the product useage. '*Errors Recovery'* was coded as reaction time, and recovery time. The verbalisation identifiers were: rushed actions, repetitive actions, and goal divergence. '*Procedural Identification'* was used to identify procedures executed during the activity (eg.two or more consecutive tasks were coded as very familiar).

Atlas.ti has been used to assist in coding of interviews and retrospective protocol. It helped in discovering patterns occurring across the data. Noldus 'The Observer XT' has been used to code observational data.

5. Conclusions

This experiment is currently being executed. Initial results show that older adults exhibit a set routine, and know how to perform the specific tasks with the contemporary products they own. This research is providing valuable insight into how older adults interact with familiar devices. There might be opportunities for innovative designs based on the older adults' prior experience with devices they are comfortable with. It is common for designers to speaking language through the products they design that older adults do not understand. It is left up to the older

adults to try and decipher these interfaces. Therefore, this research is aiming to facilitate a dialogue between designers and older adults, leading to products which will assist older adults in living a more fulfilled and independent life

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