



## Usability Evaluation of the Polytechnic Portal/Website with Different End-User Groups

*Alawode A. John<sup>1</sup> and Buoye A. Peter.<sup>2</sup>*

<sup>1,2</sup>Department of Computer Science, The Federal Polytechnic, Ilaro, Ogun State

### Article Info

#### Keywords:

End-users, Portal, website, Usability

Received 07 November 2021

Revised 25 November 2021

Accepted 26 November 2021

Available online 11 December 2021



<https://doi.org/10.37933/nipes/3.4.2021.29>

<https://nipesjournals.org.ng>

© 2021 NIPES Pub. All rights reserved

### Abstract

*The purpose of this study is to analyse the polytechnic websites' usability among three categories of users within the polytechnic community, to ascertain the ease of using the site among the group of user and investigate how various sorts of end users (i. e. academic staff, non-academic staff and students) respond to polytechnic site as far as its effectiveness, efficiency and satisfaction, which together address its usability. The basic analysis was carried out, feedback from respondents' results was used and usability of the site was evaluated according to International Standard Organization model. The model verified the websites' effectiveness, efficiency and satisfaction of the users, which has resultant effect on the websites' usability. This research produces usability evaluation results which established that students' aspect of the site has highest usability value of 89.62%, while academic and non-academic staff has usability value of 84.02 and 80.13 respectively. The result shows that non-academic staff experience least effectiveness, efficiency and users' satisfaction. Therefore, the aspect of the website to look into for improvement is that of non-academic staff.*

## 1. Introduction

Universities, colleges and other educational institutions globally, are now riding on the influence of information technology to enhance their operations, such as registration, learning and other administrative processes. Web technology is a wonderful tool that is universally accepted to break border and boundary limitations. One of the technologies that can be described as a set of logically related network of materials is website, it encapsulates multimedia contents and several online pages identified with a common domain identity on a web server [1]. Website is one of the means, through which educational institutions communicate and disseminate information within and outside the institution's communities, as well as events promotion [2]. As a medium of communication for institutions, website's interface must be attractive and aesthetically pleasing to the users. To achieve this, some usability metrics have to be considered and evaluated to attain good satisfactory level [2][3]. Website is an online technological tool that allows every user to get information through browsing. Whereas, web portals are for limiting or restriction of traffic to selected users. The Federal Polytechnic, Ilaro has registered her presence in cyberspace through website and web portal. The website promotes school events within and outside the polytechnic communities and web portal is restricted to students and polytechnic staff. The website is a great supporting facility for the polytechnic. Therefore, it has to be up-to-date periodically to meet users' need. This can be achieved through usability evaluation to determine aspects of the website to modify.

Web usability has a few definitions and attributes. It is a mix of attributes well arranged for the user, effortless learning, high velocity of task execution, low mistake rate, emotional fulfilment

and maintenance over the long haul [4]. Usability is a proportion of the straightforwardness with which a framework can be learned or utilized, its wellbeing, adequacy and productivity, and the demeanour of its users towards it [5]. The proportion of the straightforwardness may be a degree to which an item can be utilized by determined users to accomplish indicated objectives with viability, proficiency, pace of blunders, memorability and fulfilment in a predefined setting of utilization [6]. Criticism from users dependent on experience utilizing a website can determine user satisfaction in utilizing a website that is effective, simple to utilize, and meets user assumptions [7].

Therefore, it is important for a study to examine the usability aspects of the website among the three user groups (students, academic staff and non-academic staff) in the polytechnic. So as to determine and compare its' level of usefulness among the user-groups, and ascertain the aspect to adjust.

## 2. Methodology

This paper used usability testing to evaluate and analyse the polytechnic website among three groups of user within the polytechnic community. Usability testing is a process that involves evaluation of effectiveness and efficiency of the application, then satisfaction of the user with the website [8]. Respondents cover 15 academic staff, 15 non-academic staff and 15 students. All these respondents were chosen across various departments/sections from the polytechnic. Preliminary observations on the respondents show that all of them can navigate easily on any applications' interface, identify menu and collect information digitally on internet through browsers or other means.

The research work was carried out experimentally at the Information and Communication Technology Center (ICT-Centre). All the selected respondents were allocated a computer system to carry out the required exercise. Respondents were asked to carry out three different tasks and corresponding time ( $T_1$ ,  $T_2$  and  $T_3$ ) to complete or quit each task was recorded accordingly. Status of the tasks ( $S_1$ ,  $S_2$  and  $S_3$ ) were also recorded. Successful tasks were assigned "1" while failed or aborted tasks were assigned "0". Effectiveness and efficiency were analysed using International Organisation Standard function [8].

In this section, usability testing was conducted according to *International Organisation Standard* which defines usability as the functions of effectiveness, efficiency and satisfaction of the users [8]. The average value of effectiveness, efficiency and satisfaction gives the value of usability of any application [8].

Therefore, effectiveness is calculated with:

$$\bar{E} = \frac{\sum_{j=1}^R \sum_{i=1}^N n_{ij}}{RN} * 100\% \quad (1)$$

Where  $N$  is equal to number of tasks and  $R$  is equal to the total number of users.

$n_{ij}$  is the outcome of task  $i$  by User  $j$ ;  $n_{ij} = 1$ ; if user  $j$  successfully finished the task. Otherwise,  $n_{ij} = 0$ ;

Similarly, the best description given to **efficiency** is "resources spent by **Respondent/User** in order to ensure accurate and complete achievement of the **Tasks** (goals). It is therefore evaluated with:

$$\bar{P} = \frac{\sum_{j=1}^R \sum_{i=1}^N n_{ij} \cdot t_{ij}}{\sum_{j=1}^R \sum_{i=1}^N t_{ij}} * 100\% \quad (2)$$

The only additional parameter needed to evaluate efficiency is time taken ( $t_{ij}$ ) to complete the required **Task i** by **User j** or quit after failure.

**Satisfaction** is measured in this research through a formalised questionnaires featuring satisfaction scales. A 5-point questionnaire were designed with numeric value of satisfaction coefficient from 0 to 4 .Each questionnaire contains three positive and three negative questions with weight driven answers reflecting subjective users’ opinion after interaction with the application. It was also evaluated with;

$$\bar{S} = \left( \frac{\sum_{j=1}^R \sum_{i=1}^{Q_+} \frac{P_{ij}^+}{4} + \sum_{j=1}^R \sum_{i=1}^{Q_-} \frac{P_{ij}^-}{4}}{(Q_+ + Q_-)R} \right) * 100\% \tag{3}$$

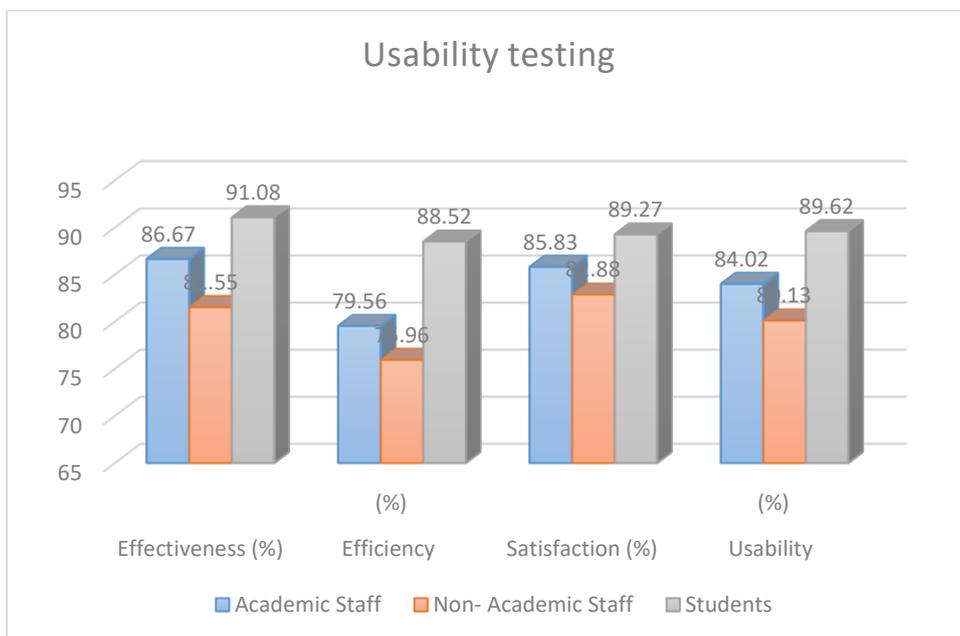
The percentage of the applications’ usability is evaluated by finding the average of effectiveness, efficiency and satisfaction. That is, the three attributes of usability that this research work is focusing.

The entire procedure was carried out for all the three groups (Academic staff, Non-academic staff and Students) Table 1: shows the summary of the analysis for each of the groups within the polytechnic community.

### 3. Results and Discussion

Table 1: Summary for the three groups

<i>Serial Numbers</i>	<i>Group of Users</i>	<i>Effectiveness (%)</i>	<i>Efficiency (%)</i>	<i>Satisfaction (%)</i>	<i>Usability (%)</i>
1	Academic Staff	86.67	79.56	85.83	84.02
2	Non- Academic Staff	81.55	75.96	82.88	80.13
3	Students	91.08	88.52	89.27	89.62



**Figure 1: Groups Usability Chart**

Table 1 shows the evaluated results from all the groups. The degree of usefulness of the website for non-academic staff was 80.13%, resulted from 81.55% of effectiveness, 75.96% of efficiency and 82.88% of satisfaction. Academic staff found the website more useful with 84.02% of usability. Effectiveness, efficiency and satisfaction are 86.67%, 79.56% and 85.83% respectively. The ease of using the website was 89.62% for the students, which is the highest of all the groups. Students recorded highest percentage of effectiveness, efficiency and satisfaction.

This study examined the concepts of usability i. e., effectiveness, efficiency and satisfaction with respect to polytechnic portal/website. It was measured with combinations of users' activities and questionnaires. All the three groups considered in this research achieved above 75% success rate, which is the threshold for a usable website as compared to [9]. The results show a statistically significant differences in usability of all the groups. Non-academic staff recorded least usability value of 80.13% in contrast to students and academic staff which have 84.02% and 89.62% respectively. Values of usability for these groups are average values of effectiveness, efficiency and satisfaction [8]. This implies that, averagely students achieve better effectiveness, efficiency and satisfaction than academic staff. While non-academic staff experience least of these usability attributes. One major factor that responsible for low usability of website is internet experience of the user [10]. It was also experienced during the experiment that internet experience of some non-academic staff was poor compared to students and academic staff.

#### 4. Conclusion

This study attempt to improve usability of the polytechnic website for all the groups. Apart from technical adjustments that is required, this website has a lot of tasks that are easy to use, affordance commands and expressive interface. Nevertheless, it becomes necessary to fix some aspects of the website to enhance better percentage of user satisfaction, effectiveness and efficiency. The research reveals that, non-academic staff module of the website has to be improved.

#### References

- [1] R. Kaur. (2018). "Comparative study for evaluating the usability of web based applications,"2018 4<sup>th</sup> international Conference on Computing Sciences (ICCS), PP. 94-97
- [2] N. Binti and N. Rozali, (2015). "Usability Testing on government agencies web portal: A Study on Ministry of Education Malaysia (MOE) web portal, "2015. 9<sup>th</sup> Malaysia software engineering conference (MySEC). Pp. 37-42
- [3] S. Jusoh (2019). The Development of usability Heuristics for Arabic M-Commerce applications, IEEE Jordan International joint conference on Electrical Engineering and Information Technology (JEEIT), pp. 779-784
- [4] B. Shneiderman, C. Plaisant, M. Cohen & S.Jacobs (2016). Designing the User Interface: Strategies for Effective Human-Computer Interaction, 6th Ed., Pearson Addison Wesley.
- [5] J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland & T. Carey (1994). Human-Computer Interaction. Addison-Wesley Longman Ltd., Essex, UK
- [6] E. Suh, S. Lim, H. Hwang & S. Kim (2004). A prediction model for the purchase probability of anonymous customers to support real time web marketing: a case study. In Expert Systems with Application, vol. 27(2), pp. 245-255.
- [7] O. G. Hekmatyar and D. Supriyadi (2017). "Measurement Satisfaction Information System Quality Service On BSI Using Webqual And CSI" Indones. Journals on Computer Information Technology., vol. 2, no. 2, pp. 1-6,
- [8] ISO 9241-11 (1998) Guidelines for specifying and measuring usability (*International Organization for Standardization*)
- [9] E. Stephan, D.T. Cheng and L.M. Young (2006). A usability survey at the University of Mississippi Libraries for the improvement of the library home page. Journal of Academic Librarianship 32(1): 35-51.
- [10] M. Sjölander, K. Höök, L. Nilsson (2005) Age differences and the acquisition of spatial knowledge in a three-dimensional environment: Evaluating the use of an overview map as a navigation aid. International Journal of Human Computer Studies 63(6): 537-564.