Web OPAC End User Satisfaction from Library Science and Information System Perspectives

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***Abstract*—Web Online Public Access Catalogue (OPAC) is widely used electronic library catalogues giving a wealth of remote access to library information resources. The end user satisfaction of the system is vital to ensure the continuation usage of Web OPAC. Most of the previous studies focused on the interface and the system itself instead of the end user satisfaction. This study is aim to integrate end user satisfaction criteria between Library Science and Information System Expectation Disconfirmation Theory (EDT). The conclusion from this study is an integrated approach from both fields is needed to provide a much comprehensive perspective to evaluate and measure the Web OPAC end user satisfaction.**

Keywords-Web OPAC, end user satisfaction, Expectation Disconfirmation Theory

I. INTRODUCTION

Academic libraries more often than not are the first resource for retrieving information related to the end-users requirements. Since academic libraries are now competing for the end-users interest, the current dispute faced is to deliver prompt, instant, seamless right of entry to resources and information to stay relevant in the fast growing information technology era. The new academic library has to be established on the just-in-time style, access to resources is more vital than the vast library collection. Academic libraries must establish the perception that the institution is a valuable asset to the academic activity.

These problems were the generally stated and argued trends in the present literature, at conferences, and by professional authorities. The academic libraries issues focused on the usage of its collection. Web Online Public Access Catalogue (OPAC) has always been the most suitable tool to retrieve the library collection by the end-users in order to utilize it. Being able to complete the searching and retrieval effectively has often represented a difficult task to be accomplished by the end-users. The critical challenge faced by the academic libraries is to provide the end-users with the right information and materials to fulfill their information needs effectively and efficiently. Without the usage of Web OPAC, some important information or materials could be left out and lead the end-users to unnecessary materials instead. Academic libraries aim to connect end-users to the best potential resources via a single interface. Most studies focused on the interface and the system itself. However, very modest assessment of the systems and end-users has been conducted. One of the study emphasized in this context is done by [1] which conducted a study on the end-users successful rate to complete common library tasks, unaided, using the Web OPAC interfaces. The end-users are having problems with typing error, high searching failure, puzzled with the truncation and low determination or early session termination.

The remainder of this paper is structured as follows. The next section provides a literature review relating to the current study. The third section discusses the integrated approach between Library Science and Information System. Finally, the conclusion is stated at the end of this paper.

II. LITERATURE REVIEW

A. Web OPAC

Web OPAC illustrated by [2] is available on the web. World Wide Web (WWW) can assist any person to access it from wherever. Washington University in St. Louis stated that, "*A Web OPAC interfaces, which uses the World Wide Web protocol to act as an OPAC*." ODLIS stated that, "*An Online Public Access Catalogue (OPAC) that uses a graphical user interface (GUI) accessible via the World Wide Web, as opposed to a text based interface accessible via telnet*." Web OPAC is a self-sufficient system produced independently from the library system. It is produced and programmed to aid end-users to access it. One characteristic which has become regular for new library Web OPAC is to include links to full text or electronic documents. Other future features are links to publishers, links to commercial resources, and links to electronic journal titles.

Simply stated, a Web OPAC is a library catalogue on the World Wide Web or Intranet. According to [3], Web OPAC is the next generation of an OPAC. End-users are capable of searching the needed materials by connecting to

Web OPAC Uniform Resource Locator (URL) during the day and accessible from wherever in the world. Web OPAC function as question-answering, richly interactive information discovery and retrieval system and to support decision making, that has no fundamental boundaries on the type and formats of data and information it can find, access, recover, exhibit, and distribute.

Study by [4] justifies that Web OPACs are user-centered and recently extensively spread to provide collaboration, interaction and communication services and infrastructures for the formation and utilization of content. The technologies have revolutionized the end-users interaction with the system, choose and systematize available information extremely. The mean of Web OPAC is to make library resources to be effortlessly discovered and requested by the end-users. End-users are capable to search the library materials and catalogue, furthermore to retrieve accessible documents and they can constrict down by using search facets. Moreover, the Web OPAC offers fascinating features such as annotating, tagging, citing and reviewing the records the end-users are concerned with. According to [5], Web OPAC end-user exploit color, book cover images, and a large diversity of icons to please the general look and feel. Web OPAC also present the end-users with experience as a Google-like search atmosphere. Each search performed will almost constantly returns with a search result.

The Web OPAC basically involving the availability of the following three elements:

- Web Technology which includes HTML, ASP, XML Web server programming etc.
- Computer Networking Technology which includes LAN, WAN, Internet, and Intranet.
- Computer Readable Catalogue which be able to access type of databases accessible through computer.

Since the implementation of OPAC first generation, the library has grown to be conscious of the value of the Web OPAC interface. Recently, Web OPAC graphical user interfaces are based on conventional menu or command arrangement with minor concern to user's requirements. Web OPAC can perform an even more diverse and various populations, the end-users interface should attend to problems produced by gradually more dissimilar knowledge and skills of the end-users.

The essential features of Web OPACs are [3]:

- Web OPAC is accessible through internet.
- Web OPAC can be search separately by Author, Keyword, Title or Year.
- Web OPAC exhibit comprehensive bibliographic information as appeared on reprints.
- Web OPAC Graphical user interface (GUI) is a provide icons, drop-down menus and a pointing device such as a mouse to get the available information.
- Web OPAC characteristic as a warehouse of bibliographic and occasionally online full text databases. Web OPAC has a capability to utilize hypertext links to assist navigation of bibliographic materials and records.
- Web OPAC shift towards imitation of the search and appearance characteristics related to search engines.
- Web OPAC has link to full text when it is offered.
- Web OPAC capable to all electronic information accessible through one interface.

Web OPACs offer the end users with several advantages, such as:

- The status of any library materials is visible to the end users. Such statuses are lost, on order etc. Acquisition order status may be accessible to both library staff and end-users.
- Web OPAC is wide-reaching and accessible all the period.
- Web OPAC is made feasible for end-users to send reprint requests instantly via e-mail by the end-users.
- Compilation of a variety of reprints listing becomes very effortless.
- Space and time will not be the limitation to conduct searches of any materials and information. Any end-users can search any document held by the library and also by any other networked library.

B. End user satisfaction in Library Science perspective

According to studies done by [6], there are varieties of methods and approaches have been used to investigate or evaluate Web OPACs. These fall into two groups. The first consists of methods that aim to measure overall system performance through retrieval tests, and includes comparative studies and controlled experiments. The second group includes more user-oriented, diagnostic analytical methods. The design of the evaluative component of an experimental study could include a combination of methods from both groups. Looking at the previous studies, however, Web OPAC studies has been primarily concerned with the performance from the system's perspective compared with studies on the end user satisfaction of the system. [7]

A number of methodologies developed to collect data on Web OPAC users, usage and satisfaction. These methodologies are not mutually exclusive, and many studies employ more than one technique to collect data. According to[8] the methodologies are:

- Experiment
  A controlled artificial environment can be used to collect the data.
- Interview and questionnaire

If Web OPAC end users are the focus of the study then a relatively straightforward method of gaining information about a search is to interview the end users after they have finished their search.

- Observation
  Observation of end users at the Web OPAC is employed by a few studies but seems to be relatively unpopular as a data-gathering instrument.
- Think Aloud
  Think Aloud techniques by end users while searching Web OPAC represent a compromise between interview and observation. This approach is to learn from the users' immediate and reflective responses regarding both the usability and the perceived usefulness of system features. End users' actions and their thoughts were collected while engaging purposefully with the system on tasks designed to engage the end user with the system to search, view the search results, and in the use of additional system functionality.

Various measurements used in the previous studies to evaluate the Web OPAC end user satisfaction. Table 1 shows the different measurement used by researchers from previous studies.

TABLE I. END USER SATISFACTION MEASUREMENT FROM PREVIOUS STUDIES

Measurement	Previous Studies				
	Bieley 2011[9]	***Hessel 2012[10]***	***Johnson 2010[11]***	***Thanuskodi 2012[8]***	***Mulla 2009[12]***
Ease of navigation	☑	☑	☑		
Accessibility to library materials	☑				☑
Integration with social media	☑				
Usability	☑			☑	☑
Ease of access to actual journal	☑				
Screen design		☑			
Learning ability		☑	☑		
Overall satisfaction		☑			
Library staff assistance				☑	☑
Response time				☑	
Aesthetic appearance			☑		
Terminologi			☑		

C. *End user satisfaction in Information System perspective*

End user satisfaction evaluates terminal computer end user holistic assessment based on using experience of an information system. Previous study by [13] identify end user satisfaction as an instrument to measure satisfaction of end users who directly interact with a specific application or system. Expectation Disconfirmation Theory (EDT) has been the most widely adopted approach in research and managerial practice for understanding consumer or end user satisfaction[14]. Study conducted by [15] is the pioneer to bring adaptation-level theory into the consumer satisfaction research and explained the satisfaction formation in terms of expectation, performance and disconfirmation.

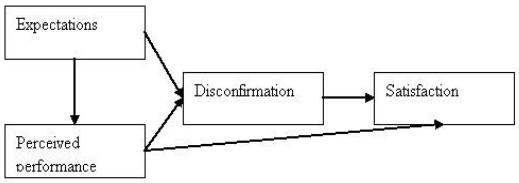

Figure 1. EDT, Oliver 1977, 1980

Figure 1 show the model proposed by [16]. EDT consist of four construct consist of expectation, perceived performance, disconfirmation and satisfaction. EDT put forward that expectations, tied with perceived performance, pilot to post-purchase satisfaction. This consequence is reconciled through positive or negative disconfirmation among potential and presentation. If a product is over expectations (positive disconfirmation), the outcome is post-purchase satisfaction. If a product id under expectations (negative disconfirmation), the end-user is expected to be dissatisfied [17].

In recent years, there is an increasing amount of IS research using EDT to explain end user IS satisfaction. For example, [18] used the EDT to investigate the antecedents of web-consumer satisfaction. EDT was applied by many researchers in different fields for a better understanding of the customer's expectations and requirements for attracting their satisfaction, such as studies in marketing done by [15], [19], [15], [20]; in tourism by [21]; in psychology [22]; in Information Technology [23], [24] and [25].

Study conducted by [26] proposed a research model and measurement instrument by incorporating EDT to explain the formation of end user IS satisfaction. They [18] further built on EDT and proposed that web information quality satisfaction and web system quality satisfaction are determined by both the perceived performance and disconfirmation. Indeed, among the diverse theoretical frameworks, EDT has been receiving a great deal of attention in recent IS research. A large body of user satisfaction research primarily focused on the

satisfaction construct and ignored the theoretical foundation. Noting this limitation, studies done by researches such as [26], [15], [18] and [14] has applied EDT in their studies.

It is important to note the performance of Web OPAC content will be evaluated by the end users. End users will distinguish between satisfaction/dissatisfaction with Web OPAC information and searching facility. They will feel extremely satisfied with Web OPAC information if their expectations are satisfied (*i.e.*, expectation consistency), because their information search and retrieval is effectively assisted by the informative and reliable Web OPAC. Based on the similar logic, it is expected that when the end users expectations for informative and reliable web OPAC are not satisfied (*i.e.*, expectation inconsistency), end users will feel dissatisfied with Web OPAC.

III. INTEGRATED APPROACH BETWEEN LIBRARY SCIENCE AND INFORMATION SYSTEM

This study proposed an integrated approach between the Library Science and Information System to measure the Web OPAC end user satisfaction. Integrated approach will streamline all of the aforementioned measurements with the end user satisfaction studies in library science field with EDT construct, as illustrated in Table II.

TABLE II. INTEGRATED APPROACH OF WEB OPAC END USER SATISFACTION

Construct	Measurement Items
Expectations	Knowledge of the system
	System performance such as ease of navigation, response time, access to actual journal articles and integration with social media
	System design such as screen design and aesthetic appearance
	Accessibility to library materials
	Library staff assistance
	Learning ability
	Terminology of the system
Positive disconfirmation	Personal benefit from the system
Disconfirmation	Sense of personal accomplishment
	Attitude concerning system use
	Perceived net benefit
Satisfaction	Overall satisfaction

The integrated approach is proposed to prepare holistic criteria that include all aspects that are multi-integrated in Web OPAC end user satisfaction measurement. The integrated approach will include the technical quality of the system, personal characteristics of the users and organizational context as well.

Previous studies on Web OPAC end user satisfaction conducted in Library Science fields used different type of measurements and methodologies. The measurement varies and difficult to identify a complete set of criteria or measurement especially dedicated for Web OPAC end user satisfaction. However, the methodology used is more comprehensive such as Think Aloud that gives the end users a chance to experience and evaluate the system.

IS offer wide and rich theory related to end user satisfaction. The theory is recognized and widely used in end user satisfaction research and studies. EDT is the most adopted theory in the field. The construct and measurement are more thorough and broad inclusive of expectation, perceived performance, disconfirmation and satisfaction. EDT has proven to be effective in evaluating the end user's satisfaction, however it can be integrated with other aspect, providing customized output for the end users.

Integrated approach benefits many stakeholders as follow:

- Librarian
  Librarian can provide a platform for courses and ongoing teaching assistance to assist the end user in optimizing Web OPAC effectively.
- Library
  The management of the library can analyze the overall performance of the service offered via Web OPAC system. From this, the management can provide feedback to the vendor on the effectiveness of the aforementioned system. Hence, the library management can provide solutions to rectify any issue and provide solution in improving the service via Web OPAC system.
- Vendor
  The feedback retrieved from the library management can be used by the vendor to upgrade the system with up-to-date features that fits the end user's needs and current technological trends.
- End User
  They can contribute ongoing ideas to optimize the Web OPAC system by providing personal and technological perspective on the system.

IV. CONCLUSION

Academic libraries are to provide the end-users with the best of Web OPAC could offer, the current challenge is to offer instant and flawless access to resources and information in order to stay relevant in today electronic world. The mean of Web OPAC is to make library resources and collection to be easily discovered and

retrieved by the end-users. Moreover, the Web OPAC offers intriguing features such as tagging, reviewing, annotating and citing the bibliographic records the end-users are interested with.

Studies of Web OPAC end user satisfaction conducted in Library Science field are using different and various criteria. The criteria used to evaluate the end user satisfaction are Ease of navigation, Accessibility to library materials, Integration with social media, Usability, Ease of access to actual journal articles, Ease of use, Learning ability, Response time, Aesthetic appearance, Terminology and Navigation. To collect the data, those studies are using several methods such as Interview and questionnaire, Observation and Think Aloud or a combination of several methods. In the field of IS, EDT has been the most widely adopted approach in research and managerial practice to understand and measure end user satisfaction. EDT measurement is according to Knowledge of the system, Personal benefit from the system, Sense of personal accomplishment, Attitude concerning system use and Perceived net benefit. An integrated approach of Library Science and IS to evaluate Web OPAC end user satisfaction should be able to provide a comprehensive and broad perspective.

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