

Impact of Interface Characteristics on Digital Libraries Usage

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Abstract

The objective of this paper is to study the impact of interface characteristics on perceived ease of use of digital libraries. Further, the study also attempts to answer whether there is a significant relationship between interface characteristics and perceived ease of use. Data were collected from post-graduate students. Analysis of the data collected discovered that interface characteristics to have impact on the post-graduate students' perceived usefulness and perceived ease of using digital library. Further, terminology has an impact on the perceived ease of using digital library.

INTRODUCTION

The higher education industry in Malaysia is experiencing an unprecedented growth rate. This trend is largely a result of new enabling technologies that have facilitated the virtual delivery of academic programs. This has in turn led libraries becoming key success factors in the virtual academic environment (Cahoy & Moyo, 2003).

The fundamental reason for building digital libraries is belief that it will provide better delivery of information than was not possible in the past (Arms, 2000). The major advantages of digital libraries over traditional libraries include:

- Digital libraries bring the libraries closer to the users: Information are brought to the users, either at home or work, making it more accessible, and increases its usage. This is very much different that traditional libraries where the users have to physically go to the library.
- Computer technology is used for searching and browsing: Computer systems are better than manual methods for finding information. It is useful for reference work that involves repeated leaps from one source of information to another.
- Information can be shared: Placing digital information on a network makes it available to everyone. Many digital libraries are maintained at a single central site.

This is a vast improvement over expensive physical duplication of little used material, or the inconvenience of unique material that is inaccessible without traveling to the location where it is stored.

- Information is always available: The digital library's doors will never close; usage of digital libraries' collections can be done at hours when the library buildings are closed. Materials are never checked-out, missed-shelve, or stolen. In traditional libraries, information is much more likely to be available when and where the user wants it.
- New forms of information become possible: A database may be the best way to record and disseminate information. Whereas conventional libraries are printed on paper, yet print is not always the best way to record and disseminate information.

Digital libraries would definitely facilitate research work and this should be accepted mainly by those involved in the field of research. However, recent studies showed that people still prefer to read from paper despite the progress in technology (Monopoli & Nicholas, 2001; Woodward, 1997; Borghuis et al., 1996; Dijkstra, 1998). Today with many people searching for new knowledge and information, the Internet is expected to take on board the role of the human intermediary. There is also an expectation that people are digitally literate (Monopoli et al., 2002). On the other hand, some end-users do not always have the literacy to search the Internet effectively for information. The problem is compounded by the fact the Internet as a whole is not well organized and information retrieval is inevitably a difficult and time consuming process.

The objective of this paper is to study the impact of interface characteristics on perceived ease of use of digital libraries. Further, this study also attempts to answer whether there is a relationship between interface characteristics and perceived ease of use. There is limited research done in Malaysia on the end-users' perception of the ease of use and usefulness of digital libraries. Thus this paper attempts to study the nature of the relationship between interface characteristics, perceived usefulness, and perceived ease of use on digital technology among post-graduate students in Malaysia.

LITERATURE REVIEW

In general, the accepted key functions of a library are known as knowledge archival, preservation and maintenance of culture, knowledge dissemination, knowledge sharing, information retrieval, education, and social interaction (Neal, 1997). The characteristics of digital library can be seen as initial innovation of the works that are stored in digital form. Later materials are always copied from the master version of the work in electronic library (Garrett & Lyons, 1993). Huge sum of money have been spent on building "useable" digital libraries. However research has shown that digital libraries are under utilized (Hong et al., 2002). Their findings indicated that perceived usefulness and perceived ease of use are determinants of user acceptance of digital libraries. Interface characteristics and individual differences affect perceived ease of use while organisational context influence both perceived ease of use and perceived usefulness of digital libraries. Interface characteristics can be seen from clarity of terminology, screen

design, and clarity of navigation; which can affect perceived ease of using digital libraries. In summation, interface characteristics refer to the interaction between the system and the users. It comprises of terminology, screen design, and navigation. Terminology refers to the words, sentences, and abbreviations used by a system (Lindgaard, 1994). Moreover, screen design is the way information is presented on the screen. Finally, navigation is the ease with which users can move around the system. On the other hand, Hong et al., (2002) indicated that interface characteristics were found to be significant determinant of perceived ease of use. It was discovered that terminology as the strongest characteristics; where clear terminology increases the ease of use of digital libraries by providing effective communications of system instructions and responses to users.

Further, organisational context variables were found to have significant impact on intention to use digital libraries through both perceived usefulness and perceived ease of use (Hong et al., 2002). Organisational context comprises of relevance, system accessibility, and system visibility. Kling and Elliot (1994) indicated that relevance refers to the integrability of the system into work practice, which is how smoothly the system fits into the person's or group's work practice. Meanwhile, system accessibility was defined as the ease with which people can locate specific computer systems (Kling & Elliot, 1994). Finally, system visibility originates from the concept of system observability, which is one of the key characteristics of technology innovation identified (Rogers, 1995). Among the organisational context variables, relevance indicated the strongest effect of perceived usefulness, and was greater than the effect of perceived ease of use. Further, this finding is consistent with Venkatesh and Davis (1996) of a direct effect from job relevance to perceived usefulness of a number of management information systems. In order to increase the relevance of library content to student's information needs, digital libraries designers should pay more attention to user requirements analysis to discover their expectations and requirements for the content of digital libraries, and then incorporate relevant materials into the systems.

THEORETICAL FRAMEWORK

The theoretical framework was adapted from the model on understanding of user acceptance of digital libraries. The research model by Hong et al. (2002) was used to understand the users' acceptance of digital libraries by studying the impact of interface characteristics through perceived usefulness and perceived ease of use on digital library. The theoretical framework is depicted in Figure 1.

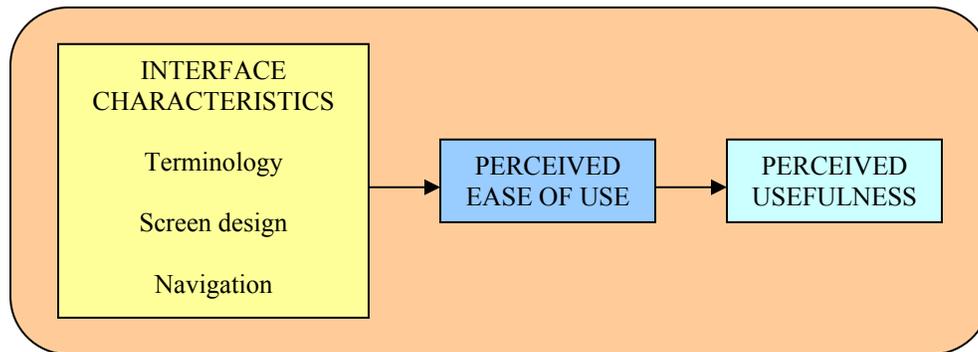


Figure 1 Theoretical Framework

HYPOTHESES

Several hypotheses were developed in this study:

- H₁ : Perceived ease of use has a direct influence on perceived usefulness of the digital library.
- H₂ : Terminology clarity will positively influence the perceived ease of using the digital library.
- H₃ : Screen design will positively influence the perceived ease of using the digital library.
- H₄ : Navigation clarity will positively influence the perceived ease of using the digital library.

RESEARCH METHODOLOGY

This paper tries to investigate the factors that influence the perceived ease of use and perceived usefulness of digital library among post-graduate students in Malaysia. Data were collected from post-graduate students in the local universities.

Individual post-graduate student was the unit of analysis and convenient sampling method was adopted. A structured questionnaire was developed, and data was collected from the respondents in various places on campus such as library and classrooms.

RESULTS

Demographic data was summarised in Table 1. One hundred sixty four completed questionnaires were returned out of 300 sets that were distributed. This gave a response rate of 46.7%. Majority of the respondents in the study were male, 55%, and female was represented by 45%. Meanwhile, 71.4% of the respondents were in the bracket of 25 to 30 years-old.

As the nation is diverse in ethnicity, Chinese was represented by 73.6%, Malay by 15%, and Indian by 5.7%. Based on the program of the study, majority of the respondents were in business (47.1%). The remaining was in science and engineering (40%), social sciences (4.3%), and education (1.4%). Full-time student was represented by 45%, and part-time student was represented by 54.3%.

Table 1 Demographic Data

Item	N	%
Gender		
Male	77	55.0
Female	63	45.0
Age		
25 – 30	100	71.4
31 – 35	26	18.6
36 – 40	9	6.4
41 – 50	4	2.9
Above 51	1	0.7
Ethnic		
Malay	21	15.0
Chinese	103	73.6
Indian	8	5.7
Others	8	5.7
Study program		
Business	66	47.1
Science & engineering	56	40.0
Education	2	1.4
Social sciences	6	4.3
Others	10	7.1
Study mode		
Full-time	63	45.0
Part-time	76	54.3
Distance learning	1	0.7

Reliability analysis was conducted on perceived ease of use, and perceived usefulness. Cronbach's coefficient alpha of .88 and .91 were generated, respectively. This indicated a very good inter-item consistency estimate of reliability. Moreover, reliability for interface characteristics was in the range from .76 to .86; this also indicated a very good inter-item consistency. Descriptive analysis was conducted and the results are tabulated in Table 2.

Table 2 Descriptive and Reliability Analysis

Item	Mean	S.D.	Cronbach's Alpha
Perceived ease of use	5.22	.96	.88
Perceived usefulness	5.57	.89	.91
Terminology	4.93	1.00	.81
Screen design	4.82	1.00	.78
Navigation	4.81	1.14	.71

Moreover, hypotheses testing were conducted using multiple regression analysis. The results were shown in Table 3.

Table 3 Multiple Regression Analysis

Dependent Variable	Adjusted R ²	Independent Variable	Beta	T	Sig.
Perceived usefulness	.28	H1: Perceived ease of use	.54	7.45	.00
Perceived ease of use	.20	H2: Terminology	.44	4.53	.00
		H3: Screen design	.07	.35	.73
		H4: Navigation	-.03	-.18	.86

The hypotheses tested were illustrated in Figure 2. From the above analysis, terminology was discovered as a good descriptor of perceived ease of use (Beta=.44, $p < .01$). Terminology had shown as the most important factor in determining interface characteristics. Moreover, the other dependents (i.e. terminology, screen design, and navigation) explain 20% of the dependent variable (i.e. perceived ease of use). Perceived ease of use had a positive influence on perceived usefulness (Beta=.54, $p < .01$). The dependent variables (i.e. perceived ease of use) explained 28% of the dependent variable (i.e. perceived usefulness).

In summary, the results concluded that Hypotheses 1 received support from the data. Results indicated that perceived ease of use predicted the perceived usefulness of using digital library. In relation to Hypothesis 2, terminology clarity was positively related to perceived ease of using digital library. On the other hand, Hypotheses 3 (screen design) and 4 (navigation) were not supported.

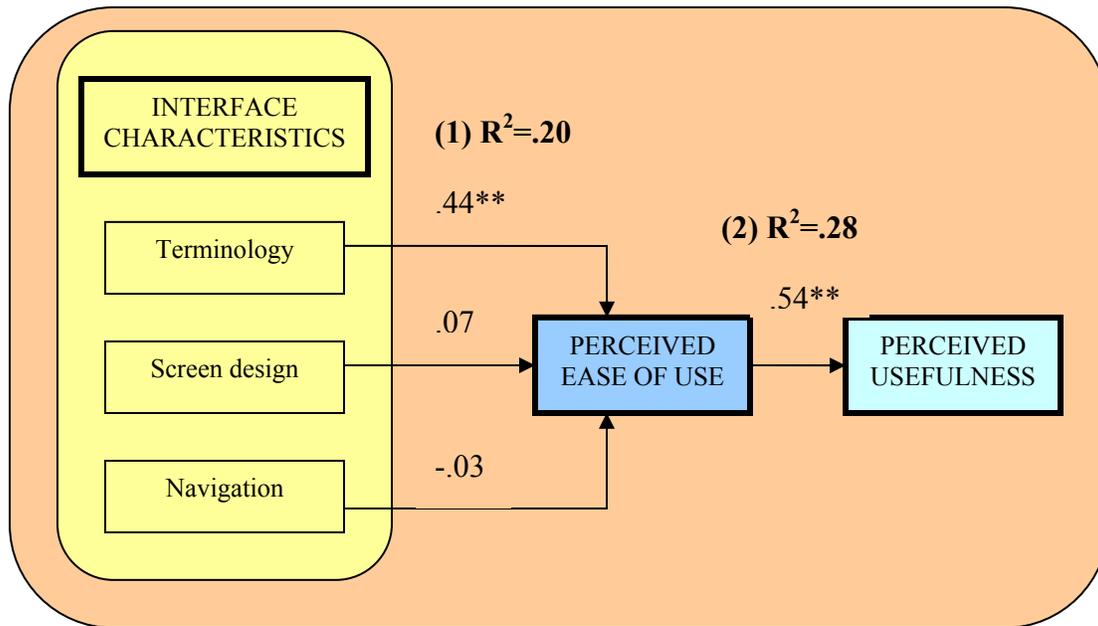


Figure 2 Hypotheses Testing Results

DISCUSSION AND CONCLUSION

Terminology has a positive influence on perceived ease of using digital library. This is true for those students who wish to understand the terms used in the digital library when retrieving complicated information. This observation is consistent with the findings by Hong et al. (2002). Clear and understandable terminology will reduce search efforts and ensure fast and efficient search of information. Clear technology will provide an effective communication of system instructions and responses to the users. Jargons and technical terms should be excluded. Efforts must be made to match the system's vocabulary with user's language to achieve terminology clarity. Once terminology clarity is present, then it would make it easier for end-users to use the digital library.

On the other hand, screen design and navigation clarity did not have much impact on the perceived ease of using digital library. This could be due to the fact that most users are already well-versed with the use of computers and would not face much navigation problems. Further, screen design would also not affect the perceived ease of use of digital library in view of the fact that post-graduate students are more interested in searching for information rather than the attractiveness of the screen itself. Thus the findings are contradicted with the study conducted by Hong et al. (2002), which found that screen design and navigation clarity contributed significantly to the perceived ease of using digital library.

However, an interesting finding from this study is that there is a positive correlation between perceived ease of use and perceived usefulness. This means that most post-graduate students who find it easy to use digital library are also likely to find digital library to be useful. Post-graduate students want to become skilful at using the digital library within the shortest time frame and probably do not want to go through the hassle of reading up manuals. This result is consistent with the study of Hong et al. (2002).

This study has provided results that can help universities better understand the impact of interface characteristics on perceived ease of using digital library among post-graduate students. The findings implied that some factors of interface characteristics at one point or another contributed to a certain extent the perceived usefulness and perceived ease of using digital library. Factors such as terminology should be studied more in-depth to gain more insight about the end-users.

This study also hoped that could be incorporated by people who build digital libraries. Factors such as exclusion of technical terms and jargons to enhance ease of use of digital libraries should be taken into consideration (when planning and building digital libraries). Clear terminology to provide effective communication of system instructions and responses to users should be given priority by organizers of digital libraries.

A more effective digital library would ensure the post-graduate students would make full use of the digital library technology when doing their research as this would solve the problems faced by them in the traditional library. Moreover, students who need to do research would benefit from a more effective digital library as it would provides a combination of digitally delivered content with learning support and services (Waller & Wilson, 2001). The digital library provides more choices, enhances flexibility and will often provide the learner with instant feedback. It allows students to select learning materials and is convenient to access at any time and at any place (Wang, 2003).

In conclusion, analysis of the data collected discovered that interface characteristics to a certain extent have impact on the post-graduate students' perceived usefulness and perceived ease of using digital library. Further, terminology has an impact on the perceived ease of using digital library.

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