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Digital Library Service Quality Assessment Model

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Abstract

With the introduction of digital library services, the quality of service (QoS) has become paramount importance for evaluating the performance of the digital library service provisioning. Various models and frameworks have been proposed to evaluate digital library QoS. However, the prevalent research concentration in QoS for digital library is on the dimensions of the perspective of users' perception. In this paper, we address the same research problem from a different dimension which is from the perspective of the digital service providers. To this end, we propose a new model suitable for evaluating the performance of digital library services. We argue that the level of QoS provided by the digital service providers have direct impact on the perception and satisfaction of the digital service end-users.

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1. Introduction

Libraries play a significant role in providing core services that include research, teaching and learning. In the conventional library setup, the library users must be physically present in the libraries if they need to make use of the library services such as reference services, interlibrary loan and bibliographic search services. However, advances in information and communication technologies have led to changes in the way libraries provide and manage (e.g., gathering, organizing, storing, retrieving and disseminating) activities into digital format. Also, various new services such as access to electronic or digital collections

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(online databases, electronic journal, e-books and digitized collections), electronic publishing, web-portals, online reference, and online document deliver, helpdesk and online library instructions have been introduced in service delivery by the libraries. This development has improved access to activities into digital format. Also, various new services such as access to electronic or digital collections (online databases, electronic journal, e-books and digitized collections), electronic publishing, web-portals, online reference, and online document deliver, helpdesk and online library instructions have been introduced in service delivery by the libraries. This development has improved access to appropriate, current and pertinent information at incredible speed.

An important and significant change in the library system is the introduction of the third-party sourced services such as computers, search engines and scholarly databases. This change has brought with it stringent Quality of service (QoS) requirements from the library patrons. Digital library introduces interactive information flow between end-user and the third-party service (service provider) using online access tools (Kiran & Diljit, 2012). Thus, libraries must now include online usage and electronic resources in the overall evaluation of the digital library (Shi & Levy, 2005). For that reason, every effort to measure digital library service quality must be established upon a strong understanding of the phenomenon of service quality and what indicates service quality from the user perspective (Cook, 2001). Therefore, QoS requirements of library service users coupled with the changes in the library service provision has mandated the need for a new approach to evaluate the quality of library service provisioning. Thus, it is crucial for libraries to face to the challenge of their patrons' demand especially which is related to the increasing sensitivity to soft service components, value and the quality of service offered in the current networked environment (Gardner & Eng, 2005). However, there is no work to the best of our knowledge that takes into account the influence of the quality of the third-party sourced services in digital library when evaluating library service quality. Relationship between digital library and third-party sourced services is different from normal customer/service provider relations (Sam & David Carlson, 2006). The aim of this paper is to close this gap in the literature. To this end, we propose a conceptual model for evaluating the service quality of the digital library. We make two main contributions. First we introduce new features that determine the right third-party sourced services efficiently. The second contribution is to provide a number of factors for digital libraries to use it as an evaluation method to determine the library service quality. The rest of the paper is organized as follows. Section 2 describes the literatures review. The proposed model is discussed in Section 3. The conclusion and future work are presented in Section 4.

2. Literature Review

According to Kiran and Diljit (2012), service quality has been explored widely and defined differently in many research studies. Parasuraman, et. al (1988) defined service quality as a perceived quality, which it is related with the consumer judgment of the product. This sense not only had been used in the marketing area but also has been used in many other fields such as banking, retail, industry etc. Key factors for organizations sustainability and driving forces for an organization achievement are services quality (Santos, 2003). Even though the acceptance of the service quality concept from the marketing literature, the indicators for quality of library services are still not well defined (Kiran & Diljit, 2011). Service quality also has received a lot attention in information system literature (Nicholson, 2005). However, a number of surveys (Green, 2008; Masood Badri et. al, 2005 & Ladhari, 2009) have shown that standardized scales are not applicable in different service conditions. Therefore, different organizations service need adaptations of different factors for ensuring quality in their organization (AneLandoy, 2011). For a library, service quality involves the cooperating relationship between the library and the patron that they supposed to aid. Therefore, to evaluate a digital library capability, Service Quality is an essential element that must be considered. This statement has been supporting based on research by Rockart (1982). He highlighted that the role of service quality in information system success and considered it's to be the most important Critical Success Factor (CSF). The recognition of service

quality determined elements were surface and don't have enough details, although extensive efforts have been done to divide service quality to process quality and output quality. Other issues, most of the research that had been done may not be directly connected to a non-profit library service environment. The various service quality evaluation tools available today are merely transferring from traditional services to the self-service electronic environment. It is not necessarily mean that traditional service measures will adequately capture the quality of electronic service quality (Kiran & Diljit, 2011). Thus, it is necessary for digital library to monitor and evaluate their third-party sourced services to perceive what expectation that digital library should attempt to meet during revising and refining their quality of services (Peter Brophy, 2006).

Digital libraries are new and pioneering information systems, under constant development and change. Ensuring patron satisfaction and providing the high quality of services are generally recognized as main factors that lead to success for digital library. Consequently, quality becomes essential to determine the patrons expectations and satisfaction on the way that digital library deliver their services (Maria Helena, et. al, 2011). The digital library could report a high volume of services offered, but abandon its long-term value due to eroding service quality (Yanchun Mao & Jin Wang, 2009). The basic of using services in digital library is to given a satisfaction based on the need of their patron. Therefore, the evaluation of service quality in digital library is importance. By this, the evaluations are to ensure not only their proper progress but also their acceptance by the patron and practice group of people. The objective of service quality digital libraries evaluation is to examine what are the main features need to collect to meet with digital library objectives. In addition, this evaluation can offer suggestions for improvements (Nicholson, 2005). The existing literature on the aspect of quality service in digital library shows that most studies have been focusing on the content services should be provided by the library (Ash Mohammad Abbas, 2011). Mainly research studies on digital library adopt service quality tools from the business and marketing field (Kiran & Diljit, 2012) such as SERVQUAL, SERVPERF, and e-SERVQUAL. In measuring quality of service for digital library, different origin theories have been established and reform (Nor Irvoni Mohd Ishar, & Mohd. Saidfudin Masodi, 2012). Among the famous theories that have been used in library service assessment is SERVQUAL (Service Quality Model) that have been introduced by (Parasuraman et. al, 1988). The well-known dimensions that most of the researchers are avail from these theories are Reliability, Responsiveness, Assurance, Empathy and Tangible. Usually researchers within the library and information science have measured gap reduction through the use of SERVQUAL (Nor Irvoni Mohd Ishar, & Mohd. Saidfudin Masodi, 2012) using the standard test method. However, it has been on counts and frequency of responses. It lacks accuracy due to nonlinearity in measurement (Kiran & Diljit, 2012). Moreover, libraries act differently from business entities. Adaptation from traditional services to electronic services goes further than application of innovative technology (Kiran & Diljit, 2012) to deliver services. Green (2006) tested the validity and reliability of SERVQUAL in the library situation and concluded that the SERVQUAL model did not match the data. Furthermore, approving an off-the-shelf measurement tool runs the risk of compliant in accurate data since each service industry might have its own unique dimensions (Carman, 1990).

Digital libraries service quality assessment has many features depending on the characteristic and the prospect of the evaluating instrument. Hernon and Calvert (2005) proposed a model that addressed applications of service quality to assess library e-service quality. The idea is based on relevant dimensions from SERVQUAL and E-S-QUAL. This study did not report a convincing empirically tested e-service quality assessment tool. However, it was suggesting that researchers should examine the various dimensions reported in the study and seek conceptualization of the e-service construct (Calvert, 2008). On top of that, Service quality can be categorized into three (3) components (a) environment quality, (b) Delivery quality and (c) outcome quality. Hence, building in the lead of work (Nicholson, 2005), the proposed model in this paper will appoint three methods of service quality for digital library specifically environment quality, delivery quality and outcome quality. This model being supporting by (Kiran &

Diljit, 2012), methods that describes the service quality of digital library is services environment quality, service delivery quality and service outcome quality.

3. The Proposed Model

A model is conceptualized based on the previous work of others (Nicholson, 2005; Fassnacht, & Koese, 2006 and Masitah, et. al, 2011). As shown in Fig. 1, the proposed model for consideration the impact of third-party sourced services on digital library services quality. Based on the review on previous work, we added three features in the model. The first features consist of (1) Service quality features (i.e. environment quality, delivery quality and outcome quality) as a dependent variable. The second features independent variables are (2) internal-focus (digital library) perspective, and third features are (3) external-focus (end-user) perspective. The components of internal perspectives are procedures and standard. While the components for external perspectives are aboutness and usability. The sufficient variables for the relationship between service quality and digital library will be (4) third-Party Sourced services features, which include utilization, capability access quality and indicator. We also used experts' opinion to filter the selected features and defined all of them to match with the existing digital library services.

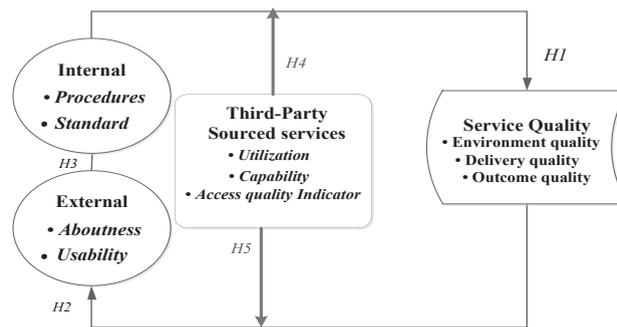


Fig.1. The proposed quality of service assessment model

3.1 Service Quality

Digital libraries service quality assessment has many features depending on the characteristic and the prospect of the evaluating instrument. Hernon and Calvert (2005) proposed a model that addressed applications of service quality to assess library e-service quality. The idea is based on relevant dimensions from SERVQUAL and E-S-QUAL. This study did not report a convincing empirically tested e-service quality assessment tool. However, it was suggesting that researchers should examine the various dimensions reported in the study and seek conceptualization of the e-service construct (Calvert, 2008). On top of that, Service quality can be categorized into three (3) components (a) environment quality, (b) Delivery quality and (c) outcome quality.

- *Environment quality*: Environment Quality covers the extent to the presence of the user interface in digital services. Hence how the library understands and interacts with their patron will affects the quality and nature of the services concentrated (Shi & Levy, 2005). Graphic quality captures how well the various elements of the user interface. The design structure of the user interface helps patron’s to find their way to clarify the layout of the extent to which text, icons, digital images, or backgrounds are visually represented (Masitah, et. al, 2011). Moreover, the interviews indicated that visual quality and clarity of layout should be considered as separate sub dimensions.
- *Delivery Quality*: Using electronic media as a method for delivering services is a crucial challenge encountered by any of the organization includes digital library. Among these challenges is related to a poor performance of the organization to identify the patron needs and desired what they want (Santos,

2003). Approaches used electronic medium in the business and management service delivery fields has been addressed by many researchers (Hernon & John Whitman, 2001). Service delivery quality as it relates to library involves with two components for instance; service quality and customer satisfaction (Kiran & Diljit, 2011). This interaction includes features that are applicable to the patrons. For examples, when the patron access the information from the digital library services, they need to select from the existing collections of resources which are stored in digital formats (electronic, database, microform) or relevant with the digital services that have been given by the libraries. To meet the needs of patron's service delivery quality is required Robust and reliable technology (Rockart, 1982). Therefore, the digital library must make sure that they already have pertinent aspects that are related for the patrons when they observing for information. The foremost supports in information system service delivery for organizations are service delivery quality (Jeng Judy, 2005)

- *Service outcome quality*: Service outcome is a view as any independent measure of digital library services, digital service delivery or usage. It's may contain digital collections and services that facilitate access, retrieval, and analysis of the collections in the library. In this model, outcome quality is viewed as what the patrons is missing by after service delivery. This includes the range of which the digital library keeps its service ability. It is significant with the accuracy and timeliness which the essential service promise is fulfilled (Masitah, et. al, 2011). Hence, to make it a feature of outcome quality this service outcome quality only can be judged after service deliver. Explicit discussion of outcome quality as a component is slight while there is wide consensus in the literature on the importance of reliability within the scope of Quality of Electronic Services (Santos, 2005). In essence, we hypothesis that:

H1: Services quality is significantly related to an internal perspective factor (Digital Library).

3.2 External-Factor

The second factor that influences the evaluation in quality of service for digital library environments is external-factor. Where the patrons present the overall usefulness of information gained through the library, either through elicitation by an evaluator or by citing/linking to library services. It is essential to assess what users need and desire for services (Sam & David Carlson, 2006). External factor (patrons) is concurrently growing their expectations of the quality of service delivery (Calvert, 2008) and service provider (digital library) that cannot maintain stage with such expectations drop behind at their risk. About ness and usability is a component that needs to be considering in this factor.

- *About ness*: External factors need the about ness in their measurement based on the theories (Nicholson, 2005). There are two components that can be categories in this component: measurement based on the patron's view of services and measurement based on the patron's view of the use experience. The use experience of patron's may extend beyond with the time spent interacting with that library. This may involve working with the patron before they start their interactions with the library and following up with users well after their library interactions measuring. These post-transactional measurements are crucial to understanding the larger picture of how the library services are being used. Understanding these differences allows libraries to offer and personalize services to meet the needs of more communities.
- *Usability*: Usability is a multidimensional concept that can be examined from various perspectives [28]. In this paper, we defined usability as ease of use or user-friendliness and consider from interface effectiveness point of view. This view has theoretical base on human-computer interaction (Arms, 2000). Several aspects such as interface design, functional design, data, metadata, and computer systems and networks had in usability (Innocenti, et. al, 2010). All of this component need to work together to create an effective and convenient digital library services. Hence, we posited that:

H2: Services quality is significantly related to an external perspective factor.

3.3 Internal-Factor

Digital library as a mutual customer for third-party service provider; thus third-party service provider must be active with the digital library need so that it would not create any contradiction in standard and procedures related with the digital library. Due to that, procedures and standards in among the factor need to be consider in this model.

- *Procedures:* In the world of digital libraries, a procedure is typically described as a condition, term or regulation governing the operation of a digital library or some aspect thereof. Individuals (such as digital library staff members, managers, and stakeholders) make procedures for digital libraries. Sometimes, this procedure can be expressed as rules. Rules provide mechanisms to express complex policies in ways that digital services can interpret and apply them. At an internal level, digital library access procedures must be enforced, and users often need to be informed of the procedure and educated as to what constitutes a reasonable behaviour (Lankes, et. al, 2003) normally through usage procedure. Finally, a procedure could be affected by quality parameters. This could require a quality assurance (QA) which would ensure documented procedures on the standards and best practices to be implemented and systematic policies for measuring compliance with this procedure (Lankes, et. al, 2003).
- *Standards:* A standard provides a powerful means of guiding library performance measurement (Peter Brophy, 2006). Standard is a collection on the process it is intentionally for administrate the minimum levels of anticipation that organization must attempt to encounter in fulfill the expectations of their external factor. In other word, is to make sure that they do not reduction underneath. Over the year library have developed standards as a basic for services. . For example by law, libraries in Australia offer comprehensives and efficient services since the libraries Act of 1964. The development of this standard is to provide a yardstick for assessing service economy, efficiency and effectiveness (Lankes, et. al, 2003). A digital library services standard can be considered as a specific case of digital services standard, which is defined as any law, regulation, rule, or practice that affects the creation, acquisition, disposition, organization, dissemination, use, or evaluation of digital services (Lankes, et. al, 2003). In principle, we hypothesis that:

H3: An external perspective factor is significantly related to internal perspectives factor

3.4 Third-Party Sources Services

There are a number of studies about the evaluation quality of digital services factors mainly on the patron's satisfaction and expectation. The delaying on standards and procedures may misuse occur of information technology (IT) in the organization. Therefore, this study highlights the sufficient variables for the relationship between service quality and digital library will be third-party sourced services. Providers of IT service no longer afford to focus only on technology and their internal organization. They also have to consider the quality of the services that they provide and focus on the relationship with customers (Fassnacht, & Koese, 2006). To develop a strong third-party sourced services that offer digital Library with accessible and quality of services, third-party must first understand the factors that influence digital library implementation of this innovation. Among the factors that have been proposed in this paper that need to be considers are, utilization, capability, access quality and indicator.

- *Utilization:* The literatures on digital library suggest that when library services is being utilized strategically for gaining competitive improvement, than library is called as strategic library services. Utilization can be defined as the standards that deal with the use and delivery of digital reference services, specifically to determine whether a digital reference services is succeeding (Fassnacht, & Koese, 2006). The third-party sourced needs to utilized their services to maximise the quality of digital services. These can include a mix of qualitative and quantitative metrics as well as more abstract statements on best practice or objectives for a service (Hernon, 1987). The crucial question is

how well digital library management' needs are satisfied. The primary utility of a performance measure is for internal self-diagnosis of library services, sourced and activities (Owens Dustin, 2010). Sourced usage can be monitored, controlled, and reported, providing transparency for both the third-party sourced services and library of the utilized service.

- *Capability*: The capability provided from third-party sourced services to the digital library is related with provision processing, storage, networks, and other fundamental computing resources where the library is able to deploy and run arbitrary software, which can include operating systems and applications. The digital library does not manage or control the underlying digital infrastructure but has control over operating systems; storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls) (Hamid & Mohammad Jabbari, 2012).
- *Access quality*: Access is the first step in digital library services and its obtaining the services that contain information. Therefore, it's important to have an access quality in digital library services environment. Digital services for the digital library should be easily reachable and navigable by any patron regardless of equipment sophistication, physical disability or language barrier (Hamid & Mohammad Jabbari, 2012). Access quality and suitability of library resources are also a satisfactory among patron (Paschke & Schnappinger-Gerull, 2006). This is also related to the perception that digital library services have an impact on the patrons work. Therefore, there is indeed potential for third-party sourced services to improve their services and make sure that they can reach the need of the digital library.
- *Indicator*: Definitions for IT services indicator are different in each of an organization. Among the indicator are availability, throughput, downtime, response time. Most of the organization had been focusing the infrastructure to define their service availability and others will refer ability to access the service application (Abby, et.al, 2000). In the perspective of information technology resources,(ITR), able in handling appropriate IT software, hardware, Network, storage and help desk is a part of indicator to measure quality of third-party sourced services. Two hypotheses were formulated:

H4: The third-party service provider has direct effects on level of services quality that digital libraries provide.

H5: The third-party service provider is significantly related to the external perspective factor.

4. Conclusion and Future Work

Digital Library will give high priority on how to give a quality of services to their patron. There are a few aspects (new methods of information-seeking, source preferences, forms of competition as well as changing services into electronic information environment) that need to be considering from library Van Bon, 2002). These aspects cannot progress by itself. There is a component that needs to be highlighted in digital service quality which concern in providing environment quality, delivery quality, outcome quality, standard, procedure for digital library. In order to provide quality of the services, it is important to make sure those elements are fulfilled (Cook, 2001). A perspective of digital library services, it is being maintained by three features, which are Service Quality, Internal Factors and External Factors (Kiran & Diljit, 2012). The intent of this paper is to develop a conceptual framework on evaluating the service quality of digital library. The proposed model should be interest to both library practitioners and academic community. For library practitioners, the model will enhance their understanding on the features that contribute towards Quality of services in digital library. A proposed model also provides plenty research opportunity to validate by academics community side, i.e. to support or disprove the proposed propositions. In the future, we were developing a new tool using Service Level Agreements (SLAs) method for evaluating the QoS in digital library.

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