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USER EXPERIENCE EVALUATION FOR AUTOMATION TOOLS: AN INDUSTRIAL EXPERIENCE

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ABSTRACT

Evaluating the User Experience in some contexts is challenging, especially in automation applications, due to specific situations and requirements. This paper presents an experience of applying the UX evaluation method for an automation tool in the Android software industry to assist software engineers in identifying the UX problems faced by users. The work applies heuristic evaluation, survey, and user interview methods to find the UX problems, understand the respective reasons, validate the given information, and finally assess the UX. The evaluation identified critical problems related to error messages, system response to errors, and proper feedback about what software is doing. The found problems and discussions contributed to developing new UX evaluation methodologies.

KEYWORDS

UX Assessment, UX Evaluation, User Experience, UX.

1. INTRODUCTION

Despite many software meets the functional requirements, the users are unsatisfied with its usability. Some users prefer to perform manual tasks instead of using some software, because they do not trust it to execute their tasks.

Such complaints relate to User Experience (UX), which consists of the perceptions and reactions of a person resulting from the use of a software, including all emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours, and achievements that occur before, during, and after its use [1].

The literature review presents problems such as the frustration of using cumbersome software, the difficult to navigate, and the execution of several steps to perform simple tasks [2]. The review also highlights that software with bad User EXperience is doomed to failure. [3] brings the following evidences about the impact of the UX in software: (a) 88% of online shoppers mentioned they would not return to a website after having a bad experience; (b) 70% of online businesses that fail do so because of bad usability; (c) 53% of mobile site visitors leave a page that takes longer than three seconds to load; (d) people form 75% of their judgment on a website's credibility purely on its aesthetics; (e) bad mobile optimization annoys 48% of users.

The root cause of software problems is the misunderstanding of the user requirements [2, 4, 5, 6]. First users have difficulty in expressing their requirements [4]. Second, even software engineers being experts on applying methods to elicit requirements, they still have troubles to identify user needs once they deal with unclear requirements, ambiguous information, incomplete knowledge,

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and inconsistent data [6]. Lastly [2] explains that UX problems are related to a lack of understanding of how humans interact with software.

This paper presents an experience of applying a UX evaluation methodology for an automation tool in Android software industry to assist software engineers in identifying the UX problems faced by users. As contribution, this work provides an industrial experience report of User EXperience evaluation.

Outline: This paper is organized as follows: Section 2 introduces the related works to this report. Section 3 describes the UX assessment methods. Section 4 shows the obtained results from the methods applied. In Section 5, it makes the discussions about the topics and concludes the report.

2. RELATED WORKS

In order to assess the UX and usability, many authors proposed distinct approaches and applied them in different contexts.

[12] proposed the heuristic evaluations and conducted four experiments indicating that individual evaluators were mostly inaccurate at doing such heuristic evaluations. The evaluators detected less than 51% of the usability problems in the interfaces they evaluated.

[13] proposes a framework for UX design and assessment, which presents the results of an experimental study to validate the framework and the instrument employed.

[14] created and validated a UX assessment rubric for online museum collections based on an experiment with UX experts and museum professionals. In the end, the work discusses how the rubric may be employed to strengthen and refine the UX of museum collection interfaces.

[9] assessed the UX and usability of a fall risk analysis tool, called FRAT-up, for use in clinical practice. They invited healthcare professionals to evaluate the tool and to provide their feedback and recommendations for further development applying two approaches: focus group and interviews. The study indicates that, to become FRAT-up useful, it needs to use the healthcare vocabulary, have a better explanation for different scores and shows the patient journal using the existing information.

[15] proposes a discovery approach, whose emphasis is placed on negative UX assessed through attitudes and behaviours expressed by users due to the lack of fulfilment of actual user needs. The approach was tested on existing software systems designed for preventing or reducing repetitive strain injury as a particular category of Behaviour Change Software Systems (BCSSs). This approach discovered 12 requirements that contribute to social sustainability.

[16] introduces a categorization of organizational barriers extracted from the relevant literature and proposes a procedure to identify and overcome organizational barriers. With a case study, the authors described how the categorization procedure helped them to anticipate and overcome the barriers encountered in the project. They conducted an UX Capability/Maturity assessment at the beginning of the project. With this assessment, they identified the organizational barriers and readjusted the UX strategy. After, they communicated the new UX strategy with stakeholders to increase their perceptions about the problems of the project.

3. METHODS

This section presents the applied methods to understand the user needs and to assess the UX of an automation tool in Android development context. The Figure 1 illustrates these methods and shows how they were applied, summarizing the respective goals of which one.

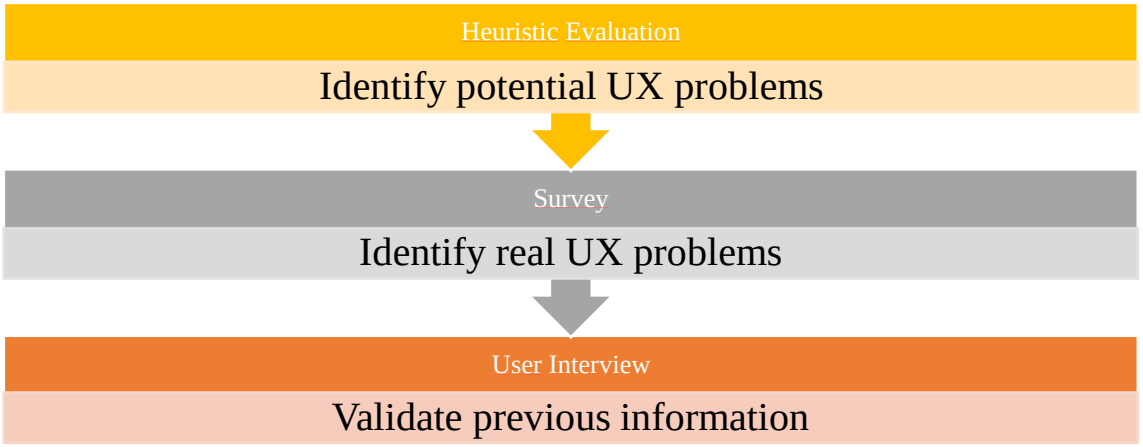

Figure 1. Applied methods.

The first applied method was the heuristic evaluation (HE) using the 10 heuristics created by Jakob Nielsen and Rolf Molich [12]. The heuristics are defined by general principles for interaction design to meet the right product for its user [17]. Moreover, HE is an alternative of rapid and low-cost evaluation method [18].

The heuristics were applied by two UX experts to identify the problems on the User EXperience of the tool as recommended by [12]. However, this method indicates the UX problems according to the UX professionals, but it does not necessarily identify the users UX problems.

For this reason, it is still necessary to conduct a careful process for identifying the real problems considering the user perspective based on the obtained results. To achieve this, a survey was developed to collect feedback about the experience of seven users, considering all potential problems found during the previous method.

The survey were developed based on six groups of questions: (1) the questions about experience describing guide the users to describe their experience rating the wonder, the difficulty, the satisfaction, the dullness, and the flexibility of the tool; (2) the questions about system speed allow the users to rate the system speed and reliability; (3) the questions about screen take into account aspects of the system interface such as characters, highlights, organization of information, and the sequence of screens; (4) the questions about learning consider learning to operate the system, exploring new features by trial and error, remembering names and use of commands, performing tasks in a straightforward manner, and helping messages; (5) the questions about usability and UI take into account the use of colours, the system feedback, the system response to errors, the system messages and reports, and the system clutter and UI noise; and (6) the questions about terminology and system information relate to use of terms throughout the system, the suitableness of terminology, the position of messages on screen, the feedback about what software is doing.

Finally, it is necessary validate the collected information from the previous methods. A guide with questions was created to proceed with user interviews.

The user interview is a popular method applied in human-computer interaction research to obtain rich and qualitative information about the problems, the user activities and their significance to all stakeholders involved [19].

The seven users that answered the survey were interviewed to give more feedback about the feelings, thoughts and perceptions related to the found UX problems.

4. RESULTS

The heuristic evaluation found the potential UX problems. The most frequent ones are related to three heuristics: 12 (43%) problems relate to Visibility of System Status, 9 (32%) are about Match Between System and Real World, 7 (25%) issues concern to Recognition Rather Than Recall. The Figure 2 illustrates the result.

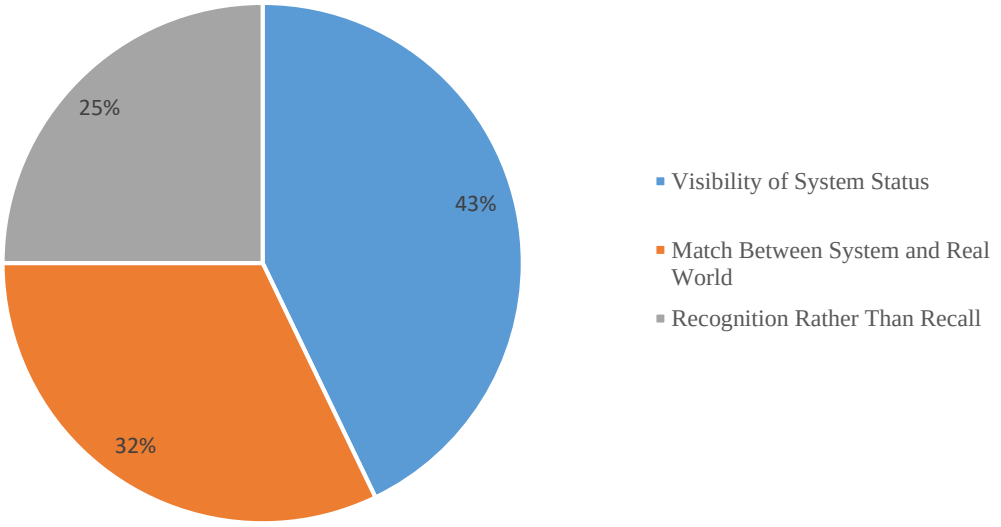

Figure 2. Most frequent heuristics relates to UX problems.

After identifying those heuristics, the UX professionals assessed the severity of each one using the following rate: (0) not a usability problem; (1) cosmetic problem: fix only if there is extra time; (2) minor usability problem: fixing this should be given low priority; (3) major usability problem: important to fix, given high priority; (4) usability catastrophe: should be fixed immediately.

The Figure 3 shows the severity of each heuristic. The problems related to Visibility of System Status and Recognition Rather Than Recall received severity 4, whilst the problems about Match Between System and Real World received severity 3.

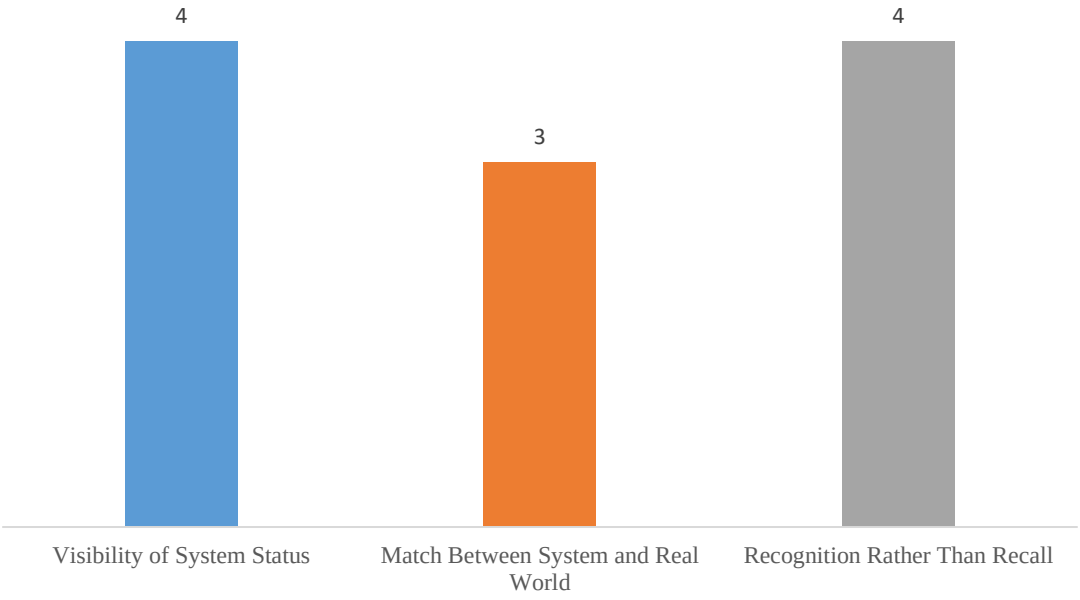

Figure 3. Heuristic severity.

The problems concerned to the first heuristic are (a) no consistent icon design scheme and stylistic treatment across the system; (b) do not show selected icon clearly visible when surrounded by unselected icons; (c) no menu instructions, prompts or error messages showed in same place; (d) error messages do not display the field in error; (e) no confirmation or feedback for user action; (f) absence of confirmation in delete information; (g) no feedback indicating the next group of actions can be started; (h) unexpected behaviour; (i) poor specification of system progress when observable delays happens; (j) no use of context labels, menu maps or place markers as navigational aids when user navigate between multiple screens; (k) confusing message of loading even when the system shows *N/A* to an information; and (l) dropdowns without signalling.

The second one presents problems such (m) there are no dialogues in system while users are performing activities, (n) no presentation of undo buttons, taking the chance of user to correct mistakes quickly (o) user does not have a choice of quickly exiting or cancel something wrongly inputted, and (p) some forms donot keep the title of wanted information, it can confuse users.

The last heuristic occurs as consequence of (q) misused white space, justification and visual cues for easy scanning; (r) no breathing space to tables with a lot of information; (s) white space is not being used to create symmetry and lead the eye in the appropriate direction; (t) long and tiring columnar fields; (u) poor use of size, boldface, underlining, color, shading, or typography to show relative quantity or importance of different screen items; (v) contrast of chosen colours make scalability difficult to some users; and (w) no indication when fields are optional.

From the twenty-three potential problems identified by the UX professionals during the HE, only six were evaluated as bad (3,6 – 4,9) or very bad (0 – 3,5) by the seven users during the survey. In other words, 26% of the potential problems are considered real problems by users.

The UX problems related to error messages presented to users (d, e) were rated with 3,27 (very bad) on average, followed by problems related to system response to errors (h) with 4,73 (bad)

and then by those ones concerned to proper feedback about what software is doing (g, i, m), which was rated with 4,80 (bad). The Figure 4 illustrates the results.

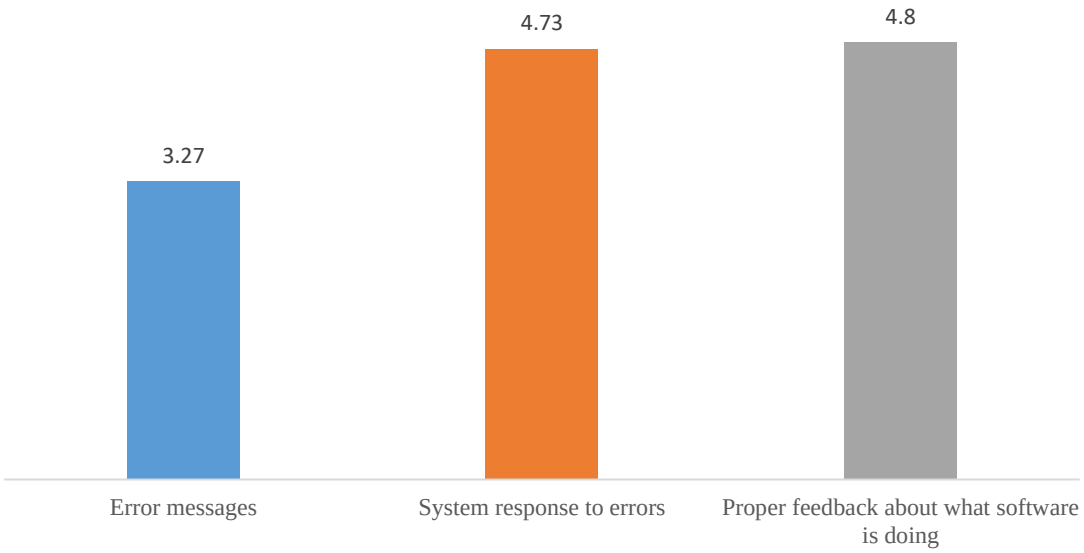

Figure 4. Average rate of each UX problems evaluated by users of the automation tool.

Corroborating with this, during the user interview, all interviewees affirmed that the tool assists them to perform daily tasks, but they often face usability or operational difficulties because of problems (d), (e), (g-i) and (m). The users also complained about the complexity of the tool or about the amount of previous knowledge they must learn before use it. Moreover, the user interview identified that 57% of the interviewees had some negative experience using the tool and because of this they do not trust the tool.

5. CONCLUSIONS

This paper presents an experience of applying the UX evaluation method for an automation tool in Android software industry.

First the work applied the heuristic evaluation to identify the potential UX problems of the tool. After, a survey based on previous information was conducted to identify the real UX problems. Finally, the user interview was conducted to confirm all the information collected before.

As result of this methodology, the work identified critical problems related to error messages, software response to errors, and proper feedback about what software is doing. The problems about error messages concern that error messages do not display the field in error and there is no confirmation or feedback for user action. The problems about software response to errors are related to unexpected behaviour. The problems about proper feedback relate to no feedback indicating the next group of actions can be started, poor specification of system progress when observable delays happen, and there are no dialogues in the system while users are performing activities.

In future work, the designers will propose a new UX and the developers will implement the changes for the automation tool considering the identified issues in this assessment. After, the UX will be assessed in order to show that the new UX fixed the found problems.

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