User Recalled Occurrences of Usability Errors: Implications on the User Experience

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ABSTRACT

Usability testing determines what problems thwart goal attainment, but what problems shape the user experience? This study gathered users recalled instances of frustration from using various technologies and categorized those frustrating incidents with the User Action Framework, an adaptation of Norman's seven stages of action for classifying usability problems. We found that many of the recalled frustrating incidents occurred while the user was in the Outcome phase and that most of those incidents were intrusive in the user's cognitive flow.

Keywords

User experience, frustration, user action framework.

INTRODUCTION

In order to facilitate a better user experience we need to know what experiences contribute to a good experience as well as a bad experience. In particular, what a user remembers of their experience gives insight on what the *user* feels was the most important part of the experience.

In this study the emotional response of frustration is focused upon. By understanding where and to what degree frustration occurs, we can improve user perception of their experience with technology.

In general we were looking for incidents of negative affect. We let the participants decide for themselves what constituted frustration. Since this study is primarily looking at user memory and perception, it was felt that the most important definition of frustration came from the user.

USER ACTION FRAMEWORK

The User Action Framework (UAF) is based on Donald Norman's Seven Stages of Actions [3]. In his book, Design of Everyday Things, Norman argues that user's go through seven stages towards goal attainment. From this

concept, researchers at Virginia Tech developed the User Action Framework [1] [2].

The Interaction Cycle of the User Action Framework has five high-level phases. These are Planning (establishing goals, tasks, and/or intentions), Translation (translating intentions into plans for physical actions), Physical Action (making physical input actions), Outcome (system internal response to users actions) and Assessment (perceiving, understanding and evaluating outcome). Planning, Translation and Assessment are all reliant on the user cognitive processing of the problem.

METHODS
Participants

Sixty-seven participants (31 men, 36 women) completed an online questionnaire. Each participant gave an average of 5.72 frustrating incidents (ranging from 2-11), which yielded a total of 383 incidents to categorize.

Apparatus

The questionnaire was online in order to allow the participants an ample amount of time to recall frustrating incidents in addition to being able to reenact the incident in question for a better description. The questionnaire began by asking the participants for their most often used applications and environments along with other basic demographic information.

Procedure

The participants were prompted to think back to using various operating systems, browsers, websites, text editors, email clients, PDAs, digital video recorders (TiVo) and any other technology. They then were asked to describe a frustrating incident if they had had one with any of the above categories. Each of the related incidents was then coded into one of the five top-level categories of the UAF by two coders. Each participant could have given more than one frustrating incident. In order to give equal weight to each participant's answers, two incidents were randomly chosen for analysis from each participant. After random selection there were 134 incidents to analyze.

RESULTS

First a test for intercoder reliability was performed which yielded 90% reliability on 10% of the data. Once all of the incidents (n=134) were categorized, 20.9% (n=28) were in Translation, 4.5% (n=6) were in Physical Action, 67.9% (n=91) were in Outcome, and 6.7% (n=9) were in Assessment. There were no incidents in the Planning phase. (Figure 1).
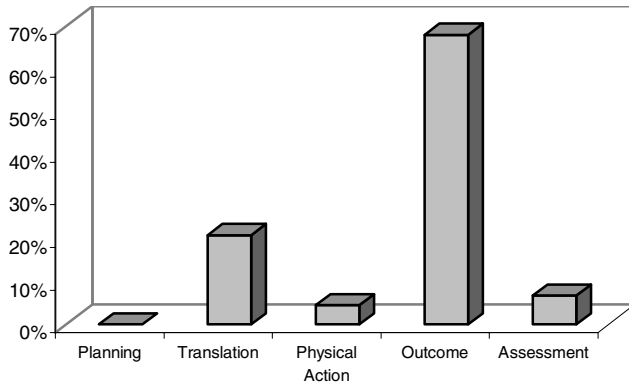

Figure 1. Categorization of incidents.

Of those incidents in Outcome (n=91), 38.5% (n=35) were attributed to bugs in the software or operating system, 18.7% (n=17) were attributed to pop-ups when using the Internet, 17.6% (n=16) were attributed to auto-formatting (primarily in Microsoft Word), and 13.2% (n=12) were attributed to a slow system response. (Figure2).
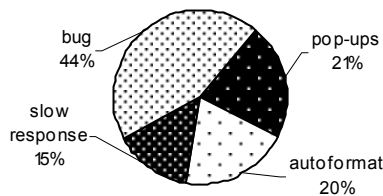

Figure 2. Frustration in Outcome phase

DISCUSSION

This study focused on where users *remember* being frustrated. This may not be an indication of where all frustration is actually occurring for the users. In fact, previous work with the UAF has indicated the majority of usability errors occur in the Translation phase. However, this study shows that user's are primarily remembering those problems that occur in the Outcome phase. If one of the goals of usability design is to improve the user's perception of experience with technology it is important to focus better design and reactive devices in areas that affect the Outcome phase.

What is an interesting observation is that even though many of the incidents that were frustrating the users were coded as occurring in Outcome, the participants did not know that these issues could easily be changed. For instance, 17.6% of incidents in Outcome were attributed to autoformatting. However, almost all of the autoformatting incidents cited could be taken care of by turning off the option of autoformatting. Thus, not causing any more frustration. Three participants mentioned that they knew they could turn off the autoformatting, but didn't know how.

Another key observation is that bugs, pop-ups, and autoformatting all have one thing in common. They are intrusive and interrupt the cognitive flow of the user. When the user decided on what goal they wanted to achieve they had an idea of the steps that were needed to complete that goal. However, when there was an unanticipated interruption, the user had to compensate for that interruption thus breaking the cognitive flow.

This seems to be an important rule for interface design and responsive systems. Responses of a system should not interrupt the user's cognitive flow and should not take control away from the user. If there is a system response that could possibly be intrusive, allow the user to easily regain control. These interruptions are remembered by the users and color their perception of the experience of using the system.

One question still remains; are users being frustrated in the other phases as much as Translation and Outcome and not recalling them? From previous research with the UAF it seems unlikely that there are that many other frustrating incidents occurring in Planning, Physical Action, and Assessment. However, it would be interesting to see if a user starts to put more importance on incidents in these areas if there are no other frustrating incidents in Translation and Outcome to cite. For instance, is frustration in other areas affecting their perception of software although they aren't consciously aware of this and what ultimate affect does this have on user satisfaction and the user experience?

REFERENCES

1. Andre, T. S. (2001). The user action framework: a reliable foundation for usability engineering support tools. International Journal of Human-Computer Studies, **54,** 107-136.

2. Hartson, H. R., Andre, T. S., Williges, R. C., & van Rens, L. (1999). The user action framework: A theory –based foundation for inspection and classification of usability problems. *Proceedings of the 8ᵗʰ International Conference on Human-Computer Interaction,* 1058-1062.

3. Norman, D. A. (1990). *Design of Everyday Things*. New York: DoubleDay.