



Usability Study on Online Database of Undergraduate Students at Higher Institution

Irwan Kamaruddin Abd. Kadir^{*1}, Saiful Farik Mat Yatin¹, Hasnah Shuhaimi¹, Md. Yazid Muji² and Mohd. Razilan Abdul Kadir¹

¹ Faculty of Information Management, Universiti Teknologi MARA (UiTM), Selangor, Malaysia

² Library, Universiti Tenaga Nasional (UNITEN), Selangor, Malaysia

*Corresponding author: irwan@salam.uitm.edu.my

Abstract. In current research environment and needs, the online database becomes one of the main resources in retrieving latest academic information and knowledge. This is due to reason that its synchronization (latest and frequently updated resources) with the on-going research trends and demands. The online database contains a collection of data, text, numerical, graphical, electronic journals, multimedia products and others. Usability of an online database for students may imply on accessing resources for meeting their assignment, project papers and research requirements. In education needs at the higher institution, students have long been using the database to fit in with their study. Nevertheless, little is known from the past works on the students' online database usability. A survey is conducted on undergraduate students at Universiti Tenaga Nasional (UNITEN), Malaysia. The aim is to examine the relationships between learnability and efficiency, and usage of the online database among these engineering students. The findings indicate that the UNITEN Library should have an opportunity to improvise their online database with respect to learnability and efficiency factors. The research is carried out through a survey participated with a total of 352 respondents. Findings indicate that, 71.7% used the online database and 28.3% was not. Furthermore, usage relationships were found to be with coefficient $r = -0.353$ (Learnability) and $r = -0.382$ (Efficiency). Both of the correlations are significant at 1% significant level. The researcher suggested carrying out a further study to investigate the relationship of learnability, efficiency and inclusive of other factors like the effectiveness of the online database to reflect the usability.

Keywords. Usability; Online database; Learnability; Efficiency

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1. Introduction

In current research environment and needs, the online database becomes one of the main resources in retrieving the latest academic information and knowledge. This is due to reason that its synchronization (latest and frequently updated resources) with the on-going research trends and demands. Online databases in the research environment have been recognized as research tools that provide the latest or current information through the network. Accompanied with multi-search techniques, the link provided in the online databases can crawl and explore to the requested resources or related content that meet information needs of the user. An electronic resource or e-resource is “any cohesive publication in digital form that is being marketed” or “any electronic product that delivers a collections of data, be it text, numerical, graphical or time based, as a commercially available resource” and includes “full text databases, electronic journals, image collections, multimedia products, collections of numerical data” [1].

The online database is provided to support teaching, research and learning in the university, basically consisting of articles, e-journals, e-magazines, conference papers and standards (technical standards). There are three major categories of e-resources which are of importance in the context of higher education and research libraries: e-journals or electronic journals which are electronic equivalents of print journals/serials or journals only appearing in electronic format; e-books or electronic books which are monographs available for electronic access like e-journals, and e-databases which are full text, bibliographic, numeric, etc. databases holding a wide variety of information on one product/platform [2].

Undergraduate students of Universiti Tenaga Nasional (UNITEN), Malaysia, are as well aware of online databases provided by the university. In association with today’s study needs, it is high time for varsity’s student to reach out to the wider domain of knowledge and not only depending on lecture and books. Dependency on online databases may or may not solid but it is how the study trend looks like in the current time. Nevertheless, little is known from the past works on the students’ online database usability. Thus a survey is conducted (using the questionnaire as the research instrument) on undergraduate students at UNITEN, Malaysia. The aim of this study is to examine the relationships between learnability and efficiency, and usage of the online database among these engineering students. The paper is organized as follow. The subsequent section provides past works related to online databases at universities, followed by methodology where the study conceptual framework is given. Section 4 is dedicated to presenting the study findings and the final section concludes the paper.

2. Literature Review/Past Works

Since 1999, UNITEN Library has subscribed several online databases to offer a user especially students in accessing resources for their assignment, project paper, and research. Throughout the years, UNITEN has subscribed more than 10 databases covering the subjects of engineering, information technology, business accounting and general studies. Among them are IEEE Xplore, Emerald Insight, Malaysian Standard Online, Science Direct and SCOPUS and ACM Digital.

The research is as well focus on other resources than online database i.e. from e-resources, electronic resources, e-databases, e-journals, and e-resources. All the past studies reviewed are

concentrated on the use of the mentioned platform and the access is via an internet connection. Through the selected studies, the topics are discussed are such as access and usage of those electronic databases.

A study finding has identified that general computer usage for information access was high due to the University's state-of-the-art IT infrastructure. Several Internet resources usage indicated very high use; however scholarly databases usage was quite low. It is quite disappointing to find out that the percentage of non-usage of some of the search tools is rather high [3]. Similar results of low usage of online databases [4–6] were reported in this studies. Another finding showed that respondents may face some limitations on the use of searching tools. The finding showed that the significant attributes include efficiency of using the online database to get accessed to e-journals. The most common problem faced by respondents at Delhi University is slow downloading (53%), not familiar with e-journals and 48% with insufficient time and training, where they could not make use of e-journals efficiently [7].

Some other results of the study were on users' difficulties including their expectations from the library supports while using online databases procured by the universities [8]. A study from [9] showed that combination of subtle factors may have an influence on use. The influence of librarians includes mentioning specific products in a user instruction class, advocating the use of a specific database in specific class assignments, referring to a database on a library's welcome screen, or reminding users about a specific database and making it easy to get to it. The finding of this research is similar to research finding [8] where the users need assistance from the Librarian to use and access the online database. A research on the use of electronic databases by Post Graduate Students and Research Scholars at GBPUAT Library, India showed that the majority of the research scholars and postgraduate students were well aware of the available e-databases and they also used these for fulfilling their purposes. As mentioned by [10], awareness could play as a mediating factor in usability. His study is focusing on digital library usage at higher institution however this finding can be regarded as a proxy on the usability of the online database. Furthermore, the majority of the research scholars and postgraduate students received instruction/help while using e-databases [11]. From his study, the availability has influenced the learnability, efficiency, and effectiveness where most of the respondents were agreed that the electronic database is easy to use and meet their expectation in fulfilling their needs.

Several models have been reviewed as a guide to form the theoretical framework of the research which is from [12–14]. These three models or approaches to measuring the usage of the product focusing attributes or characteristics such as effectiveness, efficiency, learnability, satisfaction accessibility and others.

In Figure 1, the theoretical framework of the study is shown. The two attributes selected based on the previous studies as reviewed earlier. The study examines the relationships between the independent variables (IV): learnability and efficiency and the dependent variable (DV): the usage of online database. Thus the proposed hypotheses generated are as follows:

H1: There is a positive relationship between learnability and usage of online database

H2: There is a positive relationship between efficiency and usage of online database.

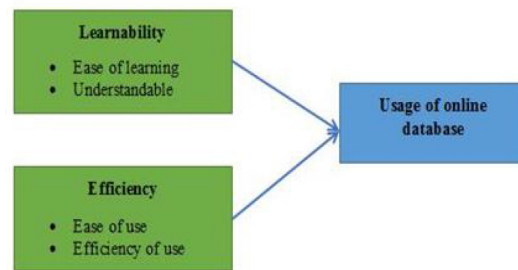


Figure 1. Theoretical framework of the study

3. Methodology

The following provides the approach taken to perform a survey including the study sample. A sample size represents the number of respondents selected from the overall population that is used in the research. In quantitative research, the size of the sample is essential in determining the reliability of the results of a study [15]. The study population consists of engineering degree students at Universiti Tenaga Nasional, Putrajaya Campus, Malaysia with the population of 4,144. The faculty has four main departments: Electronic and Communication Engineering, Power Engineering, Mechanical Engineering and Civil Engineering. Using random sampling a total of 452 respondents was chosen. The measurement item is questionnaire where 40 items are provided consisting sections of demographic, learnability, efficiency and usage of the online database. Moreover, the questionnaire is designed with closed-ended questions to allow the respondents to choose the answer according to Likert-type scale. In this study, there are 2 types of Likert-type scale (refer to Table 1).

Table 1. The first type of Likert scale

Scale	Type 1	Type 2
1	Strongly disagree	Almost never
2	Disagree	Seldom
3	Neither agree nor disagree	Sometimes
4	Agree	Often
5	Strongly agree	Very frequent

Table 1 exhibits the level of agreement scaling from level 1 to 5 (from the lowest to the highest agreement) of the two types of Likertscale used in the questionnaire where the data are preprocessed and analyzed using Statistical Product and Service Solutions (SPSS). The data collection and analysis is dependent on the methodological approach used [16]. Since the aim is to examine the relationships between variables defined in the study, SPSS is sufficient. The process used at this stage of the research contributes significantly to the study overall reliability and validity [17].

In examining the relationships between usability and the selected two factors, correlation analysis is applied to measure linear association between these variables, as claimed in

the hypotheses. Correlation measures the degree to which the change of the value of one variable predicts changes of the value of another variable. The mutual relationship is presented by direction and magnitude and the correlation coefficient takes the value between 1 and -1 . Values approaching 1 or -1 indicate strong relationship; on the other hand, values approaching 0 indicate weak or no relationships. However, correlation is not a cause and effect analysis but merely to understand the changes in two variables that could be either positively or negatively correlated.

4. Findings and Discussion

Out of 452 questionnaires, the total returned is 374. Thus the response rate is 82.7% which is considered good for a survey. The Cronbach Alpha of each study variable is as shown in Table 2.

Table 2. Cronbach Alpha of the study variables

Factor	Variable	No of Items	Cronbach's Alpha
1	Learnability	8	0.776
2	Efficiency	8	0.939
DV	Usage of online database	8	0.902

The respondent in the study consists of 65.5% male and 34.5% female from students of College of Engineering, UNITEN Putrajaya Campus. It indicates most of the students have participated in this study are male. In the study status (of the current study) the highest participation is coming from second year students of doing the course i.e. 32.9% (123 students) of the whole respondent. In terms of department, the highest rate is from Mechanical Engineering with 41.4% (155 students). The other three departments are evenly distributed around 20% each.

The study's finding presents most of the students has used or accessed online database during their study in UNITEN. It was recorded that 71.7% used and the rest was not. This finding can be summarized that almost three quarter of students from the total respondents are in need of using online database to pursue their study. For efficiency, the highest mean score of this factor is 3.79 for item of *the online database is easy to use in general*. However, the lowest mean score is 3.63, referring to *the online database is well designed and efficient to find what I required*. In learn ability the highest mean score recorded is 3.80, for *it was easy to learn to use the online database*. The lowest mean score stated is 3.57 (*I need a Librarian assistance to be able to use the online database*). According to the finding, it can be noted that the respondents are agreed the subscribed online database is easy to learn and use but still need assistance from the librarians. This claim shows that the perception on usability of the online database may not be a hindrance. Or, another reason is the database provider could provide an easy-to-use platform for users to access their desired contents. As what is known, most of the databases apply a basic or simple search for users to enter any keywords or phrases in order to obtain a required content of their topic of interest. However, users may sometimes get stuck with advanced search.

A correlation analysis is performed to investigate the relationships of the variables. The results are surprisingly interesting where linear relationships between DV and IVs had shown significant reciprocal relationships. The Pearson product moment correlations show negative coefficients such that directly imply negative linear relationships. The r coefficients for the IVs are as given in Table 3.

Table 3. Pearson product moment correlation coefficients between online database usage and independent variables of the study

Independent variables	r coefficients
Learnability	-0.353
Efficiency	-0.382

The results of correlation analysis in Table 3 indicate that all of the tests are significant at 1% level of significance. The results of correlation analysis in Table 3 indicate that all of the tests are significant at 1% level of significance. Thus, both of the hypotheses were supported and there is evidence that relationships exist between DV and IVs of the study. However, the identified relationships are reciprocal. Meaning to say, for the learnability; users may find difficulties to use or to understand the menus/functions on the online database. In simpler words, the more they use the online database (like to search or download some online resources), the more difficulties they are facing.

From another point of view, the usage of an online database in UNITEN among engineering degree students shown there is significant or reflected the relationship of performance and advantage provided by the platform (subscribed online database). The finding shows most of provided online database is reflected to the learnability and efficiency towards the usage of the online database. Referring to the relationship, the learnability and efficiency both have negative relationships with the usage. For instance, in learnability, the database provides an easy use and learn platform for easy access. It goes the same with the efficiency that performs a quick and easy search for users to obtain a fast result. Insight from this finding may lead to a reason that even though the online database presents a good performance but the usage level is still unsatisfactory. Based on the relationships between these two variables, it can be concluded that the users are understood being provided with easy to use and search however these criteria seem insufficient to determine they can achieve what they really desire or to obtain accurate (or related) results from the search.

In the future research, the authors' intention to expand the scope of the study to the postgraduate students in order to discover their feedback in using an online database which is specific use for their coursework and research. The authors should consider more factors like as follows usefulness, ease of use, reliability, and flexibility. Using these variables might reveal more interesting and surprising insight on the usability of an online database in higher institution.

5. Conclusion

In this article, the authors present a framework that captures the relationship between usability and selected attributes i.e. learnability and efficiency. The study framework expressed the relationships between the dependent variable and independent variables where the author hypothesized that the relationships do exist. The case study has randomly selected students only from the Faculty of Engineering, UNITEN, Malaysia. The results from the findings indicate opposite direction of relationships between the factors. The learnability or efficiency may not portray the positive effect of the level of online database usability. The author believes it is vital that usability of different studies using different samples may present different results.

This research output or finding is very important for Library to observe and identify what the function offered by an online database that reflects the use of the platform. The Library can plan to provide the learnability, efficiency and effectiveness best function of an online database from the local and international market for students to use and access in order complete their studies such as assignment, project paper, and research. There is also a need to provide training about how to use the advanced search to users. In additional, the Library has budget wise to subscribe a related and best function database to ensure students has some opportunities to retrieve an information and knowledge in systematic and efficient approach. Furthermore, this research furnishes an output to the Library what the function of the online database is preferred the most by the students and to what extent they are using it such as to find latest online resources, update subject knowledge, prepare an assignment and project paper, enhance information resources or others.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

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