

Usability and User Acceptance of University Web Portal Interfaces: A Case of South African Universities

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Abstract. There are growing concerns over the user friendliness and other usability issues of South African Universities Web Portal Interfaces (UWPIs), which obviously will negate the user acceptance of the UWPIs. The main objective of this study is to select and use appropriate usability and user acceptance criteria to evaluate South African web portal interfaces for their usability and user acceptance and to suggest improvement on them. The study applied a triangulation of Ubiquitous computing Evaluation Areas (UEAs) and Technology Acceptance Model (TAM) as a theoretical research model for this study. Multiple regression and stepwise regression analysis were used. The results suggest that Interaction and Invisibility of UWPIs are the most important measures, which have a huge impact on user acceptance and usability respectively. The results of the study will provide guidelines for the development and design of UWPIs to meet their usability and user acceptance standards or needs.

Keywords: Technology Acceptance Model, Ubiquitous computing Evaluation Areas, Usability, User Acceptance, University Web Portal Interfaces.

1 Introduction

Computers are playing a vital role and continue to play this role in our daily existence. For more than two decades computers have grown to such a point where they are present anywhere, anytime and in almost every facet of life. Usability and user acceptance of Computer System Websites and Interfaces attract many researchers from different domains such as psychology, human factors, human computer interaction and management because of usability and user acceptance problems associated with them.

Currently web portal interfaces, including South African UWPIs, suffer from a number of weaknesses such as technical difficulties, user friendliness and other usability issues, and there are growing concerns over the usability of South African UWPIs. These concerns will obviously negate the user acceptance of the UWPIs. Different methods have been recommended in the literature to solve the problems of usability and user acceptance of Computer System Websites and Interfaces.

In South Africa, there are 23 universities, which consist of 11 traditional universities, 6 comprehensive universities and 6 universities of technology. All these universities

have one major objective: to provide quality information and knowledge to students; staff and the general public to sustain their competitive advantage locally and globally. With the functions and services offered by universities to provide the variety of information and services, the question to be asked is: are users happy about what they are getting in terms of portal interface usability, information content, as well as their functionalities? This question raises some concerns; hence it is justifiable to evaluate South African UWPIs for their usability and user acceptance to make ratings and recommendations for their improvement.

User participation studies were used in this study and the research model for the study was derived using constructs from both TAM and the UEAs framework. Questionnaire based on the research model was used in conducting the evaluation of the interfaces. Data collected for the main survey was analysed using SPSS. The results indicate that Interaction, Invisibility, Application robustness and Appeal of South African UWPIs give rise to the usability of the interfaces which subsequently lead to user acceptance of the portals. This study provides guidelines for the development and evaluation of South African UWPIs for their usability and user acceptance.

2 Theoretical Underpinning of the Study

Technology Acceptance Model (TAM) is regarded as the most noticeable model describing the acceptance of computer technology [1]. Research had identified TAM as a cost effective tool for predicting user acceptance of systems [2]. Davis[1] further argues that the goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both economical and theoretically.

Scholtz and Consolvo [3] incorporated ideas of usability evaluation from different researchers such as Freidman et al. [4], Bellotti et al. [5] and etc. With these incorporated ideas, a framework called Ubiquitous computing Evaluation Areas (UEAs) was formulated. The UEAs presents numerous metrics and conceptual measures. These metrics and conceptual measures help in comparing the technology under evaluation to the users' normal environment.

TAM was selected for this study based on the fact that all usability and user acceptance aspects are covered in the model. The UEAs were adopted for this study because of the conceptual measures which best complements the main objective of the study, which is to select and use the appropriate usability and user acceptance criteria to evaluate South African University Web Portal Interfaces for their Usability and User Acceptance.

The research model for this study was derived by the triangulation of TAM and the UEAs framework. The following constructs were selected from TAM and are used in this study: the actual system use; perceived ease of use; perceived usefulness and external variables. The external variables used in the study, which fed into TAM were taken from UEAs constructs - Interaction; Appeal; Application Robustness and Invisibility. All the identified constructs were used in this study to form the research model. Based on the research model, the following hypotheses were formulated:

- H1: Interaction positively impacts usability of ubiquitous web portal interfaces
- H2: Appeal positively impacts usability of ubiquitous web portal interfaces.
- H3: Application robustness positively impacts usability of ubiquitous web portal interfaces.
- H4: Invisibility positively impacts usability of ubiquitous web portal interfaces
- H5: Usability of ubiquitous web portal interfaces positively impacts user acceptance of ubiquitous web portal interfaces

3 Research Design and Methodology

3.1 Research Design

The research design for this study will be based on the guidelines provided by Babbie [6], which describes the important research design and methodology aspects employed in the study. The research design includes aspects such as: nature of the research; unit of analysis; time dimension; research methodology and data collection method.

The nature of this research is exploratory and explanatory [6]. It is exploratory because it is generally developed to initial rough understanding of the some phenomenon; and also explanatory because the research is conducted in a way that will discover and report some relationship among different aspects of the phenomenon under study. In this study the unit of analysis is the individual existing students in the institutions, students seeking information, staff members, the public, employers and job seekers. There are two options in terms of time dimension: cross-sectional and longitudinal dimensions. In cross-sectional study, the unit of analysis is observed at one point in time whilst in longitudinal, the unit study is observed over a long period of time. In this study cross-sectional dimension is the most appropriate and feasible.

3.2 Research Methodology

Two major methodologies for usability testing, which are laboratory studies (user participation) and field studies were identified in the work of [7]. Interface design process involves user participation and it has been considered as the best practice in the HCI domain and it was used in this study. User participation or laboratory studies have been considered to be the most appropriate methodology for this problem, because the individuals such as staff, students and the general public are the ones interacting with the university portals and will be involved in the evaluation and rating of the portals. Using the user participation or laboratory studies is considered to be very helpful to usability studies that which emphasis on comparing multiple interface designs or data input mechanism for ubiquitous computing applications.

3.3 Data Collection

Questionnaire based on the research model formulated for this study was used in conducting the evaluation of the interfaces. A pre-test and pilot test of the questionnaire was conducted and data collected was analysed manually.

A representative sample was drawn from the traditional universities, comprehensive universities and universities of technology for the main survey. A total of 200 questionnaires were administered and the primary data collected was analysed using SPSS. The results of the main study are presented in the section below.

4 Results of the Study

A total number of 200 questionnaires were distributed and 180 returned. Of the total 180 returned, only 118 questionnaires were suitable for analysis. Pearson's product-moment correlation matrix was used to analyse the degree of the relationship or association amongst variables. The results of the Pearson's Product-moment correlations indicated that the majority of correlations were statistically significant. The highest correlation reported was between Invisibility of the UWPIs and usability of UWPIs (H4, $r = 0.720$).

In order to identify the variables that were relatively important in determining Usability leading to User Acceptance of UWPIs, Multiple Regression analysis was performed. In this study's analysis, a variable was not entered into regression model unless the p-value for that variable was less than or equal to 0.05. The same level was also set for removal of variables. A stepwise regression was used by allowing addition and removal of variables at various steps in progressively building the regression model.

The results of the analysis indicate that all hypothesized relationships were supported. However, the results indicate that there is a low positive correlation between Usability and User Acceptance. This proves Dillon's [8] explanation that there are no guarantees that the web portals will be acceptable despite the fact that they may be highly usable. The research questions which were addressed using multiple regression analysis and the stepwise regression analysis showed that Appeal, Application Robustness and Invisibility constructs from the UEAs have no significant contribution towards User Acceptance. It is also suggested that invisibility and interaction of South African UWPIs have a great impact on user usability and acceptance respectively.

5 Significance of the Study

The significance of the study is twofold: theoretical and practical. Theoretically, the study is significant in providing a framework for research into UWPIs usability and user acceptance. Practically, the results of this study will provide guidelines for designers/developers, particularly in South Africa, by creating better understanding on how to plan and design UWPIs that are usable and acceptable to users.

6 Conclusion

This study reported the evaluation of South African UWPIs for usability and user acceptance. The study applied a triangulation of UEAs and TAM as a theoretical framework for the evaluation of the web portal interfaces. Based on the findings presented, the overall conclusion that can be drawn for this study is that: Interaction, Appeal, Application Robustness and Invisibility measures represent important variables that explain how the UWPIs are evaluated as well as the criteria which users use for evaluating UWPIs. Their importance from the most influential to the least influential is Invisibility, Interaction, Appeal and Application Robustness. Once these are taken into account designers/developers can use these as guidelines when designing, developing and evaluating the UWPIs.

7 Future Work

This study did not include all constructs of the UEAs framework. A further study may be necessary to include all the constructs. Also perceived usefulness and perceived ease of use constructs of TAM were conceptualized as usability in this study. It may be necessary to use these TAM constructs as they are in a further study.

Based on the results of the study a prototype needs to be developed to validate the results. The results of this study needs to be used as proper guidelines for the prototype, and the prototype needs to be evaluated against the results. Future studies should therefore concentrate on the implementation of the prototype and also aim at including more variables in the research model. This may assist in explaining the variances in the usability leading to user acceptance.

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