Factors Affecting End Users’ Intrinsic Motivation to Use Software

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1. Introduction

Several research efforts have developed new tools to help end users create effective software. End users will gain benefits from these new tools if they actually adopt and use the systems’ features. Most users are likely to be driven by job productivity; thus, they tend to use known features to complete a task rather than taking time to learn to use new features which could more effectively handle the task [3]. This research proposes to investigate what motivates end users to use new features. Particularly, it focuses on end users’ intrinsic motivation. Intrinsic motivation is an internal drive to perform an activity for the sake of enjoyment of the activity itself [5]. Users with intrinsic motivation enjoy exploring and using the new features. Evidence shows that intrinsic motivation can impact users’ software adoption better than extrinsic motivation. For example, game-based software training, which was more interesting and enjoyable, enhanced users’ perceived ease of use and intention to use the software more than traditional lecture-based training [10]. Workplace applications can also be intrinsically motivating. Users who used a menu-based word processing application had greater intrinsic motivation than those using a command-based application [8].

The main research question is how to design software that will encourage users to learn and use new features, that users enjoy to use, and that helps users remain engaged in performing their tasks. To tackle this question, a first step is to identify factors affecting users’ intrinsic motivation to use a computer system. The study’s contribution will be the identification of factors that promote or inhibit end-user programmers’ intrinsic motivation.

2. Background and related work

Many system and non-system factors affecting users’ software adoption and use have been identified. This research will investigate the following factors that can possibly affect end-user programmers’ intrinsic motivation to use features. Impacts of these factors on intrinsic motivation, their impacts on performance, and their relationships have yet been looked at in the domain of end-user programming.

Cognitive Playfulness (CP): Prior research shows that users with CP in computer learning perform better and show more positive affect [9, 12]. More playful trainees exhibited more positive attitudes toward the skill and used the software more than less playful trainees [13]. Further, individuals with high computer playfulness achieved higher performance on an objective test of software knowledge than individuals with low computer playfulness [9].

Self-efficacy (SE): Despite the large body of research on the impact of SE on computer performance and use [4, 13], there exists little research attention to the impact of SE on intrinsic motivation to use a computer system. An interesting question is whether individuals with high SE will believe in their ability to successfully carry out an end-user programming activity and perceive a high sense of control over the environment. These perceptions may encourage individuals’ total involvement with the activity, thereby leading to the state of flow, which is a construct to measure intrinsic motivation.

Perceived Ease of Use (PEU) and Perceived Usefulness (PU): A study has shown that intention to use a system is affected not only by extrinsic motivation (PU) but also intrinsic motivation (enjoyment). Davis et al. [7] found significant effects of PU and enjoyment on intentions to use word processing and business graphics programs. They also found that PEU significantly influenced both users’ PU and enjoyment. However, there is not much research investigating the role of PEU and PU on users’ performance and intrinsic motivation in the field of end-user programming.

Gender: Females’ low level of SE has been found to be a major contributor to females’ low effectiveness in using debugging features in spreadsheet debugging software [1]. Low SE females perceived that learning
to use a new feature would take a long time to learn. This unwillingness to learn and adopt a new feature led to males’ low effectiveness in debugging performance. No research has looked at whether SE affects males’ and females’ intrinsic motivation differently and whether gender difference exists in CP, PEU and PU. An interesting question is whether the effect of these factors on intrinsic motivation is different between males and females.

3. Methodology

The research study is a 2 x 2 experimental design: interface (simple vs. enhanced condition) and gender (male vs. female). An end-user programming tool that will be used in this research is Forms/3 with WYSIWYI [1]. Two features of this tool, i.e. tooltips and checkmarks/x-marks [2], will be presented differently to end users to create two study conditions: simple and enhanced interface. In the simple condition, explanations in tooltips are very brief, mainly to describe what each feature is. Tooltips in the enhanced condition give further information on why the object is in its current state and possible actions to take next. The second difference is number of choices for placing checkmarks and x-marks. When users decide that the cells’ values are correct or wrong, they can place checkmarks or x-marks respectively. In the simple condition, users can either place a checkmark or an x-mark on cells. In the enhanced condition, there are two choices for checkmarks and two choices for x-marks. Users can choose to place checkmarks/x-marks either when they are sure or unsure about correctness of cells. Two conditions are applied in this study because system complexity may have different impacts on other factors in the study.

Validated Likert-scale questionnaires will be used to measure SE [1, 4], CP [12], PEU and PU [6]. Also, a questionnaire from [11] will be used to measure the flow state, a construct to measure intrinsic motivation. Tasks in this study deal with testing and debugging two spreadsheets. Therefore, users’ performance will be measured through number of seeded bugs fixed, number of new bugs introduced, final percent testedness of the spreadsheet, number of new features used and frequency of each feature use. Impacts of SE, CP, PEU, PU, and intrinsic motivation on users’ performance and willingness to adopt new features will be investigated. Participants will be recruited from undergraduate students. Students who have some experience using formulas in spreadsheet software and have little or no programming experience will be recruited.

A preliminary study was conducted and the data is currently being analyzed. Results should be available at the time of the conference.

4. References