

Video Games as Research Stimuli to Study New Ways to Assess User Experience

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ABSTRACT

A number of methods have been proposed to assess users' subjective experiences when engaging with interactive applications. These range from self-report methods such as interviews and questionnaires that are administered after the interaction to measuring physiological data during interaction. While physiological data can objectively show arousal states, it fails in capturing how users subjectively appraise their experiences. Though self-report can give us the subjective appraisal, in practice it suffers from requiring users to have excellent linguistic skills and demanding a certain level of reflection in the first place.

In particular for children these drawbacks have been addressed by employing facilitators that assist children, trying to keep them engaged and to elicit feedback. Yet, facilitators can influence children in these evaluations in various ways.

In this paper we outline our planned research on establishing a new method for assessing user experience. The envisioned method is based on an embodied view of interaction and makes use of physical objects, which users are using during their interactions and that help them afterwards in reflecting on their experiences.

We describe how games are proving useful for this endeavor. They are used widely in our young target group, thus novelty effects can be expected to be low. Games are also designed to elicit a wide range of emotions. We thus can test our approach in such emotive environments before moving on to traditional task-oriented scenarios.

Author Keywords

User Experience, Embodied Interaction, Children, Games

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INTRODUCTION

A tricky part in evaluations is to capture how users feel during the interaction with an interactive application. Often they have difficulties expressing their feelings towards a new tool or application. A further difficulty arises from the personal context of a user. They bring with them expectations, prejudices, likes and dislikes difficult to take into account in traditional evaluation frameworks. Children are not the only category of users that is experiencing problems in expressing both verbally and textually their feelings and opinions, but indeed they are usually badly affected by this limitation.

Established self-report methods, e.g. questionnaires, focus groups, “think aloud” walkthroughs; also rely on participants having excellent linguistic skills. This and the ability to provide objective feedback are desirable features when selecting participants in user-centered evaluation experiments, even more so when looking at usability issues known to have a strong subjective component. Emotions and the ability to keep track of them explicitly play a critical role in this context even if traditionally there have not been any specific instruments for gathering this type of feedback so that it could be used as a filter when interpreting feedback data.

With established evaluation methods we refer to a number of methods that are used widely commercially and that have a sound theoretical backing from Human-Computer Interaction research. We should also add that, as we focus on user-centered evaluations, we address methods that involve users as opposed to expert inspection methods. So methods we address here include but are not limited to questionnaires, focus groups, interviews, and “think aloud” walkthroughs.

All these methods share a common drawback in that they rely on the participants' subjective memories, instead of objective measures. Also, they require participants to have excellent linguistic skills. Children often do not possess the skills required. To cope with this, often facilitators are employed that continuously try to elicit information from the child. Yet, the presence of a facilitator can bias results of such an evaluation, as a child might feel forced to say

certain things or just interacts differently with a system as when using it unassisted.

In recent years, the field of affective computing has come up with a number of approaches that provide more objective data. Typically, these approaches detect one or several modes of affective feedback. The most studied mode here are facial expressions, but also gestures, postures, vocal (nonverbal) affect have been investigated [7]. Often, multimodal systems combine several channels of affective feedback and fuse them into a more robust recognition system. Also physiological data like heart rate or skin conductance, have been used to infer the affective state of the user.

There have been significant advances in automated affect recognition, yet for the time being they are constricted to tightly controlled environments and not suited for real world applications [5].

USE OF PHYSICAL OBJECTS

We aim at establishing a further channel of affective feedback by employing physical objects that users interact with at evaluation time. In particular in the case of children, we think that there are clear advances to an embodied, nonverbal way of eliciting cues about the affective state. It has been shown, that children are able to act on preconscious knowledge, though they are not (yet) able to verbalize it [1], and put forward that the difference between preconscious and explicit knowledge is bigger in children than in adults [2]. We speculate that there is a parallel for affective states and that we can learn a lot about a child's affective state through cues from an embodied interaction.

The starting point of our investigation is the Sensual Evaluation Instrument (SEI) objects, i.e. 8 hand-sized sculptures developed by the Interaction lab at the Swedish Institute of Computer Science (SICS) that are presented in detail in [4]. The objects all share the same color and texture, and only differ in their shapes, which range from pointy edges to bulbous curves. Figure 1 shows the SEI objects.



Figure 1. Sensual Evaluation Instrument (SEI) objects

There is no direct mapping of certain affective states to an object. Instead users are encouraged to interact with the

objects during an evaluation session and then later reflect on their emotional experiences and their reasons for choosing a particular object.

An initial validation of the objects shows encouraging results: Two groups of users were asked to use them freely in any combination or position as means to express their emotions in three different situations: looking at static pictures, playing a video game and while being interviewed about the previous experiences. One group was based in Sweden and one in the United States. Both groups included university students and HCI experts, and both had 12 participants [3]. Findings showed users were all positive about using the tools, recognized some form of ambiguities among them and suggested either to have more in order to represent a wider spectrum of emotions (US users) or less in order to achieve a clearer picture (Swedish users).

Our plan is to adapt the original validation experiments of the Swedish group to an educational context and a younger target group, i.e. school children. We repeat the video game condition with the video game console Nintendo Wii, which is popular in our target group. The static image condition is substituted by showing an emotionally charged, yet age-appropriate movie, under the supervision of educators. Finally, we also plan to interview children on the previous two conditions.

The initial validation was an exploratory one. We see the need for a more thorough validation of the objects as a research instrument. This should include a comparison to other methods and considering different scenarios. At the moment we are planning to consider two use cases, based on our prior research experience: Games, an area associated with high emotional involvement and e-books, as a rather unemotional, matter-of-fact condition.

We see in fact two areas in which we want to employ the SEI objects: First, we want to validate them as evaluation instrument for children. Second, we want to explore in which way we can extend them to improve their range of application, explanatory power, and ease of use.

For the moment there is no direct mapping of the objects to a specific emotion. Depending on the outcome of our own validation we consider to further develop the objects, e.g. by changing shapes in order to achieve a direct mapping. Another option is to try other materials with different tactile properties or explore color as a new dimension.

An approach we are certainly going to follow is to enhance the objects so that feedback can be elicited automatically. We are thinking here of tracking the amount of activity of a particular object by implementing accelerometers and wireless transmission capability. Should the objects be made from a softer material also sensors measuring grip strength is conceivable here. The automatic elicitation of feedback features would free us from the need of manually annotating recordings of evaluation sessions, which is a very time consuming process. The activity data itself could

also be presented to the user in a suitable way to stimulate reflection.

NATURALISTIC SETTING

We want to conduct our evaluations in a naturalistic setting. The advantages of evaluating “in the wild” instead of a sterile laboratory environment have been mentioned widely. Especially when evaluating with children it appears useful to put them at ease by doing so in a familiar environment.

At the moment we have established a working collaboration with a Swiss primary school. Our target here is a 4th grade class, with typical ages between 9 and 10 years. The requirements for ethical approval of this collaboration consisted of getting the approval of the school dean and the teachers in whose classes we participate. In addition, parents were informed in a written letter of our research aims and planned activities.

During the first month we took part in the “computer class” as silent observers in order to get a first impression of the class but equally important to get students used to us so that our presence becomes normal to them.

At the time of writing this paper we have started to interact with the students in class. This means for the moment interviewing them on their experiences in computer class.

We also started to visit the primary school’s after-school program. Here students can stay after class up to two hours until their parents pick them up. Typical activities include doing homework assignments but also painting and playing games. We have begun to bring a Nintendo Wii console to the after-school party and have children play with it. Afterwards we briefly interview them and show them the SEI objects. For the moment we do not use the objects as an evaluation device but try to find out how the children appropriate them.

All of the 10 students that participated in our first session reported the overall gaming experience as enjoyable and pleasant, and the interaction with the Wii as intuitive, without differences between experienced players and novices. They did so by answering to a short, ad-hoc satisfaction questionnaire after playing with the Wii and interacting with the SEI objects.

Maybe as a reaction to the Wii Sports games that they had just played, a few boys tried to play bowling by rolling the round object into the other objects. Quite in contrast, several girls assigned character attributes to the objects and used them to invent and narrate a story around them.

Children were fascinated by SEI and looked at them as desirable toys. They also expressed their preference for spiky shapes, pointing out that these looked more interesting than the plainer, roundish ones. Yet, they tended to associate round shapes with their (positive) Wii game experience. So, unsolicited, they differentiated between their personal preferences for objects and objects that better represented their emotional experience.

In the near future we also plan to take part in the physical education class. Here, the educational goal of 4th grade is learning to deal with emotions, which appears to overlap significantly with our research aims of facilitating the reflection and articulation of one’s emotional states.

GAMES AS STIMULI

Video games are useful for our research for two major reasons. There exists a high familiarity in our young target group with video games. Also, games can be seen as a highly emotive environment, as they are specifically designed to provoke, excite, arouse, and motivate gamers.

During our early explorations at the primary school we learned that most children are video game-savvy and many have video game consoles at home. Playing video games constitutes an integral part of their everyday life. As such, it makes sense for us to test the SEI objects in this familiar environment. This helps us to ensure that a potential novelty effect can be kept as low as possible.

In our previous research we found evidence that gamers of the Nintendo Wii console play it for two dominant reasons [6]: One reason is to engage in an activity for the purpose of fun and enjoyment, without a utilitarian or abstract goal in mind. Playing video games here serves relaxation and recuperative purposes. It also reduces surplus energy and can be seen as an opportunity to practice and rehearse skills. It can also be important to reduce anxiety by confronting one’s fears in a safe environment. The other reason is to receive gratification by reaching high scores.

Since games are played for no utilitarian reasons, but for the sake of enjoyment, it makes sense for us to test the SEI objects first in research settings that are likely to elicit emotional reactions of users. Once we find good results here we can go on to other, more task-oriented scenarios.

CONCLUSIONS

This study starts from recognizing the shortcomings of traditional techniques when involving children in evaluation experiments. By using physical objects to elicit affective feedback from children, we not only aim at overcoming the need of facilitators, who can bias outcomes but also gaining access to preconscious, tacit knowledge that children often have, but are not able to verbalize. Our goal is to provide new, effective tools to support evaluators in different scenarios such as formative evaluations involving children and/or systems expected to have a strong emotional impact.

Our evaluations are set in a naturalistic setting, i.e. for the moment in a primary school. Here we can evaluate in a familiar environment and within the children’s social context.

Video games are widely spread in our young target group. The familiarity of children with video games, as well as the nature of video games being highly emotive environments predestines their use as stimuli in our evaluations.

The tools we propose should help to get a clearer picture of the affective states of users and to get more accurate and representative feedback to be gathered by evaluators. This should provide designers with better communication tools to support a fruitful and more natural collaboration with users, which is expected to result in improved system usability.

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