

Usability Evaluation of Native Web Application and Latest Web Application using Student Enrollment Service Application

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ABSTRACT

It is a common notion that in new technology web applications, the usability and user experience are key elements and are infused in the development process at universities. However, in the development of a student enrollment service web application called Tiger Center, this is not the case. Students at Rochester Institute of Technology (RIT) still use the native application called Student Information Service (SIS), developed few years ago. To test the hypothesis, *Tiger center application has better user experience than the student information center*, the proposed evaluation method could be helpful in testing the usability of web applications. It can also help designing web application as well analyzing the user experience. Further, if the hypothesis fails, a study could be done on re-designing the web application following the heuristic principles and results based on its evaluation.

INTRODUCTION

Web applications created of modern front end web technologies can be faster [1] and reliable in terms of security. But according to a previous study, the researchers believe that defining and evaluating the goals of end users is a primary task before developing the web application [2]. Tiger center, a student enrollment service web application at RIT was built with the latest web technologies by few students majored in computer science of the same university. Even though the application was built with all the present day technologies available in the market by students and which is specially meant for the students, but still many students use the native application developed by the university few years ago called Student Information Service (of which student enrollment service is one among many of its features). The main reason would be either the needs of end users, user personas and scenarios were not taken into consideration in the new design or students may be accustomed for the native process of enrollment into courses.

Effectiveness of latest web technology trends

Recent studies on trends of web design [3] suggest that the modern design layouts made of javascript, CSS3 and popular use of ajax had the most traffic rate when compared

to the website developed of native technology. The visual interface components which comes default by the code does have good experience by the users. The problem analyzed is that, such elements are not cleverly used while developing the web application thereby failing its special feature. For example, a special trend of visual aesthetics in interface design had an immense interest for the participants as per the experiment conducted by Mahlke and Thuring [4]. The researchers have analyzed that the user gives priority to the visual appeal and usage of the components of an interface. Thereby this can lead to an essence of higher usability and positive emotional reaction judgments in the case of a newer design approach.

Responsive design and its usability

Now that users are more tend towards using the mobile phones than a desktop, a major advantage of the modern coding languages is with the responsive feature, thereby execution of such web applications are compatible to any kind of screen sizes. This can justify for the case of user experience but cannot be completely judged under the usability criteria [5]. Here the user experience is the commonness of the application throughout any application would not change, which makes the user feel comfortable using the interface. As the desktop screens are bigger in size and due to its visibility of each and every component of the interface, desktops can have a better than compared to the mobile screens. Such other heuristics principles are also applied to evaluate the responsive experience for various size of screens [6] for better usability of the application.

User experience approach over developers

According to Ovad et al. [7] study, there is a significant drop in the participants who were web developers, good at understanding the user experience and usability principles. A majority of developers were not able to recognize the principles and were also found to be disinterested. Hence, this study suggests that even though if a developer is proficient in the modern web development, still there is a lag in providing a better user experience to any kind of web application. A step by step process of design evaluation and development process can result in cutting edge user experience of the web application. A developer should be

able to validate the designs and start the process of development or if needed iterate till the best experience or solution is achieved. Thus, there is always an urgent need for the developers to learn or practice the usability as well as user experience skills [8] [9] [10].

Large data base and security threats

However, the universities still use the native technology for few technology products urge on the protection of precious data that have been populated since years of establishment. For the universities the data is the most valuable. The protection of data would only be possible with such old servers on which the native applications are still being deployed. But according to the experimentation conducted by Rodden, Hutchinson and Fu [11], the researchers encourage the implementation of large scale web applications going through the HEART framework, which is a brilliant tool for the analyzing the data metrics for such a large user data base. Such study can always prove that the the modern web applications are very beneficial for securing the data as well as efficient in maintenance.

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Research Question

It is clear that considering the aspects and recommendations from various previous usability research studies, the researcher would like to test the hypothesis:

Tiger center application has better user experience than the student information center

It is hypothesized that the latest web technologies come up with interactive interface elements which are easily recognizable by general users and thus making this kind of web technology a better way of user experience initialization. But in the initialization process, the developers forget the user-centric goals of end users and thereby resulting in bad user experience with the final product. The researcher would like to evaluate the usability as well as test the user experience over the native technology web application and the latest technology web application, to prove or disprove the proposed hypothesis.

METHODS

Experimental Design

Experimental evaluation method will be carried out in a controlled environment say laboratory, which allows the participants focus on performing the task on both native

application and modern application on a desktop screen. This experiment will be conducted to test the hypothesis: *Tiger center application has better user experience than the student information center*. The independent variable will be the quickest time of enrollment captured from the experiment process and dependent variables will be the different time captured out of each set of task. The 'within-subject design method' or the 'repeated measures design method' will be used in conducting this experiment since, the usability can be measured on the analysis made out of a same set of participants accessing the native and modern application.

Participants

The participants are generally the students of RIT. The age criteria of students for the participation is not considered since, the application is generally meant for the age between 20-28 years. For example, a computer science student can be well aware of accessing the computer, where as a non computer background student may not be proficient. Hence, students of various departments would be considered as there can be different types of people with different backgrounds.

Procedure

Firstly, the participants will be briefly instructed prior to the experiment process regarding the usage of the computer so that to avoid any kind of confusion or problems faced while operating.

Four most important and common goal oriented tasks are given to the participants to complete with in an estimated time of 5 minutes. One good feature of Tiger Tank application is that the validation process of a course enrollment confirmation is done dynamically by the code (development feature) verifying the prerequisites and availability of seats. Whereas for the SIS, an external approver is required to validate the process.

The First set of tasks list are as follows:

- Search and open the 'tiger center' application.
- Search for the class needed to be enrolled.
- Add the class into the cart.
- Finish the enrollment process with confirmation.

The Second set of tasks list are as follows:

- Search and open the 'SIS' application.
- Search for the class needed to be enrolled.
- Add the class into the cart.
- Get a confirmation message for a wait on an approval process.

Evaluation

Both sets of tasks are performed one after the other under direct observation and are requested to think-aloud. During the participation, the time is carefully noted to complete the task, verify whether the task is achieved or not and take feedback of the experience. Post evaluation process, the participants are given a set of a questionnaire [12] to understand the user perceptions on a particular task for future study.

DISCUSSION

The data analysis out of conducting the experiment to test the hypothesis: Tiger center application has better user experience than the student information center, the result can either pass or fail. The results are highly dependent on the participants' experience on usability problems with different types of application for a common goal. Since all the participants are asked to perform the first set of tasks which is through Tiger Center Application, due to its modern design and functionalities, Users may feel comfortable recognizing the web interface elements and thereby quickly get enrolled into the searched class. Whereas the SIS, being an old design, its hard for the users to recognize the web interface elements, as most of them are used to modern web trends [4]. A quick result can be understood by evaluating the average time taken for the participants to enroll using the tiger center under the first set of tasks and the same participants from the second set of task. By the statistical analysis, if the hypothesis proves true, then efforts are to be put to sustain its user experience and could be improved based on the analysis out of the questionnaire from participants for Tiger Center. It can also be inferred that due to the lack of publicity in the university, the students are not aware of the Tiger center and thus, sticking on to the native enrollment service. If the result proves to be failed, it is clearly understood that the user experience is not up to the mark of modern trends and thus need to be changed. single platform.

Limitations overview

The experiment can have few limitations and conditions such as the browser compatibility, web accessibility for people experiencing with disabilities and screen compatibility.

Browser Compatibility

The native applications can work only with few stand-alone browsers such as Internet Explorer, but not the other popular web browsers such as Chrome, Mozilla or Safari. Whereas the modern web applications have few limitations of functional issues on browsers such as safari, due to the absence of few plugins. However, under a controlled

environment, the application is tested on all browsers before the experimentation to avoid errors in the final evaluation process.

User restrictions

The other limitation can be web accessibility issues for the students facing disabilities such as deaf or hearing loss. RIT is well known for its ASL-English interpreted approach for the students who are hard of hearing. Currently, for this experiment, this set of students are not considered due to an ignorable percentage of students as a whole. If for further studies, ASL-trained people can be recruited in order to help in the evaluation process if considered into the sample space of participants.

Screen compatibility

The user experience of desktop and mobile have a similar user experience for the latest technology web applications, which boosts the usability of devices up to a certain case. But in the case of native applications, the technology is not much upgraded to display on smaller screen resolutions. Hence, for this reason, the screen resolutions were not considered in the evaluation process.

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