

Assessment of Idea Generation Effectiveness of Children with Visual and Verbal Techniques

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ABSTRACT

My research explores how to optimize children's input in an early design process. By comparing the output of creative design sessions with children in which different participatory methods have been applied, I intend to determine factors contributing to an effective expansion and exploration of the design space at stake. The output will be measured by analyzing transcripts of the sessions in options for a design problem and criteria for those options. The options and criteria are then assessed on novelty, variety, quality and quantity. At this stage, I am comparing the effects of methods using verbal or visual techniques with children.

Author Keywords

Participatory method assessment; idea generation effectiveness, children

ACM Classification Keywords

H5.2 User Centered Design

INTRODUCTION

Research shows that children can be successfully involved in a user centered design process [3], [10] However, successful involvement does not necessarily mean that the method in itself was so successful. Until now, the application of most participatory design methods have been informally examined rather than formally assessed [7].

A participatory design method can be analyzed in terms of information exchange (instructing the children, evaluation of ideas by the children) and the creation of new information (a creative activity). Aspects like novelty, variety, quality and quantity determine the effectiveness of ideas generated by a method. This project examines how to

optimize children's input in an early design process., through comparing the output of creative a design session with children on novelty, variety, quality and quantity. Further considered evaluation criteria are cost/benefit measures of time and effort and fun in participation.

RESEARCH PROBLEM

Concluding the above, the research problem is: How to optimize early participatory design sessions for eight to twelve year old children?

To answer this question a study is planned comparing the ideation (i.e. idea generation) effectiveness of visual and verbal participatory techniques in the early design process with groups of children. The age group of eight to twelve year olds seems a logical choice since children in this age group are able to reflect as well as to generate and present ideas [1][5].

When choosing a target group among children, the following issues were considered: developmental stage, verbal abilities and consciousness about products and their alternatives as a certain level of abstract thinking was required. Acuff defined the children in age groups. The group of eight-to-twelve-year-old children has developed rule based thinking. They can understand rules, can define them and explore the consequences. From then on they start to develop abstract thinking, for example thinking about rules and their values. The language development of children is in principle complete around the age of six. After that age, they will increase their vocabulary and the difficulty of their utterances. Hennessey [5] found that children from eight year and older can successfully contribute to a group conversation. Finally the group of eight to twelve year olds is important from a marketing perspective, because they have sufficient influence in a household to take part in a decision making process on buying new products. In addition, they start to receive pocket money and therefore start to make decisions for themselves on what to buy and why. The combination of all three makes this age group interesting for this research.

The work of Druin [3] shows that it is fruitful to involve children in a design process. Their input can be valuable for designers to inspire, to collect requirements and even to

make design decisions. In this project, the user involvement is extensive, the children are involved in the entire design process. Nonetheless, the designer is the decision maker in this process, the child remains an informant providing information through participation in the design activities (see also Scaife [10]).

Approaching target users raises in the case of children a number of problems. Firstly, children feel more at ease when they are among peers than when they are one-on-one with an adult. Secondly, it is more efficient to approach a larger number of children in one session (provided that there is no loss of data) because group members will prime each other for information. Finally, it is more attractive for children to work in a group than individually.

The following sections explain the theoretical framework developed so far on PD-methods in terms of information processing and creativity. Furthermore, the experimental approach is explained, in which metrics for ideation effectiveness are proposed. The final paragraphs provide an overview of the work done so far together with emerging conclusions.

THEORETICAL BACKGROUND

To examine participatory design methods, concepts from cognitive psychology are applied. A method can be analyzed as a combination of periods of information processing and periods of creativity. An experimenter informs and instructs the participants to start a creative process after which the participants inform the experimenter about their ideas.

The distinction between verbal and nonverbal stimuli is a phenomenon in cognitive psychology that is relevant in both information processing and in creativity. The human memory works better if visual and verbal information are processed in parallel (Paivio [9]). A similar distinction is made in theories about creativity. In her book on creativity in context, Amabile explains that established creativity tests score for verbal creativity and nonverbal creativity [2].

Although it is a simple and appealing distinction, it needs some further refinement. Paivio [9] explains nonverbal information as visual stimuli. Amabile explains that although established tests make the gross distinction between verbal and nonverbal, creativity should be looked at per sensory modality, she mentions for example auditory creativity and artistic (visual) creativity [2]. The refined distinction is vital when looking at participatory design methods. For example story-telling, photography and drama make use of respectively verbal, visual and combined verbal and visual information.

Some participatory techniques require multiple cognitive modalities. For example, in prototyping or gaming are combinations involved of verbal, visual, auditory and even tactile information. To make a start with optimizing participatory design methods for a single modality, or combinations of modalities, simplification is required.

Therefore the focus of the next experiment is on the influence of verbal and visual stimuli on ideation effectiveness.

Hypotheses regarding potential implications of using verbal and visual stimuli for ideation effectiveness

If there is a clear distinction between processing verbal and visual stimuli, the effects should be noticeable in the output generated by using a participatory method. In the following paragraphs, two hypotheses regarding the expected effects for the information transfer from experimenter to the children and vice versa, and for the creative episode for the children are explained.

Information transfer from experimenter to the children

Starting a participatory design session, a design problem should be explained and instructed with both verbal and visual data. If the children receive both verbal and visual information, they make more referential connections [9] than when they receive only one type of information. We hypothesize that by being exposed to two stimuli simultaneously children will understand the design problem better, which means they become better informed about the design space than in a situation, in which they are exposed to only one stimulus at the time. Consequently, if children are better informed about the design space, they should be able to explore that space better and therefore generate more ideas.

Finally, if children communicate their ideas in both verbal and visual information to the experimenter, the experimenter should be able to make more referential connections within the design space. Therefore s/he should become better informed about the children's ideas and thus better understand their associations.

Creativity and verbal and visual stimuli

When working with a group of children, the experimenter will encounter individuals with different skills. Hennesey [5] defined the guideline of making groups of at least five children, to increase the chance that there are at least two to three talkative children in the session. However, to be more effective, a contribution from the less talkative children is desirable. Using techniques that require both qualities increases the chance that a child can actively contribute and participate in the session. Therefore, we also hypothesize that using more than one stimulus increases the chance for every child in the session to express him/herself and therefore increases the ideation effectiveness of the session.

APPROACH CHOSEN

The approach of my PhD project consists of three components. First, variations of design methods will be compared to examine the influence of different media (such as verbal or pictorial media) on the outcome of the session. The method will consist of individual creative episodes followed by a group session. In the creative part, existing techniques will be used (for example storytelling, or

photography). The time with the group is then used to discuss the results of the (individual) creative session.

Secondly, the data will be analyzed in terms of design alternatives and evaluation criteria mentioned during the sessions. This distinction is made based on theories about design rationales [6] in design meetings [8]. I have conducted a pilot experiment which showed that eight-to-twelve-year-old children can take part in a moderated design conversation.

Thirdly, the results will be analyzed using the ideas on measuring ideation effectiveness by Shah and Vargas [11] will be applied. They reason that a design method is fruitful if it significantly expanded and explored the design space. They proposed a combination of four metrics: novelty, variety, quantity and quality of uncovered ideas.

The level of novelty of the ideas is determined by the number of most unique ideas per method. The variety is determined by the number of different ideas per method. The quantity is the total number of ideas generated per method. The quality is the total number of feasible ideas generated per method. The Options and Criteria of the focus group session can also be analyzed according to these metrics.

The outcome of this research will provide insights on how using participatory design methods explore and expand a design space. In the first experiment, which will be carried out and analyzed before NORDICHI 2006, a comparison is made between using pictorial and verbal data during the individual creative session.

WORK PERFORMED

The work so far focused on developing a theoretical framework on the influence of using verbal and nonverbal stimuli in participatory design methods. Secondly a pilot experiment has been conducted to explore what output children would provide in an entirely verbal technique. It showed that the discussion suffered from cognitive tuning; especially the shy children started to agree with the talkative ones. Fern [4] described that risk for creative focus groups and suggests using nominal group techniques. That has led to introducing an individual creative session prior to the discussion.

Finally the experiment confirmed the idea that a design discussion is feasible for children of around ten. Olson and Olson analyzed conversations of adults for which they scored options and criteria. The transcript of the conversations showed that the children clearly discussed options and criteria for the issues raised by the moderator.

Future work includes the following experiments:

- A comparison of a mostly verbal technique (like word associations, or story telling) with a mostly pictorial technique (like photography, or collages)
- A comparison of a mostly tactile technique (for example using clay) with a mostly pictorial technique

- A comparison of using one technique among different age groups, for example eight year olds versus twelve year olds.

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