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GAUGING THE USE OF AND SATISFACTION WITH HOME GROWN ELECTRONIC JOURNALS: A MALAYSIAN CASE STUDY

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ABSTRACT

This study examines the users of electronic journals published in a hosting system called EJUM (Electronic Journal of the University of Malaya) and their perceived satisfaction with the electronic journals as well as their preferred features in electronic journals and problems they face when using the electronic journals. The Malaysian Journal of Computer Science (MJCS), Malaysian Journal of Library & Information Science (MJLIS) and Journal of Problem Based Learning (JPBL) are being hosted by EJUM. These three electronic journals constitute 3 out of an estimated 17 electronic journals published in Malaysia. Users seem to use the electronic journals to mainly support research and teaching needs. About 50% of respondents rated the journals as "good", 20.6% rated "fair". Respondents seem to find out about the journals mainly serendipitously as they were browsing the Internet or "found out from a conference paper" or "saw information about it in an article". Keywords (28.9%) and title (24.3%) searches were chosen by a third of respondents respectively. The majority of respondents (70%) indicated preferring retrieving articles in PDF or HTML. About 41.8% of respondents access the electronic journals while making searches on Google or Yahoo. The next most selected option was "from specific journal hosting system" (21.8%), followed by "from my library web portal" and "from citation links found in another resource". Most respondents scan the abstracts first to check relevance and then download the articles. Most respondents believed that electronic journals will co-exist with print journals (46.2%). The rest believed that electronic journals will replace the print journals (25.5%) or will supplement (25.5%). The list of functions and features preferred by electronic journal is provided.

Keywords: Electronic journals; Electronic publishing; User studies; Journal use study; EJUM; Malaysian Journal of Library and Information Science; Malaysian Journal of Computer Science

INTRODUCTION

It is normal procedure for any electronic journal to conduct a user as well a usability study to gauge users' satisfaction with the journal in supplying their information needs as well as their satisfaction with the functionalities of the journal system itself. Such user study is usually conducted in an educational setup where the provision

and use of electronic journals began earlier. Most early studies between the years 1996 and 1999 indicated low actual use. Bancroft et al (1998) administered 2000 questionnaires to faculty members and graduate students at the Washington State University to examine their use of electronic journals. About 70% of respondents reported never using or have no opinion about electronic journals, even though they appreciate their value in terms of the access and downloads of full-text articles. Another American study at the Texas A & M University by Tenner and Yang (1999) also indicated low usage with only 37% of the respondents actually used electronic journals. The survey conducted in the United Kingdom at the University of Strathclyde by Tommey and Burton (1998) indicated that only 21% of the 150 respondents used electronic journals. The study found heavier use of electronic journals amongst respondents from the faculty of business, engineering and the sciences compared to those from the faculties of history and education. The main reasons given for not using and contributing to electronic journals were unawareness and fear of potential text alterations. This unawareness was also indicated by Weingart and Anderson (2000) who opined that since electronic journals and databases were not displayed on library shelves, academics and administrators were not aware of their existence. The researchers therefore advocated the need for publicity and training. This low use of electronic journals was also indicated by academic economists in Japan (Akasawa and Ueda, 1998) which revealed only about 31% of respondents used electronic journals.

Attitudes towards electronic journals began to take a turn from the beginning of 2000 onwards. A longitudinal study on the use of electronic journals during 1998 to 2000 amongst faculty and students at Ohio State University indicated the increase use of electronic journals from 200 titles in 1998 to 3000 titles in 2000 (Rogers, 2001). Use pattern also increased from 19% for once a week in 1998 to 36% in 2000. The use of printed journals also decreased. Respondents gave availability and ease of use as the major advantages provided by electronic journals. This shift from print to electronic journals was also indicated by the Max Plank Institute study carried out by Rusch-Feja in 1999. The advantages foreseen by respondents were accessibility, currency, ease of downloading and improved search ability. In this study electronic journals were found to indispensable by 7% respondents. A Greek study at the University of Patras by Monopoli, Nicholas, and Korfitai (2002) revealed that academics used the electronic journals mainly for writing up publications and teaching. Most academics also accessed the electronic journals from their offices and prefer to read the articles on screen (66%). The indispensability of electronic journals was also indicated by an Israeli study (Bar-Ilan, et. al., 2003).

In the year 2001 a large scale online survey was administered to the whole faculty and graduate students at the University of Maryland (Dillon and Hahn, 2002), and half of the respondents reported they used electronic journals at least once a month. More were using electronic journals especially if they did not find print equivalents. About 70% preferred both electronic and print to be made available especially in situations where core journals were considered important in respondents' fields. The largest journal use study was conducted by the Stanford e-journal initiative that began in 2000, which constitute three surveys (e-Just, 2000, 2001, 2002). The results of the 2001 survey indicated a definite preference for electronic journals amongst respondents (75%). The 2002 survey indicated the kinds of problems faced by respondents especially lack of back issues. Respondents preferred hypertext links to articles cited as 75% of them reported using and finding this feature useful. The finding also indicated that 50% of respondents read full text articles on screen rather than printing them out and most began their search by using multi-journal portals such as *PubMed*, *Ovid* and *Science Direct*. The 2002 survey indicated that among the avid electronic journal users, most kept copies of articles on their computer and printed copies later to read. An interesting study by Brennan, Hurd, Blecic and Weller (2002) found that electronic journal users made fewer visits to the library and most claimed that they were reading more than in the print only years and believed that they were exposed to a broader range of titles.

The above studies indicated that the use of electronic journals is expected to increase in future. Studies have already begun to show that authors and academics tended to ignore bibliographic databases, which did not provide full-text links (Ashcroft and McIvor, 2001). Users tended to employ the "least effort" approach preferring immediate and easy access full-text publishers rather than the referral databases. Current use studies have also begun to use log records to study user behavior. Log files record events and are used to study retrieval behaviour. However, there have been some contentions that log files does not really measure use as it does differentiate between purposeful or non-purposeful use.

This study examines the users of electronic journals published in a hosting system called *EJUM* (*Electronic Journal of the University of Malaya*) and their perceived satisfaction with the electronic journals as well as their preferred features in electronic journals and problems they face when using the electronic journals. *EJUM* was developed at the faculty of Computer Science and Information Technology, University of Malaya. The electronic journals which *EJUM* hosts are *Malaysian Journal of Computer Science* (*MJCS*), *Malaysian Journal of Library & Information Science* (*MJLIS*) and *Journal of Problem Based Learning* (*JPBL*).

These three electronic journals constitute 3 out of an estimated 17 electronic journals published in Malaysia (Zainab, Ang and Abrizah, 2005). *MJCS* and *MJLIS* were made available electronically in 1998 and had undergone several changes in terms of platform used and design.

METHOD

The study utilized a descriptive survey method and employed a questionnaire as the data collection instrument. Wherever possible, independent demographic variables (gender, age, faculty and non-faculty members) were tested for significance when cross-tabulated with dependent variables. The questionnaire used was a mixture of fixed response-type questions and those requiring open-ended responses. The questionnaire was in an electronic form distributed to respondents via a link through their e-mails. An online survey management system manages the collected data by channeling responses into an Excel spreadsheet. The questionnaire was divided into three sections; the first section collected demographic information such as gender, age, and occupational field or position; the second section solicited users' opinions on the functionalities and features of EJUM and the third section provided respondent's use and perception towards electronic journals in general.

A list of users registered with EJUM up to 12th January 2005 was obtained from the host's administrator. The list comprised 355 users and out of this a total of 330 users were selected based on the completeness of the information obtained in their registration form. An email was sent to each with an invitation to participate in the online survey and linking the mail directly to the survey form. A total of 140 responses were returned and out of this only 102 responses were used for analysis based on the completeness of responses (Table 1).

Table 1: Demographic Characteristics of Respondents

Demography of Respondents (n=102)	**Counts**	**Percentages**
Gender		
Male	63	62.0%
Female	39	38.0%
Ages		
21-30	36	35%
31-40	42	41%
41-50	24	24%
Fields / Disciplines		
Computer Science and IT	51	50.0%
Education	15	14.7%
Library & Information Science	15	14.7%

Business	6	5.9%
Sciences	6	5.9%
Engineering	3	2.9%
Health	3	2.9%
Others	3	2.9%
Occupations / Positions		
Faculty Members		
Lecturers	36	40%
Associate Professors	9	10%
Professors	6	6.7%
Non-Faculty Members		
Tutors	9	10%
Researchers	6	6.7%
Students	3	3.3%
Others	21	23.3%
Country		
Malaysia	66	65%
Others	36	35%

RATINGS ON USING EJUM

Reasons for Accessing the Electronic Journals

Six reason statements were listed against which respondents were allowed to choose more than one reasons. The intention here is to know user's reasons for accessing *EJUM* (Figure 1). Users in this study use the electronic journals mainly to support their research and teaching needs.

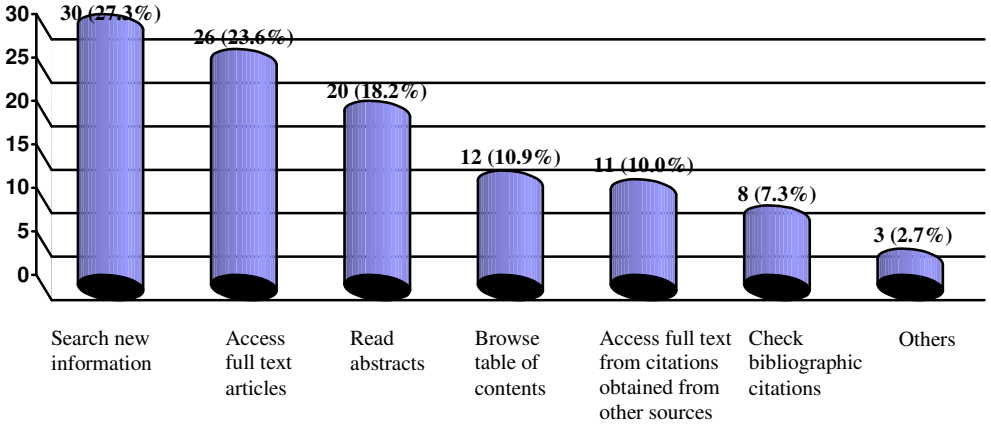

Figure 1: Reasons for Using the Electronic Journals in EJUM

How Respondents Find Out About the Electronic Journals

The statements listed in this section intended to find out how respondents gain access to the electronic journals in EJUM. As respondents were allowed to check more than one options presented, a total of 116 responses were obtained. Respondents seem to find out about the journals serendipitously as they were browsing the Internet. Other instances which steered users to EJUM were situations such as "found out from a conference paper", "saw information about it in an article". The results imply that the Internet is the best means of marketing the electronic journals, which means devising a way so that meta information from contents pages can be harvested by popular search engines such as Yahoo and Google scholar to increase article level accessibility (Figure 2).

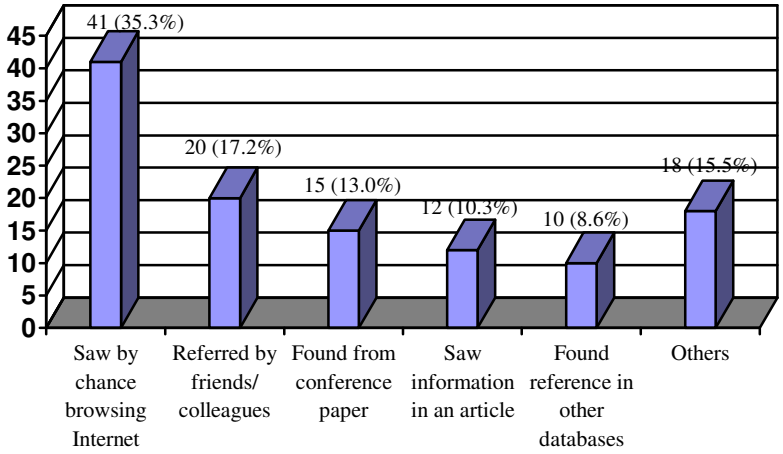

Figure 2: Means by Which Respondents Find Out about the Electronic Journals

Rating on Usefulness

When asked to rate the usefulness of the electronic journals accessed, 50% of respondents rated the journals as "good", 20.6% rated "fair" and 17.6% rated "could be improved". Only 0.8% rated the journals as "excellent" and 2.9% had no comments.

Level of Satisfaction with the Functions Available in EJUM

A total of 26 statements were listed to indicate levels of satisfaction to the functions available in EJUM, comprising registration, search, browsing, and viewing functions; subscription information; general and editorial information; navigation and design functions. A four-point scale was used for each statement ranging from

"Poor" (1), "Fair" (2), "Satisfactory" (3) and "Good" (4). Under each section the responses were listed in accordance to mean scores (Table 2).

Table 2: Satisfaction with Functions Available in EJUM

Statements	Count	Mean
Registration, Search, Browsing, Viewing Functions		
As a user I could register easily	102	3.3
View articles according to broad subject categories	102	3.1
Change my personal information anytime	99	3.1
Search by author's name	102	2.9
Search by keyword/subjects	102	2.8
Browse article via author index	99	2.8
View recently published articles on the main page	99	2.8
Browse article by author's affiliation	102	2.6
Focus my search using Boolean operators	99	2.6
Search archived back issues	99	2.6
Limit search by year	96	2.6
View links to references	96	2.5
Review new article alert from the publisher	99	2.1
Subscription Information		
Let subscriber renew account online	96	2.8
Able to view subscription information	99	2.7
Able to pay subscription online	99	2.6
General / Editorial Information		
Able to view general information about journal	102	2.9
Able t view about instructions to authors	102	2.7
Able to know submission datelines for each issue	102	2.7
Able to view information about editors, reviewers	102	2.6
Features and Design		
Text font (size, colour, type)	99	3.2
Navigation between screen	102	3.1
Background color / image	102	3.0
Quality of contents	99	3.0
Easy to learn its functions	93	3.0
Help screens	99	2.9

Table 2 indicates that users were satisfied with features such as registration, viewing of articles by broad subject categories and the ability to change personal information at anytime. The rest of the searching and viewing features were considered fair. Users indicated being satisfied with five out of six EJUM's features and design, all of which received mean scores of 3 and above. The subscription information as well as the general and editorial information received only "fair" mean scores. The results

imply that that there is definitely room for improvements. Features such as new article alert needed to be improved. Another feature which users rated low was "viewing links to references" and this feature is identified as important as it value-add functions that only an electronic environment can provide and should be capitalized upon. When the mean scores were applied to a rating scale (Table 3) only 61.5%, 16 achieved "good" and 30.8%, 8 were rated as "very good". None of the functions were rated "excellent", "poor" or "very poor".

Table 3: EJUM's Performance Based on a Rating Scale

Scores	Level of satisfaction	Count	%
3.6 – 4.0	Excellent	0	0.0%
3.1 – 3.5	Very Good	8	30.8%
2.6 – 3.0	Good	16	61.5%
2.1 – 2.5	Fair	2	7.7%
1.6 – 2.0	Poor	0	0.0%
1.0 – 1.5	Very Poor	0	0.0%

Preferred Search Options

Keywords search and searching under title were chosen by a third of respondents respectively. The rest of the respondents preferred simple search options and lesser still preferred browsing the title and author index. Very few indicated preferring the advance search features (Figure 3), which imply that perhaps users put low priority on wanting to search full-text of articles.

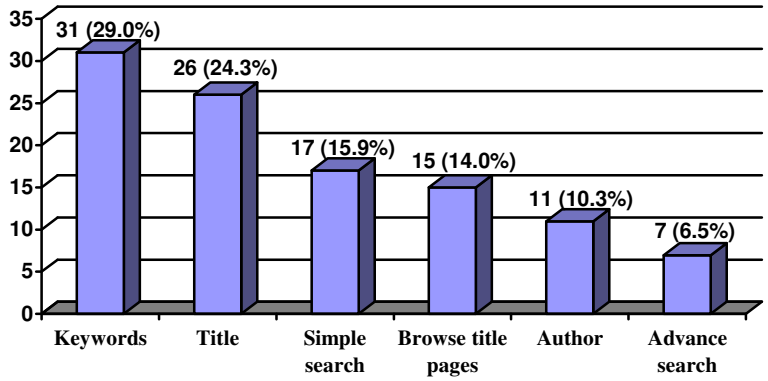

Figure 3: Search Options Preferred by Respondents When Finding Articles

Preferred Format for Reading Retrieved Articles from E-Journals

The majority of respondents prefer retrieving articles in PDF (70%, 69) followed by HTML (6%, 6). Most of the respondents "print and read off screen" (18. 18%) or "save and print out to read later" (6,6%). This finding contradicts to the findings in the E-Just study (Savori and Jeffrey, 2002) where the majority of respondents reported that they would read 2 to 5 pages on screen.

Problems Faced by Respondents When Using EJUM

Respondents indicated "downloading articles" problematic (48, 38.1%), followed by "searching and browsing for articles" (42, 33.3%), "viewing articles" (21, 16.7%) and "printing articles to read later" (9, 7.1%). The problem in downloading may be because users do not have Adobe Acrobat Reader installed in their PCs and a link should be provided to users to download the Reader which is available gratis on the WWW.

USE OF E-JOURNALS IN GENERAL

Location of Accessing Electronic Journals

More than a third (51, 39.5%) of respondents accessed the electronic journals on campus using personal PCs. Another third (42, 32.6%) accessed from their homes and the rest access on campus using shared PCs, which were most probably located in laboratories and the library.

How Respondents Come Across the Electronic Journals

About 41.8% (69) of respondents access the electronic journals while making general searches using popular search engines such as Google and Yahoo (Figure 4). The next most selected option was "from specific journal hosting system" (36, 21.8%). This is followed by "from my library web portal," and "from citation links found in another resource". Very few gained access through e-print portals. This is expected as EJUM is not designed to be on open access and article-level information could not be harvested by popular search engines and are therefore less accessible. This is an important feature that needs to be improved as the majority of respondents use search engines to begin their information search.

Frequency of Retrieving, Reading, Downloading Articles from E-Journals

Users on average, retrieve, read or download articles from the e-journals about once a week. There is a significant relationship (Pearson Chi-square=12.655, df5, $p<0.05$) between the frequency of use among faculty members (lecturers, Associate professors and Professors) and non-faculty members (tutors, researchers, students

and others). Faculty members tended to use the electronic journals more frequently than the non-academics.

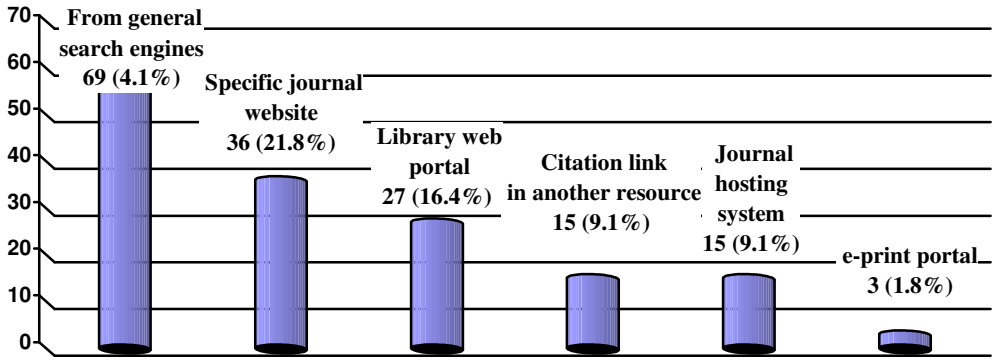

Figure 4: How Respondents Came Across the Electronic Journals

What Users Do with Retrieved Articles

Most respondents scan the abstracts, read a few sentences to check relevance and then download the articles. The rest exhibit varied types of behaviour (Figure 5). Users' behaviours indicate that full-text access at abstract and article levels is essential in electronic journals since most respondents indicate reading articles straight away or later.

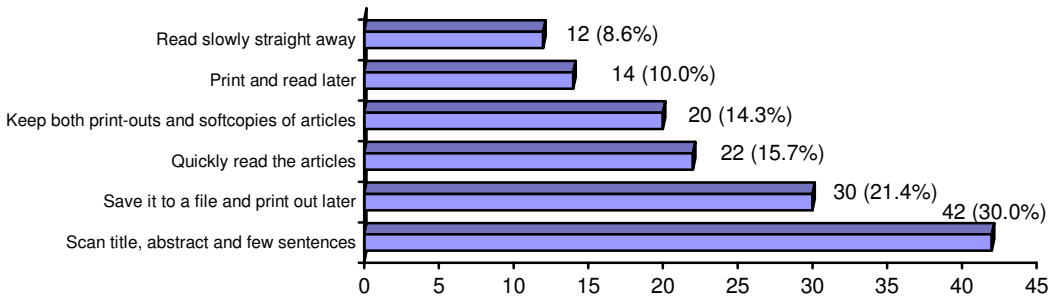

Figure 5: Article Handling in Electronic Journals

Type of Alert Options Most Useful

Respondents preferred e-mail alert that links directly to the articles (42, 29.8%) and the rest preferred links from table of contents (39, 27.7%), article citation (24, 17%), and keyword alert (24, 17%).

Preferred Function and Characteristics of Electronic Journals in General

Table 4 indicates the list of characteristics or functions which respondents prefer to find in electronic journals. The high mean scores indicate users regard all features as important or very important and are therefore essential features of electronic journals

Table 4: Preferred Functions in Electronic Journals

Functions/Characteristics	Don't know		Not important		Important		V. important		Mean
	C	%	C	%	C	%	C	%	Mean
Convenient to use	-	0	-	0	18	17.6	78	76.4	3.8
Back issues are available online	-	0	-	0	33	32.3	66	64.7	3.7
Easy to download full-text articles	-	0	-	0	30	29.4	63	61.7	3.7
Easy to use	-	0	6	5.9	15	14.7	78	76.5	3.7
User friendly interface	-	0	-	0	30	29.4	69	67.6	3.7
Good image quality	-	0	-	0	39	38.2	60	58.8	3.6
Easy to search within journal issues	3	2.9	3	2.9	24	23.5	69	67.6	3.6
Remote access	-	0	12	11.8	30	29.4	57	55.9	3.6
Easy to browse through contents	3	2.9	-	0	36	35.3	60	58.8	3.5
Easy to print	-	0	3	2.9	45	44.1	51	50.0	3.5
Reasonable subscription costs	-	0	3	2.9	42	41.1	54	52.9	3.5
Refereed	-	0	-	0	48	47.0	48	47.0	3.5
Hyperlinks to other subject-related articles	-	0	9	8.8	36	35.3	54	52.9	3.4
Indexed by indexing databases	3	2.9	9	8.8	33	32.3	54	52.9	3.4
Average Mean Score									**3.6**

C = Count

Problems Faced by Respondents When Using EJUM

Respondents indicated "downloading articles" problematic (126, 38.1%), followed by "searching and browsing for articles", "viewing articles" and "printing articles". Since most respondents carry out searches by keywords, the browsing feature could be accommodated in the keyword option. The problem in downloading may be because users needed the Adobe Acrobat Reader link to download the reader which is available gratis on the WWW.

Opinion About the Future of Electronic Journals

Most respondents believed that electronic journals will co-exist with print journals (49, 46.2%). The rest believed that electronic journals will replace the print journals

(27, 25.5%) or will supplement (27, 25.5%). Three respondents did not give any opinion on this question.

Relationship between Demographic Variables with Journal Use
Only the significant relationships are reported.

Gender and Ratings on Functions - Female respondents significantly gave higher ratings to "easy to search within journals" (x^2=15.89091, df 2, p <0.001), "reasonable subscription cost" (x^2=13.535, df 2, p <0.001), "indexed by indexing databases" (x^2=14.215, df 2, p <0.003), and "hyperlinked to other subject-related articles" (x^2=14.882, df 2, p <0.001) than the male respondents, even though there are more male respondents.

Age and Preferred Characteristics in Electronic Journals – The younger users gave significantly higher ratings (very important) on certain characteristics such as "easy to use" (x^2=24.843, df 4, p <0.001), "easy to browse within journal issues" (x^2=23.874, df 6, p <0.001),, "easy to browse through contents" (x^2=22.227, df 4, p <0.001), "user friendly interface" (x^2=29.981, df 2, p <0.001), and "reasonable subscription costs" (x^2=13.574, df 4, p <0.001).

Academics and Non-Academics and Preferred Characteristics in Electronic Journals – A significantly higher number of non-faculty members view these characteristics as very important compared to the faculty members, "easy to use" (x^2=11.679, df 2, p <0.003), "easy to browse through contents" (x^2=13.323, df 2, p <0.001), and "easy to download full-text articles" (x^2=7.320, df 1, p <0.007).

OUTCOME AND DISCUSSION

The level of acceptance and usage of electronic journals in *EJUM* is important in order to sustain *EJUM*'s objectives in serving Malaysian scholarly communication community. It also helps to identify factors which users of *EJUM* perceived to be important in electronic journals and allow developers of *EJUM* to study its overall usability in order to improve its services and serve both users and authors. The outcome obtained is a matrix of elements which help makes a useable electronic journal. Table 5 indicates the features indicated by users as important listed in order of preference. This is based on the respondents' ratings on "important" and "very important".

Table 5: Matrix of Quality Electronic Journal System

Features	Count*	
Back issues are available online	99	Important for scholarly journals as it serves those engaged in research and writing looking for articles. However this feature is discipline dependent. Perhaps in disciplines such as Computer Science and information technology there is lesser need for back issues as development in such discipline move so fast but important is the arts, humanities and social sciences.
User friendly interface	99	Users seem comfortable to use electronic journals that have a familiar look and feel to most e-journal systems. Users tend to prefer familiar command buttons, located in familiar places on the screen. Younger users significantly view this as a very important characteristic in an electronic journals
Good image quality	99	The journal system should support TIF, JPG, GIF, PNG image types.
Refereed	97	This is an important criteria for scholarly journal users
Convenient to use	97	Provide by online journals because the medium allows access regardless of time and place
Easy to browse through contents	97	Users are allowed to browse abstracts and full-text through author, title, keyword, subject. Non academic users regard this feature highly
Easy to print	97	Printing functions should be effortlessly located on the page or screen. PDF is preferred as the look and feel of documents are preserved when printed out. An alert to download Adobe Acrobat reader is essential to remind users to download it from the Web.
Reasonably subscription	97	Less important if the electronic journal is on open access. Important for hybrid journals where subscription cost is priced lower for the electronic version of the journal and attractively priced for individual subscribers. Reasonable subscription was regarded highly by female and younger users of EJUM
Easy to download full-text	93	Several forms of identification and prompts before the process of downloading an article will tire the user and should be avoided
Easy to use	93	Users prefer a system with functions that is easy to learn and use. Younger and non-academic users are more concerned with the system's level of simplicity compared to the mature and academic users
Easy to search within journal issues	93	Users prefer search functions that are effortless to use and takes minimal amount of time for users to use. Users from IT Related fields may not value this character as much as they are more adept at using e-based systems. It is valued by female and younger users
Hyperlinks to other related articles	90	Preferred because it saves time and is an excellent way of bringing related articles on any subject together. Female users regard this feature very highly.
Remote access	87	This is important as library visits may not be convenient to all users. Hence accessibility from own desktop, office or home is a valued feature
Indexed by indexing databases	87	Users seem to rate this lower because availability of electronic journals directly on the Internet negates the need to use an indexing service, which most often provide only referral citation information

* Count for "important" and "very important"

Other value adding features especially important to authors include speedier submission to publication time, prompt publication time, e-mail alerts to currently published articles; personalized web pages; submission templates; and email alert of referee evaluations.

Due to considerations given by users of *EJUM*, the developers have undertaken two courses of action. The first plan handles the accessibility problem as users indicated "coming across" *EJUM* by chance while searching the Internet. In order to expose the hidden article information in the contents pages an indexing page was written, which automatically retrieves the Meta labels of individual paper of every issue published. This strategy allows Google crawler for example, to harvest article contents of both *MCJS* and *MJLIS*, making them accessible under Google scholar. This strategy is expected to increase citations to articles published in both journals in future. This effect can already be seen as it possible to obtain total number of articles an author has published in the electronic journals in *EJUM* as well as the number of citations obtained by the articles (Figure 6).

The importance of utilizing Google Scholar is indicated by a recent study by Bauer and Bakkalbasi (2005), which indicated that this search engine would be able to track and provide citation information. Bauer and Bakkalbasi has compared the performance between *Google Scholar*, *Scopus* and *Web of Science* in extracting citation counts for 105 and 41 articles published in the years 2000 and 1985 respectively. In April 2005 they extracted the citation counts for each article from the three search services. The results show that the number of times an article is cited in *Web of Science* for the year 2000 ranged from 0 to 52, with an average of 7.6. *Google Scholar* detects an average of 4.5 more citations (12.0) than the *Web of Science* or *Scopus*. However, for the older sets of articles published in 1985, a higher average citation count is achieved by the *Web of Science* because they existed longer. This means that opening article contents to search engines such as *Google* would increase article level as well as author accessibility. The second strategy involved redesigning the electronic journals in *EJUM* which will be eventually changed to be on open access and accommodate hyper linking of subject related citations. The user study has therefore helped *EJUM*'s publishers to develop short and long term plans to improve its features, functions and accessibility.

Figure 6: Citation Information Obtained for Articles in *MJCS*

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