

The Role of Librarian in E-learning: An Empirical Investigation

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Abstract

This study was to investigate the role of librarians in enhancing the effectiveness of e-learning. The sample of this study was 155 UiTM students from various programs of studies. The study used a 7 Likert scale questionnaire as an instrument for data collection. The questionnaire consisted of 5 sections i.e. demographic section, role of librarian section, content quality section, service quality section, system quality section and the effectiveness of e-learning section. The data were analyzed using SmartPLS version 3.8.2. The findings showed that librarians positively influenced the effectiveness of e-learning through content quality, service quality and system quality. PLS predict was employed to analyze the power of the model using blindfolding technique. The result showed that the model has predictive relevance.

Keywords: Content Quality, E-learning, Librarians, Service Quality, System Quality

Introduction

According to Laurillard (1995), the richest mode of learning is when a student learning through exploring, yet this should require continuous interactive support from professional involvement of a lecturer. Driven by this theory, e-learning has been widely used at national and international platform, particularly in education sector (Hamid, Waycott, Kurnia, & Chang, 2015). In this modern era of teaching and learning, self-driven online learning to encourage student to discover and engage with the content has been largely used to support the traditional classroom learning. This is a clear opportunity for Malaysian academicians and universities to deliver education in best possible way in line with the growth of internet access and mobile usage among university students in Malaysia. However, apart from being the richest form of education it is also the most expensive (Laurillard, 1995). Therefore, universities should carefully implement e-learning by considering the factors that affecting the effectiveness of e-learning to reap the most benefit for students, lecturers and universities. Ozkan and Koseler (2009) found that there were six factors that affect the effectiveness of e-learning comprising both social and technical entity namely system quality, service quality, content quality, learner's perspective, instructor attitudes, and supportive issues. While there were researchers such as Islas et al. (2007) only focusing on technological factor. Apart from that, some researchers were only focusing on human related

factor. However, through extensive and exhaustive literature review on e-learning framework, researchers found out that the role of librarians was neglected towards enhancing e-learning. Information professional such as Librarian in universities could play a key role in enhancing e-learning among students (Scripps-Hoekstra & Hamilton, 2016).

Research objectives

1. To study the influence of librarians on content quality, services quality and system quality.
2. To study the influence of content quality on the effectiveness of e-learning.
3. To study the influence of service quality on the effectiveness of e-learning.
4. To study the influence of system quality on the effectiveness of e-learning.

Literature review

Overview of E-Learning

Within the domain of educational studies, the terms “electronic learning,” “online learning,” “learning portal,” “Massive Online Courses,” “I-Learn” or “E-learning” have been used interchangeably by different authors. Despite the variety of terminologies, the term “e-learning” is considered the most popular and widely used. Kaplan-Leiserson (2000) defined e-learning as to the use of electronic devices for learning, including the delivery of content via electronic media such as Internet, audio or video, satellite broadcast, interactive TV, CD-ROM, and so on. According to Technology Standard Committee, e-learning is a learning technology that uses web browsers as a tool for interaction with learners and other systems. Ferdousi (2009) defined e-learning as a system that works as a platform to assist teachers and learners. E-Learning has become a crucial component of teaching in universities as it becomes a common style of providing educational materials in every part of the world as it believes to improve performance, develops skills, provides ease of access, reduces costs and increases levels of motivation (Ali & Magalhaes, 2008).

Role of Librarians

According to Franklin (2013), librarians integrate information literacy into learning and teaching process in universities. Farber (1999) has stated that not only librarians enhance student’s information literacy skills, but also help in understanding specific subjects to find and evaluate information. Referring to Scripps-Hoekstra and Hamilton (2016) model, librarians play three roles in enhancing students learning which are Librarian-as-Reference, Librarian-as-Consultant, and Librarian-as-Instructor. Librarian-as-Reference means librarians in the university serving as reference for faculties or students outside class meetings such as helping faculties or students onsite in the library or through electronic communication. This is because the library provides increasing number of multimodal resources that should be used by students (Fulton, 1985). Hence, the increasing number of library resources via online reflects another important role for librarians to assist student in navigating and accessing the resources given librarians’ knowledge of subject areas and their abilities to locate, and access content (Thompson, 1985).

Supporting specific student learning for a course, Librarian-as-Consultant includes consultation on library resources available to complete the course assignment as well to support course content. The ever-increasing volume of digital information and the constant development of tools to generate and access information requires librarians to operate as information consultants (Scripps-Hoekstra & Hamilton, 2016). Julien and Genuis (2011) stated that librarian should take a leading role in developing and promoting student's information literacy. This is to keep up with the demands of emerging information literacy programs for active participation in the society and lifelong learning (Vassilakaki & Moniarou-Papaconstantinou, 2014). This is in line with Thurston (1985), who called on librarians to move beyond reticence to take on more active roles by working alongside education faculty, doing so as a consultant. Frank, Raschke, Wood and Yang (2001) said librarians' role as a consultant includes providing multiple information literacy programs. While, Frank et al. (2001) described the role of librarians as consultant is to strengthen graduate students' information literacy by teaching them how to use printed and electronic research sources. In line with Bewick and Corral (2010), which they said librarians' role as consultant in enhancing information literacy could be in the form of short presentations to small user groups instead of one-off session at the start of semester for all students.

Librarian-as-Instructor includes librarians instructing or co-instructing during scheduled class sessions via online or face to face. Thompson (1985) highlighted the importance of librarians as instructor in using the available information resources otherwise it is a failure. Scripps-Hoekstra and Hamilton (2016) added the instruction given by librarians should objectively equip students the skills necessary to locate, understand and use the information. The content of library instruction should cater relevant skills in using computer technology to locate relevant resources (Gallegos & Rillero, 1996). According to Fulton (1985), this instruction could affect the students' lifelong learning skills. A study by Floyd, Colvin, and Bodur (2008) reported an increase in the use of scholarly sources by education students following an instructional session facilitated by an education librarian.

Assessing the effectiveness of E-Learning

Methods of assessing the effectiveness of e-learning systems are a critical issue in both practice and research. Agrawal, Agrawal, and Agarwal (2016) suggested the success of the e-learning systems could be measured by using the six factors from Ozkan and Koseler (2009) model which consisted of system quality, content quality, service quality, instructor attitudes, learner perspective and supportive issues. From their research, all six factors had positive effect. The effectiveness of e-learning was measured by the user satisfaction (Ozkan & Koseler, 2009). While some researchers measured its effectiveness using user motivation (Kim, Trimi, Park, & Rhee, 2012). Liaw, Huang, and Chen (2007) measured effectiveness of e-learning by measuring learner's attitudes.

System Quality

System quality refers to the quality of the functionality of an information system itself (Delone & McLean, 2003). Supportive factors, system quality, learner's perspective, instructor perspective, information quality, and service quality are the factors pointed out by Agrawal et al. (2016) that had significant effect on e-learning in their study in Universities in India. While Fleming, Becker, and Newton (2017) stressed out that low-complexity, authenticity and technical support were found to be useful predictors for future use intention and satisfaction. Meanwhile, Kim et al. (2012) investigated a Course Management System by using DeLone and McLean (2003) information system success model to analyze the success of e-learning. System quality, information quality and instructional quality positively influenced user satisfaction hence increased the e-learning benefits. From this point of view, the e-learning system itself is one of the most important factors and should be in the highest quality in terms of ease of use, ease of access, flexibility therefore the student would love to engage on it. Farid, Ahmad, Niaz, Arif and Shamshirband (2015) explained the barriers in e-learning in 5 dimensions and one of the dimensions are quality of the software. This can be said that lack of system quality would prove to be difficult for student to interact with lecturers hence affecting their e-learning.

Service Quality

Quality is an important criterion for a service-oriented organization. Wahab, Nor, and AL-Momani (2010, p. 369) defined service quality as "...judgement of a service that perceptions on service quality and ease-of-use contributes to customer satisfaction". As long as quality is concerned, a user does not have any physical product that he/she can hold, feel and assess. Therefore, experience in interacting or accessing the services will play a vital role in ascertaining the level of quality. Specifically, in an e-learning context, distance learners access their learning materials through a web portal also known as a Learning Management System (LMS). Their experience with the LMS will act as a representation of the service quality of the education institution they are currently registered with. Furthermore, service quality will enhance satisfaction (Lai, 2006).

Easy navigation, easy to find required information and available help information are important aspects of service quality in encouraging learner's habit (Ozkan & Koseler, 2009). The user interface is an area where a high level of interaction took place, well designed and user-friendly interface becomes one of the most critical factors in determining user satisfaction (DeLone and Mclean, 2003). Mason & Rennie (2007) stated interactivity of student depended a lot on this service quality. The quality of the service provided by the e-learning systems could improve student interactivity hence could increase the willingness to explore the content. Once the students have the willingness to explore and interact within the system, it would be interesting to find out whether service quality has a positive effect towards effectiveness of e-learning or not.

Content Quality

Content quality is also known as information quality. It refers to the perceived output produced by the system. The common characteristics of information quality include accuracy, relevance, timeliness, sufficiency, completeness, understandability, format and accessibility (Bailey & Pearson, 1983; Seddon, 1997). In the e-learning context, Roca, Chiu, and Martínez (2006) measured information quality by indicators related to relevance, timeliness, sufficiency, accuracy clarity and format, and proved that information quality directly significant on learner's satisfaction and indirectly on perceived usefulness. Likewise, Lee (2006) found content quality was significant on learners' perceived usefulness. In the Middle East, Al-Busaidi (2009), in an exploratory study in Oman, indicated that information quality (sufficiency, accuracy, relevance, timeliness, and understandability) to some extent was cited as a determinant of learners' LMS use.

Harandi (2015) found that carefully designed course content has a positive effect on student motivation towards e-learning. Previous model such as DeLone and McLean's (2003) included instructional quality as factor that affected e-learning and Kim et al. (2012) found out that instructional quality had positive effect on course management system. Content of the course should be carefully designed by instructors so that it will give an impact on the effectiveness of e-learning in which students are willing to explore the quality content for their learning. Making the students exploring the contents by themselves is one of the main objectives for an effective e-learning. The research framework from the above discussion is in figure 1 below.

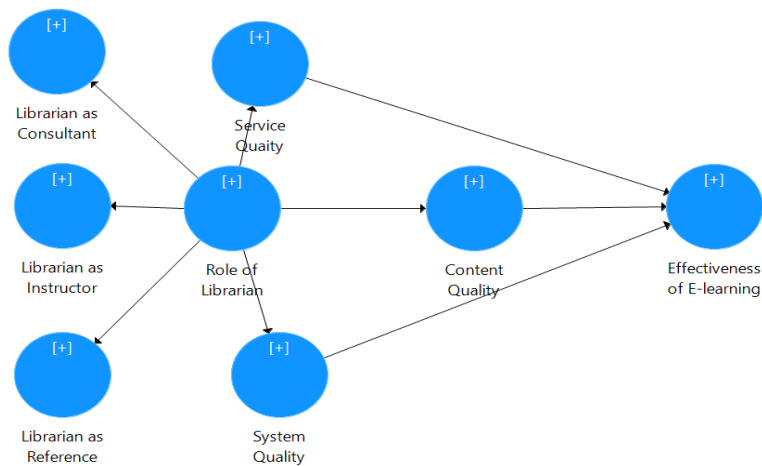


Figure 1 Research Framework

The hypotheses in the figure 1 are:

- H1. Role of Librarians (RoL) has positively influenced Content Quality (CQ),
- H2. Role of Librarians (RoL) has positively influenced Service Quality (SQ),

- H3. Role of Librarians (RoL) has positively influenced System Quality (SyQ),
 H4. Service Quality (SQ) has positively influenced Effectiveness of E-Learning (EeL),
 H5. System Quality (SyQ) has positively influenced Effectiveness of E-Learning (EeL),
 H6. Content Quality (CQ) has positively influenced Effectiveness of E-Learning (EeL).

Research methodology

This study utilized survey research using questionnaire for data collection. A corresponding 7 Likert scale was deployed (1 for “Extremely Disagree”; 2 for “Strongly Disagree”; 3 for “Disagree”; 4 for “Neither Agree nor Disagree”; 5 for “Agree”; 6 for “Strongly Agree” and 7 for “Extremely Agree”). The questionnaire was divided into 5 sections. Section A is on the role of librarians, section B, section C and section D are on content quality, service quality and system quality respectively. Section E is on demographic question and lastly section F is on the effectiveness of e-learning. Prior to pilot testing and main data collection, the questionnaire was pre-tested with several experts in the field and also several students who constitute potential respondents. The questionnaires were pilot tested with 50 UiTM students. The responses of these 50 students were analyzed for assessing the reliability of the measurements. The recorded Cronbach Alpha for all variables employing multi-items estimated range from 0.80– 0.97 (role of librarians = 0.94, service Quality = 0.81, system quality = 0.80, content quality = 0.93 and effectiveness of e-learning = 0.97) which suggests that the questionnaires were reliable (Kline, 2011).

Table 1

Sections in Questionnaire

Section	Content
A	Roles of Librarians
B	Content Quality
C	Service Quality
D	System Quality
E	Demographic Questions
F	Effectiveness of E-learning

The sample of the study were 170 students. There were 159 students responded. However, only 155 questionnaires were valid for the data analysis. The remaining 15 were analyzed using Partial Least Square (SmartPLS version 3.8.2). This study first developed and assessed the measurement model and followed by the development and assessment of the structural model. Previous studies have indicated a sample threshold of as little as 100 samples for PLS-SEM (Reinartz, Haenlein, & Henseler, 2009). Alternatively, one can revert to the more restrictive minimum sample size recommended based on statistical power (Hair, Hult, Ringle &

Sarstedt, 2014). The study used G* power to calculate the minimum sample size based on statistical power (Faul, Erdfelder, Buchner, & Lang, 2009). The software suggests that we needed a sample size of 77 for a statistical power of 0.80 for model testing. Since, our sample size exceeded 77, the power value in this study was 0.801 which also exceeded 0.80. Moreover, the minimum power required in social and behavioral science research is typically 0.80. Therefore, in both cases, we can conclude that our sample size was acceptable for the purposes of this study.

Results

Common Method Variance (CMV)

Common method variance is a phenomenon that is caused by the measurement method used in a SEM study and not by the network of causes and effects in the model being studied. For example, the instructions at the top of a questionnaire may influence the answers provided by different respondents in the same general direction, causing the indicators to share a certain amount of common variation. Another possible cause of common method variance is the implicit social desirability associated with answering questions in a questionnaire in a certain way, again causing the indicators to share a certain amount of common variation (Kock, 2015).

Common method variance could be a severe issue in the study when a researcher adopts the single-source data (Mackenzie, Podsakoff & Podsakoff, 2011). To overcome this issue, the study was utilised a statistical method which is full collinearity test. Kock and Lynn (2012) proposed the full collinearity test as comprehensive procedure for the simultaneous assessment of both vertical and lateral collinearity. Through this procedure variance inflation factors (VIFs) are generated for all latent variables in a model. The occurrence of a VIF greater than 3.3 is proposed as an indication of pathological collinearity, and also as an indication that a model may be contaminated by common method variance. Therefore, if all VIFs resulting from a full collinearity test are equal to or lower than 3.3, the model can be considered free from common method variance. Table 2 shows the VIFs obtained for all the latent variables in the model, based on a full collinearity test. The latent variables in the model with VIF are less than 3.3. Therefore, the model is free from the common method variance as proposed by Kock and Lynn (2012), based on the full collinearity test procedure.

Table 2

Full Collinearity VIFs

CMV	RoL	SQ	SyQ	CQ	EeL
VIFs	1.964	1.787	2.484	1.380	1.775

RoL = Role of Librarian, SQ = Service Quality, SyQ = System Quality, CQ = Content Quality, EeL = Effectiveness of E-Learning.

Assessment of Measurement

To examine the research model Partial Least Square (PLS) analysis technique was employed by using the SmartPLS 3 software version 3.2.8 (Ringle, Wende, & Becker, 2015). In an effort to refine all structural equation models two stage analytical procedure was employed, where researchers tested the measurement model and structural model recommended by Hair, Sarstedt, Hopkins and Kuppelwieser (2014). Prior to structural model, the study has to assess the measurement model of latent constructs for their dimensionality, validity, and reliability. Cronbach's (α) and composite reliability were also tested as recommended by Henseler, Ringle, and Sarstedt (2015).

The measurement model used in this study included five constructs: role of librarian (RoL), service quality (SQ), system quality (SyQ), content quality (CQ), and effectiveness of e-learning (EeL). In assessing a model's reliability, the loading of each indicator on its associated latent variable must be calculated and compared to a threshold. Generally, the loading should be higher than 0.5 for indicator reliability to be considered acceptable (Kim, 2010). A loading lower than 0.4 indicates that an item should be considered for removal, and items with a loading of 0.4–0.5 should be considered for removal if they decrease the composite reliability (CR) and Average Variance Extracted (AVE) above the threshold (Kim, 2010). Table 2 indicates that most of the indicator loadings on their corresponding latent variables for the respondents were higher than 0.5.

Validity Assessment

1. Assessment of Measurement Model

Validity was assessed in terms of convergent validity and discriminant validity. Convergent validity is the extent to which the scale correlates positively with other measures of the same constructs. Convergent validity of measurement model is usually ascertained by examining the factor loading, average variance extracted (AVE) and composite reliability (CR) (Hair et al., 2014). All the values were above 0.5, which shows the convergent validity of the model. Convergent validity can be evaluated by examining the loading ≥ 0.5 , AVE ≥ 0.5 , and CR ≥ 0.7 (Kim, 2010). Each item's coefficients on its underlying construct were observed. A test of each item's coefficient was used to assess convergent validity. All values fulfil the required standard, indicating high convergent validity. Table 3 shows the results of factor loadings threshold level of 0.5 as recommended by Kim (2010).

Table 3*Factor loading, C.R. and AVE*

Constructs	Loading	C.R.	AVE
First Order			
Content Quality (CQ)	0.930	0.945	0.742
Effectiveness of E-Learning (EeL)	0.962	0.970	0.842
Librarian as Consultant (LC)	0.877	0.924	0.802
Librarian as Instructor (LI)	0.915	0.959	0.921
Librarian as Reference (LR)	0.820	0.892	0.734
Service Quality (SQ)	0.787	0.903	0.824
System Quality (SyQ)	0.805	0.883	0.716
Second Order			
Role of Librarian	0.924	0.939	0.660

Besides assessing the convergent validity, the study also evaluated the discriminant validity. Discriminant validity can be evaluated by examining Fornell-Larcker criterion (Fornell & Larcker, 1981). Fornell and Larcker (1981) have suggested examining whether the square root of the AVE for each construct is greater than the correlation between the constructs. Table 4 shows the results of the discriminant validity assessment of the measurement model using the Fornell-Larcker criterion and indicates that the models possess acceptable discriminant validity.

Table 4*Fornell-Larcker Criterion*

	CQ	EeL	ROL	SQ	SYQ
CQ	0.861				
EeL	0.591	0.917			
ROL	0.569	0.597	0.812		
SQ	0.394	0.484	0.395	0.777	
SYQ	0.511	0.678	0.480	0.438	0.846

2. Assessment of structural model

The study performed bootstrapping involved 500 samples whilst our actual sample stood at 155. The SEM results are presented in Table 5. It can be observed that R^2 values for CQ is 0.315, SQ is 0.153, SyQ is 0.225 and EeL is 0.562 suggesting that 31.5% of the variance in CQ is explained by RoL, 15.3% of the variance in SQ is explained by RoL, 22.5% of the variance in SyQ is explained by RoL. Meanwhile the CQ, SQ and SyQ constructs in turn contribute to 56.2% of

the variance in effectiveness of e-learning (EeL), Table 5 shows that all beta path coefficients were positive and in the expected direction and were statistically significant. To elaborate role of librarian (RoL) ($\beta = 0.562, p < 0.05$), ($\beta = 0.392, p < 0.05$), ($\beta = 0.475, p < 0.05$) was found to have significant effect on CQ, SQ and SyQ respectively. Therefore H1, H2 and H3 were supported. Meanwhile, service quality (SQ) ($\beta = 0.165, p < 0.05$), system quality (SyQ) ($\beta = 0.468, p < 0.05$) and content quality (CQ) ($\beta = 0.287, p < 0.05$) were found having a significant effect on effectiveness of e-learning (EeL). Thus H4, H5 and H6 were supported. Table 5 also shows that system quality is the most influential factor on the effectiveness of e-learning looking at the effect side value ($f^2 = 0.350$) followed by content quality ($f^2 = 0.131$) and service quality ($f^2 = 0.050$). The study evaluated for multicollinearity among the variables in the model and did not find any cause for concern using the criteria of variance inflation factor (VIF) in Table 5 which is the suggested value of 5.0 and below (Hair et al., 2014).

Table 5

Path coefficient and hypotheses testing

Hypotheses	β	S.E.	t value	p value	R ²	VIF	Decision	f ²
H1. RoL -> CQ	0.562	0.107	5.266	0.000	0.315	1.000	supported	
H2. RoL -> SQ	0.392	0.097	4.049	0.000	0.153	1.000	supported	
H3. RoL -> SyQ	0.475	0.149	3.193	0.001	0.225	1.000	supported	
H4. SQ -> EeL	0.165	0.096	1.708	0.044		1.249	supported	0.050
H5. SyQ -> EeL	0.468	0.146	3.209	0.001	0.562	1.429	supported	0.350
H6. CQ -> EeL	0.287	0.159	1.810	0.035		1.443	supported	0.131

Finally, we also assessed the predictive relevance (Q^2) of the model through the blindfolding procedure (Table 6) as suggested by Hair et al. (2014). The Q^2 values for content quality ($Q^2 = 0.214$), effectiveness of e-learning ($Q^2 = 0.443$), role of librarian ($Q^2 = 0.621$), service quality ($Q^2 = 0.068$) and system quality ($Q^2 = 0.114$), are > 0 , suggesting that the model has sufficient predictive relevance. As shown in Table 6, most of the values fulfill the requirements, hence indication that theoretically establishes a path model improves the predictive performance of the available indicator data.

Table 6

Predictive Relevance

Predictive Relevance (Q^2)	
Variables	Q^2
CQ	0.214
EeL	0.443
RoL	0.621
SQ	0.068
SyQ	0.114

Discussion

The study shows that librarians have a significant impact on content quality, service quality and system quality. The data analysis indicates that 31.5% of content quality is influenced by librarians. Librarians have to make sure that all collections in a librarian are up to date and can fulfil the demands of users. Librarians also have an impact of service quality. Table 5 shows that 15.3% of service quality is influenced by librarians. The service quality includes borrowing, returning, internet access, online journals and so on. These services will make a library more attractive to visit. Indirectly, a library will become a center of learning. Besides content quality and service quality, the system quality is another element in a library. Since a library have tons of collection in the form of paper based and digitals. The retrieval system should respond quickly to the requests of users. If a retrieval system is slow, it will affect a perception of users towards the quality of a system. Hence this situation will affect a learning process. The result shows that 22.5% of the system quality is influenced by librarians. Table 5 shows that all those three qualities, content quality, system quality and services quality, have influenced the effectiveness of e-learning. These findings will deny the view that only lecturers or teachers can contribute to the effectiveness of e-learning because they are professionally trained to be a teacher or a lecturer. However, there are other factors to be considered besides the skill of teaching in order to make e-learning more effective. Those factors are system quality, content quality and service quality such as internet speed, learning tool, attractive content in order to make the learning process more interesting and so on. During COVID19 pandemic, students have to study at home using online learning approach. However, students keep complaints on their hardship for online learning due to internet accessibility.

The impact of those three qualities (content quality, service quality and system quality) contribute 56.25% towards the effectiveness of e-learning. However, when we look at the effect side (f^2) of those three qualities we found that system quality has the most influential factor in the effectiveness of e-learning (0.350) followed by content quality (0.131) and service quality

(0.050). We can conclude from the above analysis that system quality becomes an important factor for the success of e-learning. Therefore, in order to make e-learning more effective and successful, information technology infrastructure should become a priority in implementing e-learning environment. Since system quality becomes the vital element in e-learning, a government or any party involved should upgrade info structure and provide platform for e-learning to all students. A government has to make sure that there is no single student left behind especially in the era of industrial evolution 4.0.

Conclusion

This study shows that the role of librarians, content quality, service quality, system quality are important elements for effective learning. The role of librarians significantly affects the process of e-learning. However, the impact of librarians on e-learning can be seen in the form of content quality of knowledge and information. Besides the content quality, library should have good service quality and excellent system quality in facilitating e-learning. These facilities can increase the effectiveness of teaching and learning.

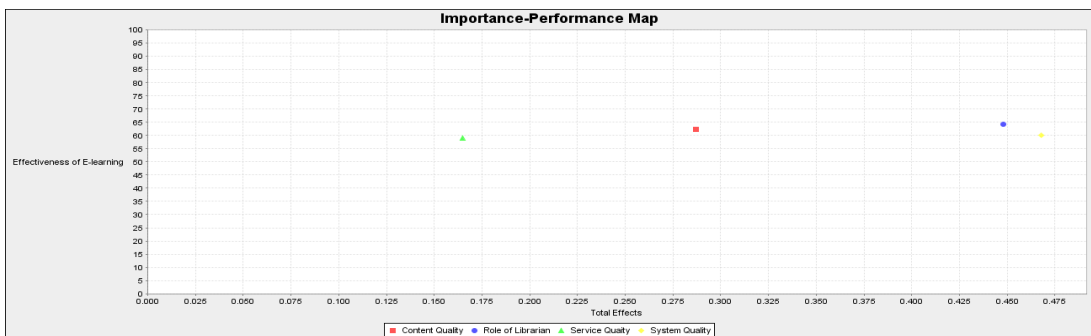


Figure 2 Importance Performance Matrix Analysis (IPMA)

Based on the analysis of Importance-Performance Matrix Analysis (IPMA) in Figure 2 shows that the role of library, system quality and content quality are the most important and high-performance factors for the effectiveness of e-learning. Nevertheless, service quality becomes a less important variable compared to system quality and content quality, but it also contributes to the high performance of e-learning in terms of providing content quality. Hence, librarian has an important role in improving e-learning.

The enhancement of e-learning can be achieved by having adequate service quality and system quality in a library. It is important to note that e-learning needs more than a skill of teaching. The info structure to be ready in terms of internet technology, internet accessibility and learning equipment. Librarians can support teachers or lecturers in learning process in which students can make their libraries as their learning center with the assistance from librarians. It

does not mean the role of teaching will be taken over by librarians but they can assist the process of learning outside a classroom. We should look at the role of librarian more than a person who work in a library or a person who provides services for borrowing reading materials. All libraries should subscribe online database for the purpose of references and the reading materials must be updated so that students will have recent information and up to date knowledge. Libraries should also be equipped with high speed internet so the process of learning will be run smoothly.

Researchers identified some limitations in this study. Firstly, the study used a cross sectional research design rather than a longitudinal study. Thus, it is not able to examine the effectiveness of e-learning over a period of time. The longitudinal study can cope with the long-term nature of learning process. Secondly, this research concerns the sample drawn from only one public university which is UiTM. Therefore, the findings from this study still cannot be generalized in the context of public universities in Malaysia. Researchers would like to suggest few recommendations in future research. The model should be tested further using samples from other public universities in Malaysia to further generalize the results of the study. Lastly, this study should compare the effectiveness of e-learning among students before and after the involvement of librarians.

References

- Agrawal, V., Agrawal, A., & Agarwal, S. (2016). Assessment of factors for e-learning: an empirical investigation. **Industrial and Commercial Training**, 48(8), 409-415.
- Al-Busaidi, K. A. (2009). The impact of learning management system characteristics and user characteristics on the acceptance of e-learning. **International Journal of Global Management Studies**, 1(2), 75-91.
- Ali, G. E., & Magalhaes, R. (2008). Barriers to implementing e-learning: A Kuwaiti case study. **International Journal of Training and Development**, 12(1), 36-53.
- Bailey, J. E., & Pearson, S. W. (1983). Development of a tool for measuring and analyzing computer user satisfaction. **Management Science**, 29, 530-545.
- Bewick, L., & Corral, S. (2010). Developing librarians as teachers: a study of their pedagogical knowledge. **Journal of Librarianship and Information Science**, 42(2), 97-110.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and Mclean model of information systems success: A ten-year update. **Journal of Management Information System**, 19(4), 9-30.
- Farber, E. (1999). Faculty-librarian cooperation: A personal retrospective. **Reference Services Review**, 27(3), 229-234.
- Farid, S., Ahmad, R., Niaz, I. A., Arif, M., & Shamshirband, S. (2015). Identification and prioritization of critical issues for the promotion of e-learning in Pakistan. **Computer in Human Behavior**, 51, 161-171.

- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149-1160.
- Ferdousi, B. J. (2009). **A study of factors that affect instructors' intention to use e-learning systems in two-year colleges** (Doctoral dissertation). Available from ProQuest Dissertation and Thesis database. (UMI No. 3357474)
- Fleming, J., Becker, K. L., & Newton, C. J. (2017). Factors for successful e-learning: Does age matter? *Education+Training*, *59*(1), 76-89.
- Floyd, D. M., Colvin, G., & Bodur, Y. (2008). A faculty librarian collaboration for developing Information literacy skills among preservice teachers. *Teaching and Teacher Education*, *24*(2), 368-376.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.
- Frank, D. G., Raschke, G. K., Wood, J., & Yang, J. Z. (2001). Information consulting: The key to success in academic libraries. *Journal of Academic Librarianship*, *2*, 90-96.
- Franklin, K. Y. (2013). **Faculty/librarian interprofessional collaboration and information literacy in higher education** (Doctoral dissertation). Available from ProQuest Dissertation and Thesis database. (UMI No. 3558948)
- Fulton, T. L. (1985). Collaboration: Prospect or imperative? In A. Bagley (Ed.), **Professors of education and education librarians: Prospects for collaboration** (pp. 25-29). Minneapolis, MN: Society of Professors of Education.
- Gallegos, B., & Rillero, P. (1996). Bibliographic database competencies for preservice teachers. *Journal of Technology and Teacher Education*, *4*, 231-246.
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). **A primer on partial least squares structural equation modeling (PLS-SEM)**. Los Angeles, CA: Sage.
- Hair, J. F., Jr., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106-121.
- Hamid, S., Waycott, J., Kurnia, S., & Chang, S. (2015). Understanding students' perceptions of the benefits of online social networking use for teaching and learning. *The Internet and Higher Education*, *26*, 1-9.
- Harandi, S. R. (2015). Effects of e-learning on students' motivation. *Procedia-Social and Behavioral Sciences*, *181*, 423-430.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, *43*, 115-135.

- Islas, E., Pérez, M., Rodríguez G., Paredes, I., Ávila, I., & Mendoza, M. (2007). E-learning tools evaluation and roadmap development for an electrical utility. **Journal of Theoretical and Applied Electronic Commerce Research**, 2(1), 63-75.
- Julien, H., & Genuis, S. K. (2011). Librarians' experiences of the teaching role: A national survey of librarians. **Library & Information Science Research**, 33(2), 103-111.
- Kaplan-Leiserson, E. (2000). **E-learning glossary**. Retrieved from <http://www.learningcircuits.org/glossary.html>
- Kim, D. Y. (2010). **The impacts of quality management practices on innovation** (Doctoral thesis, Carleton University, Ottawa, Canada). Retrieved from <https://curve.carleton.ca/b3125860-8972-4361-b9d7-da87d6ec3e09/>
- Kim, K., Trimi, S., Park, H., & Rhee, S. (2012). The impact of CMS quality on the outcomes of e-learning systems in higher education: An empirical study. **Decision Sciences Journal of Innovative Education**, 10(4), 575-587.
- Kline, R. B. (2011). **Principles and practices of structural equation modelling** (2nd ed.). New York: Guilford Press.
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. **International Journal of e-Collaboration**, 11(4), 1-10.
- Kock, N., & Lynn, G. S. (2012). Lateral collinearity and misleading results in variance-based SEM: An illustration and recommendations. **Journal of the Association for Information Systems**, 13(7), 546-580.
- Lai, J. Y. (2006). Assessment of employees' perceptions of service quality and satisfaction with e-business. **International Journal of Human-Computer Studies**, 64(9), 926-938.
- Laurillard, D. (1995). Multimedia and the changing experience of the learner. **British Journal of Educational Technology**, 26(3), 179-189.
- Lee, Y. C. (2006). An empirical investigation into factors influencing the adoption of an e-learning system. **Online Information Review**, 30(5), 517-541.
- Liaw, S. S., Huang, H. M., & Chen, G. D. (2007). Surveying instructor and learner attitudes toward e-learning. **Computers & Education**, 49(4), 1066-1080.
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. **Management Information Systems Quarterly**, 35(2), 293-334.
- Mason, R. & Rennie, F. (2007). Using web 2.0 for learning in the community. **The Internet and Higher Education**, 10(3), 196-203.
- Ozkan, S. & Koseler, R. (2009). Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. **Computers & Education**, 53(4), 1285-1296.

- Reinartz, W., Haenlein, M. & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. **International Journal of Research in Marketing**, 26(4), 332-344.
- Ringle, C. M., Wende, S. & Becker, J. M. (2015). **SmartPLS 3. Bönningstedt: SmartPLS**. Retrieved from <http://www.smartpls.com>
- Roca, J. C., Chiu, C. M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the technology acceptance model. **International Journal of Human-Computer Studies**, 64(8), 683-696.
- Scripps-Hoekstra, L., & Hamilton, E. R. (2016). Back to the future: Prospects for education, faculty and librarian collaboration thirty years later. **Education Libraries**, 39(1). Retrieved from <http://educationlibraries.mcgill.ca/article/view/10>
- Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. **Information Systems Research**, 8(3), 240-253.
- Thompson, A. (1985). Educators and librarians: Prospectus for partnership. In A. Bagley (Ed.), **Professors of education and education librarians: Prospects for collaboration** (pp. 20-24). Minneapolis, MN: Society of Professors of Education.
- Thurston, C. (1985). Professors of education and education librarians: Prospects for collaboration. In A. Bagley (Ed.), **Professors of education and education librarians: Prospects for collaboration** (pp. 7-13). Minneapolis, MN: Society of Professors of Education.
- Vassilakaki, E., & Moniarou-Papaconstantinou, V. (2014). A systematic literature review informing library and information professionals' emerging roles. **New Library World**, 116(1/2), 37-66.
- Wahab, S., Nor, N. A. M., & AL-Momani, K. (2010). The relationship between e-service quality and ease of use on electronic customer relationship management (E-CRM) performance: An empirical investigation in Jordan mobile phone services. **2010 International Conference on e-Education, e-Business, e-Management and e-Learning, Sanya, China, 2010**, 368-372. doi:10.1109/IC4E.2010.113