PENERBIT
Universiti Sultan Zainal Abidin

MALAYSIAN JOURNAL OF APPLIED SCIENCES
eISSN:0127-9246

ORIGINAL ARTICLE

Structural Equation Model on Factors Affecting Students Satisfaction towards University Library: A Case Study

Zahayu Md Yusof[1,2], Masnita Misiran[1,3], Hasimah Sapiri[1], Massudi Mahmuddin[4]

[1]School of Quantitative Sciences, Universiti Utara Malaysia, 06010 Sintok Kedah, Malaysia
[2]Institute of Strategic Industrial Decision Modelling, School of Quantitative Sciences, Universiti Utara Malaysia, 06010 Sintok Kedah, Malaysia
[3]Center for Testing, Measurement and Appraisal, Universiti Utara Malaysia, 06010 Sintok Kedah, Malaysia
[4]School of Computing, Universiti Utara Malaysia, 06010 Sintok Kedah, Malaysia

*Corresponding author: zahayu@uum.edu.my

Abstract

Library in the university is known as the centre of knowledge. University library offers learning support, research requirement and also teaching materials. The objective of this study is to identify the most (and least) factors that contribute to students satisfaction towards university library. A case study on selected respondents consist of 266 undergraduate students was conducted. Their opinion on the library services has been recorded. Questionnaires were distributed to the respondents. Structural Equation Model was developed to display their responses. The finding concluded that online services and collections have significant relationship with the overall satisfaction towards the library, whereas facilities and library staffs do not have significant contribution to the satisfaction. As a suggestion, the library management should improve their service quality by upgrading the online services such as wireless access, library website service, and online book renewal process to mentioned a few, which might be effective in improving the students' satisfaction towards the library.

Keywords: Library, University, Satisfaction, Undergraduate, Structural equation model

Introduction

Library in the university is known as the centre of knowledge. Students can seek knowledge from the books, learning materials and online services. With a multitude of books, many visitors see library as a treasure house of knowledge (Ahmad, Abiodullah & Irum, 2011, Bolinteanue, 2020). The basic functions of university library are to offer learning support, research requirement and teaching material. Most text books and reference books are costly, thus it is difficult to purchase them. Olanlokum (1982) highlighted that students go to the library to find additional information,

completing class work or having group discussion with group members for their research work, among others in the university library. University library gives a lot of support for the students by providing rich information, resources and also conducive environments as it is also known as a focal point of academic and research activities in the university (Oyedum & Nwolo, 2011). Besides that, Omojuwa (1993) illustrated that through reading in the library, users can receive inspirational, spiritual and recreational activity more effectively.

In the advance of technologies, library system could be improved to be more suited towards today's condition and needs. Current trend shows that most libraries starting to convert physical books into online resources, in which students can obtain loads of information with just a click of a button. Library also exposes various types of information to users and is the best source for expanding knowledge. Expensive and numerous research journals are now accesible for library users.

Applegate (1997) and Mugo & Mathu (2021) identified user satisfaction as the level of whether customers felt satisfied or not satisfied with the service, facilities and resources offered by library. For example if library service met user's expectation and needs, then in consequence users will feel satisfied enough and vice versa. To be able to meet the needs the users' in all categories, university libraries should attempt to manage their service quality in an orderly manner. These services include online service, facilities, inquiries and materials collection among others. Basha (2010) stated that users of library are the most qualified to be the best judge in order to evaluate the services provided. Thus, in this research, we are interested to know students satisfaction level towards library, known as Sultanah Bahiyah Library. This study aim to accomplish the following objectives: (i) to identify the most (and least) influence factors that contribute to student satisfaction towards UUM Library and (ii) to provide suggestion for UUM Library to improve their services. There are 4 hypotheses to answer the objectives which are:

H_1:   There is a relationship between student satisfaction and online services provided by library.
H_2:   There is a relationship between student satisfaction and facilities inside the library.
H_3:   There is a relationship between student satisfaction and staffs/ librarian in the library.
H_4:   There is a relationship between student satisfaction and collection in the library.

Library in the university is a conducive place where students can discover and indulge in deeper knowledge. It also acts as catalyst to research leading towards creative and inovation for researchers. User satisfaction is acknowledged as indicator for library's performance. Thus, it is important for libraries to fulfill users' need that will lead to user satisfaction (Mahanta, 2020).

Larson & Owusu-Acheaw (2008) and Bakti & Sumaedi (2013) discovered that there is a significant correlation between satisfaction of library users and internet services and materials provided by library. They revealed that service quality of library will directly influence customer satisfaction. Similarly, Sahu (2007) found that there is also a strong relationship between quality of information service (e.g. interaction with library staff) and students' satisfaction towards library. Nejat and Mostafa (2008) propose effective ways to increase the satisfaction of users by digitalizing the library and upgrading its computer resources.

In regards to library staffs, Larson & Owusu-Acheaw (2008) revealed that there is a significant correlation between the efficiency and helpfulness of staff with user satisfaction. Library users were satisfied with the willingness in helping users and efficiency of the staffs. Sahu (2007) and Nejat & Mostafa (2008) concluded that library staffs has a positive correlation with the user's satisfaction, where all requests have to be treated equally for any information besides offering correct information and assuring customer's problem to be handled with same level of importance provided to every user's request. A constancy of purpose can help to improve the services of library.

Pierce (1980) highlighted that the facilities provided in university library such as table and chair is not comfortable and adequate to users for reading purpose. Somaraju (1992) stated that the resources, facilities and service provided in the library were not satisfied to researcher.

Whereas, Payne, L (2007) notice that a researcher can search for huge archival collection or a long run of journals onsite reading room in most library. On the other hand, Khasiah and Kassim (2006) revealed that factors which lead the most towards user satisfaction are lengthening of library opening hours and library collection.

Library collection also play important role to bring satisfaction towards users. Comeaux and Schmetke (2007) provided guidelines in which making library accesible with adaptive design and assistive technology. They believed that library problem is mostly linked to inadequate collection in its resources. Oluebube & Yusif (2011) showed that most of the users felt dissatisfied with the material availability and electronic resource provided by their library.

The successfulness of library is relying on the level of user satisfaction. The more effective the management system of a library, the more the satisfaction. Yang (2004) indicated that satisfaction of users depends on how the degree of service quality met users' needs and expectations as well. Hence, library needs to monitor and evaluate its services, facilities and resources from time to time. In short, it is necessary to meet the changing needs of users continuously.

Materials and Methods

A questionnaire contained of multiple choice questions and semantic differential scale questions was distributed to 266 undergraduate students reside in one of the residential hall in the university. Simple random sampling method was adopted when selecting the respondents. The questionnaire was devided into 2 sections. Section A represented biographic data of students as respondent while Section B includes the overall satisfaction which consists of 5 sub-questions about satisfaction of students regarding the library and the second part related to 4 dimensions of service quality provided by library such as online services, facilities, library staffs and collections with each factor contained 6 sub-questions. All the semantic differential scale questions were prepared in a five-point scale. The responds range of choices indicated as 1 represents "*strongly disagree*" and 5 represents "*strongly agree*".

Analysis of the survey will be conducted on the basis of confirmatory factor analysis using the method of Structural Equation Modeling (SEM). AMOS, a statistical analysis software for SEM has been used.

Internal Consistency Reliability
During the pilot test, 30 respondents have been randomly selected to answer the questionnaire. From the SPSS result obtained, the Cronbach's Alpha value for all variables and overall satisfaction is 0.962 (≥ 0.60), meanwhile for each factor in **Table 1** also proved reliability hence the internal consistency reliability is accepted. While **Table 2** displays the reliability for each factors.

Table 1: Cronbach's Alpha Coefficient for Overall Items

Cronbach alpha	*N* of items
0.962	29

Table 2: Cronbach's Alpha Coefficient for Each Factor

Construct	Measurement Items	Cronbach-α coefficient
Online Services	OS1, OS2, OS3, OS4, OS5, OS6	0.877
Facilities	FC1, FC2, FC3, FC4, FC5, FC6	0.805
Library Staffs	LS1, LS2, LS3, LS4, LS5, LS6	0.940
Collection	CL1, CL2, CL3, CL4, CL5, CL6	0.840

Results and Discussion

Descriptive Statistics
The highest frequency shown in Table 3 is age between 20-25, which is 89.8%. While the lowest which is 4.5% shown by the age above 25. From the frequency table, the question on *'How many times you visit library'* has shows that several times per week has the highest percent contribute than others, which is 39.1% while the lowest times visit library is 15% which is once a month or less.

Table 3: Demographic Particulars of the Respondents

Variable	Frequency	Percent
Gender		
Male	62	23.3
Female	204	76.7
Age		
<20	15	5.6
20-25	239	89.8
>25	12	4.5
Category of Student		
Local Student	248	93.2
International Student	18	6.8
College		
COB	170	63.9
CAS	49	18.4
COLGIS	47	17.7
How many times you visit library?		
Several times per week	104	39.1
Several times per month	62	23.3
Once a month or less	40	15.0
Few times per semester	60	22.6

Factor Analysis
The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to be preceded. Looking at the Table 4, the KMO measure is 0.931. From the same table, we can see that the Bartlett's test is significant and its associated probability is less than 0.05.

Table 4: KMO Measure and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.931
Bartlett's Test of Sphericity	Approximate Chi Square	4280.952
	df	276
	Sig.	0.000

Confirmatory Factor Analysis (CFA)
Table 5 provides the guideline for model goodness of fit. The first run and fitted model will be shown for each of the factors investigated in this study.

Table 5: Index Category and the Acceptance level for every Index

Name of category	Name of index	Acceptance Level	Comments
1. Absolute fit	RMSEA	RMSEA < 0.08	Range 0.05 to 1.00 acceptable.
2. Incremental fit	CFI	CFI > 0.90	CFI = 0.95 is a good fit
3. Parsimonious fit	Chisq/df	Chi square/ df < 5.0	Value should below 5.0.

For overall satisfaction's first run model and fitted model in Figure 1, RMSEA value reduced from 0.126 to 0.066 (within range of 0.05 to 1.00), so it is considered fitted and acceptable. CFI value of fitted model 0.993 is higher than first run model 0.953, thus proved that it is a better model compared to original model. Chisq/df ratio also shows improvement after ameliorate as decreased from 5.226 to 2.161, thus fitted model is proved.
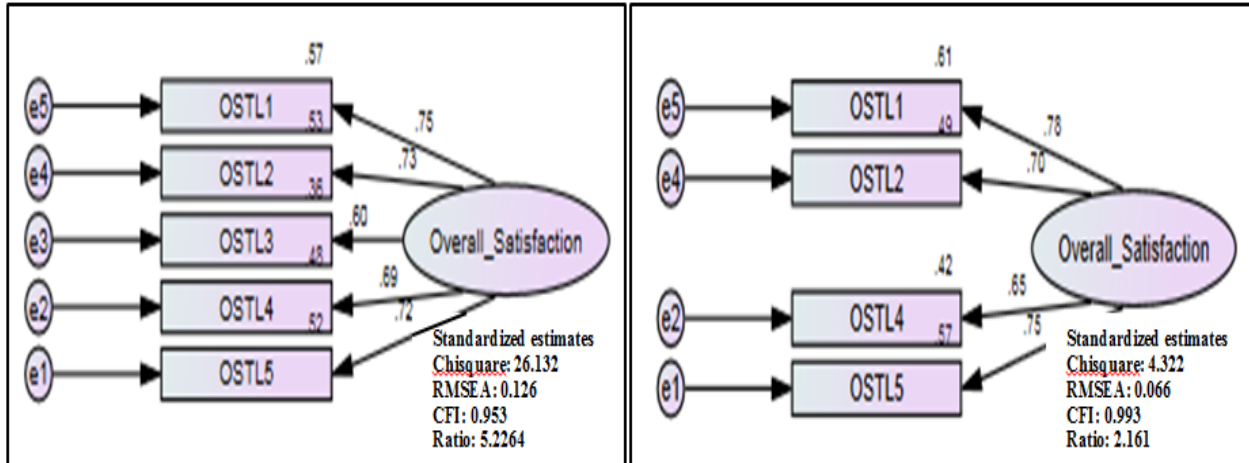

Figure 1: First Run and Fitted Model for Overall Satisfaction

For first run model and fitted model of online services in Figure 2, there is a decrease of RMSEA from 0.166 to 0.000, so revised model is fitted. CFI value of fitted model 1.000 is higher than first run model 0.900, thus proved that it is a better model compared to original model. Chisq/df ratio also shows improvement after modification as drops from 8.332 to 0.625, hence revised model is better.
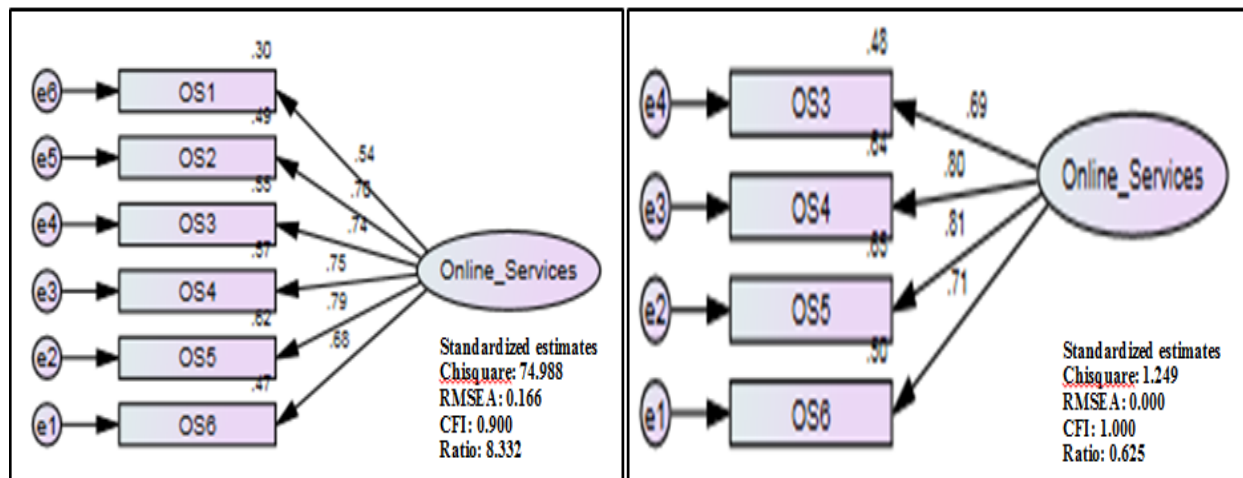

Figure 2: First Run and Fitted Model for Online Services

By comparing between facilities' first run model and fitted model in Figure 3, RMSEA value drops from 0.114 to 0.088, so improved model is considered fitted. CFI value of fitted model 0.986 is higher than first run model 0.938, thus proved that it is a better model compared to first run model. Chisq/df ratio also shows improvement after ameliorate as decreased from 4.423 to 3.062, thus fitted model will be used.
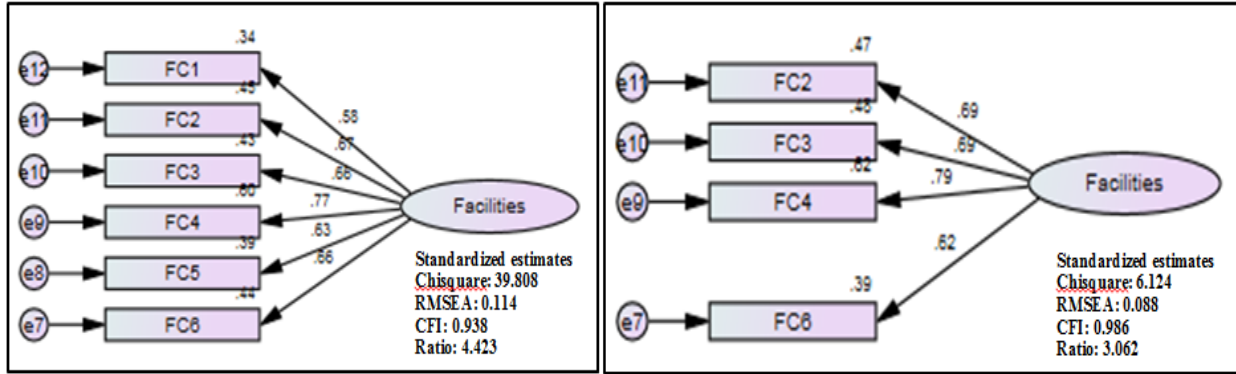
27

Figure 3: First Run and Fitted Model for Facilities

Then for first run model and fitted model of library staffs in Figure 4, there is a decrease of RMSEA from 0.163 to 0.008, so improved model is fitted. CFI value of fitted model 1.000 is higher than first run model 0.959, thus proved that it is a better model compared to first run model. Chisq/df ratio also shows improvement after modification as drops from 8.056 to 1.018, hence modified model is better.
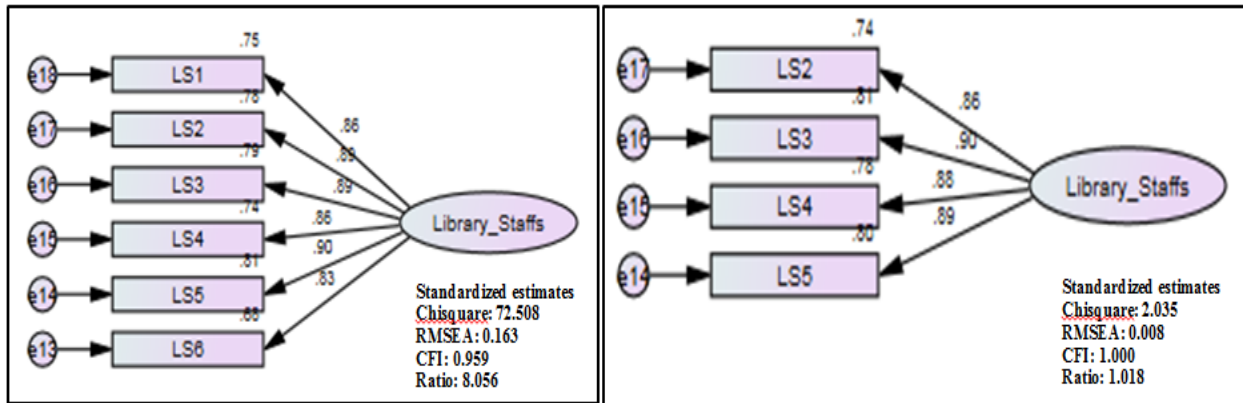

Figure 4: First Run and Fitted Model for Library Staffs

By comparing between collections' first run model and revised model in Figure 5, RMSEA value reduced from 0.163 to 0.072, so modified model is considered satisfied. CFI value of fitted model 0.989 is higher than first run model 0.926, thus proved that it is a better model compared to first run model. Chisq/df ratio also shows improvement after ameliorate as decreased from 8.036 to 2.381, thus revised model is better fit than first run model.
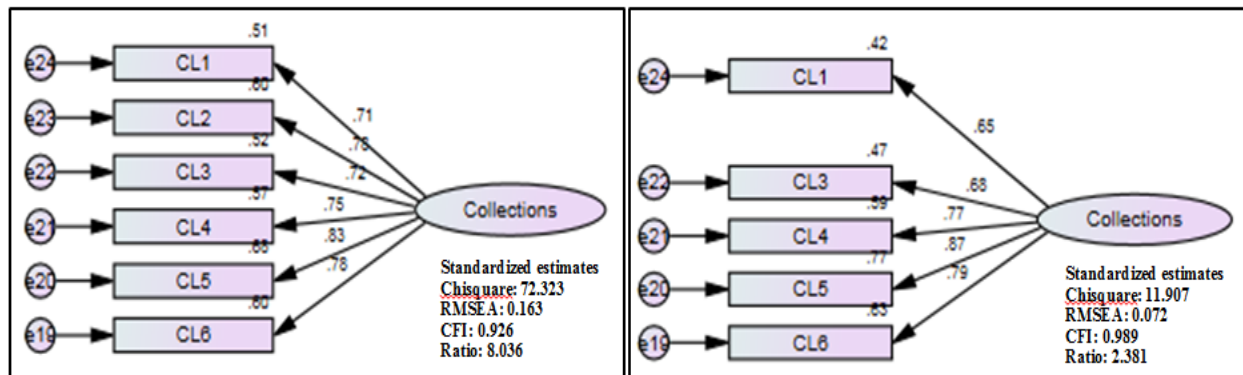

Figure 5: First Run and Fitted Model for Collections

Reliability of Measurement Model

From Table 6, CFA result reporting that for Internal Reliability, all Cronbach's Alpha are greater than 0.70. Meanwhile for Construct Reliability (CR), all CR are greater than 0.60. For average variance extracted (AVE), all AVE are equal to or greater than 0.50 except for facilities, hence it can be said that the requirement for reliability is achieved. Table 6 also shows factor loading for other items after seven items were deleted.

Table 6: CFA Results Reporting for the Measurement Model

Construct	Item	Factor Loading	Cronbach alpha (above 0.7)	CR (above 0.6)	AVE (above 0.5)
Overall Satisfaction towards Library	OSTL_1	0.780	0.810	0.812	0.521
	OSTL_2	0.700			
	OSTL_4	0.650			
	OSTL_5	0.750			
Online Services	OS3	0.690	0.837	0.840	0.569
	OS4	0.800			
	OS5	0.810			
	OS6	0.710			
Facilities	FC2	0.690	0.788	0.792	0.490
	FC3	0.690			
	FC4	0.790			
	FC6	0.620			
Library Staffs	LS2	0.860	0.934	0.934	0.779
	LS3	0.900			
	LS4	0.880			
	LS5	0.890			
Collection	CL1	0.650	0.864	0.833	0.572
	CL3	0.680			
	CL4	0.770			
	CL5	0.870			
	CL6	0.790			

Table 7: Summary of Fitness Indexes for the Measurement Model

Name of Category	Name of Index	Index Value	Comments
Absolute fit	RMSEA	0.052	The required level is achieved.
Incremental fit	CFI	0.960	The required level is achieved.
Parsimonious fit	Chisq/ df	1.720	The required level is achieved.

Validity Of Measurement Model

For Discriminant Validity, we have been eliminated or constrained those redundant items, finally all correlation between exogenous constructs is less than or equal to 0.85, if not the discriminant validity for the measurement model is not achieved.

Analysis of the Structural Equation Model

After reliability and validity of measurement models have been resolved, all constructs are assembled into Structural Equation Modelling (SEM) for more analysis. Measurement model is assembled for further analysis.
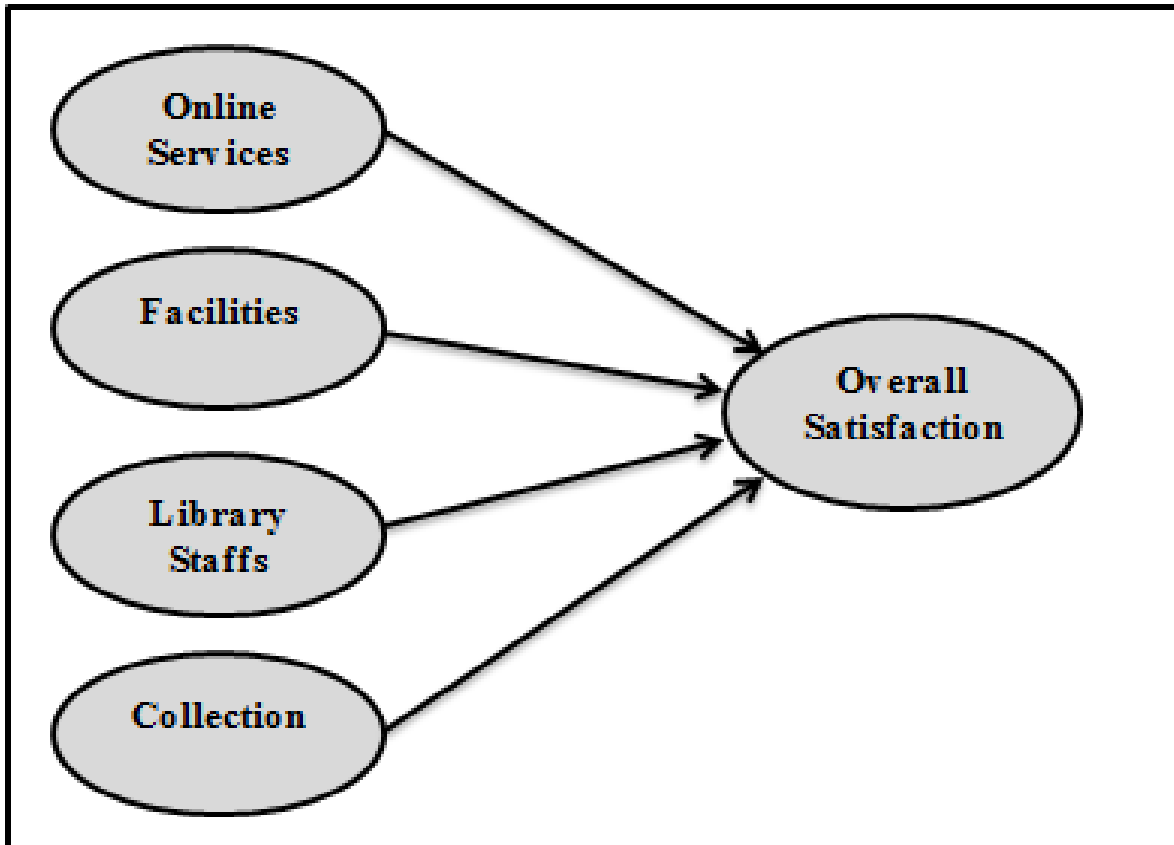

Figure 6: Schematic Diagram of the Research Model

Before proceeding with the construction of Figure 7, there is a schematic diagram which has been used as guideline to develop the structural model. This schematic diagram (Figure 6) was based from the input from previous studies. Figure 7(a) is a combination of all fitted model from Figure 1 to Figure 5. After that, the goodness of fit checking for this model was conducted. The final model is shown in Figure 7(b). This figure displays a fitted final model.

Based on Table 8 and Table 9, the finding concluded that online services and collections have significant relationship with the overall satisfaction towards the library, whereas facilities and library staffs do not have significant contribution to the satisfaction. The most influence factor which contribute to the student satisfaction towards university library is online services since it has the highest standardized regression weight (0.433), whereas the least influence factor is facilities (-0.038).
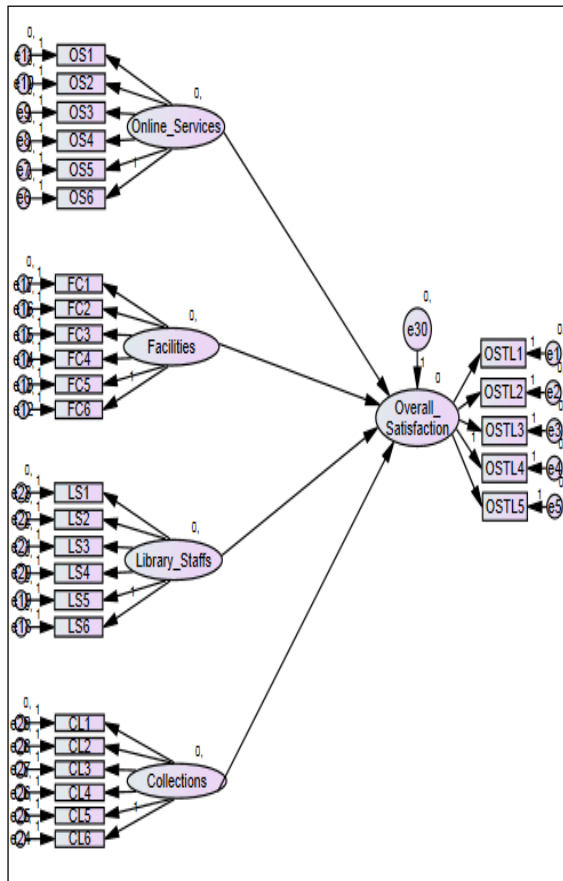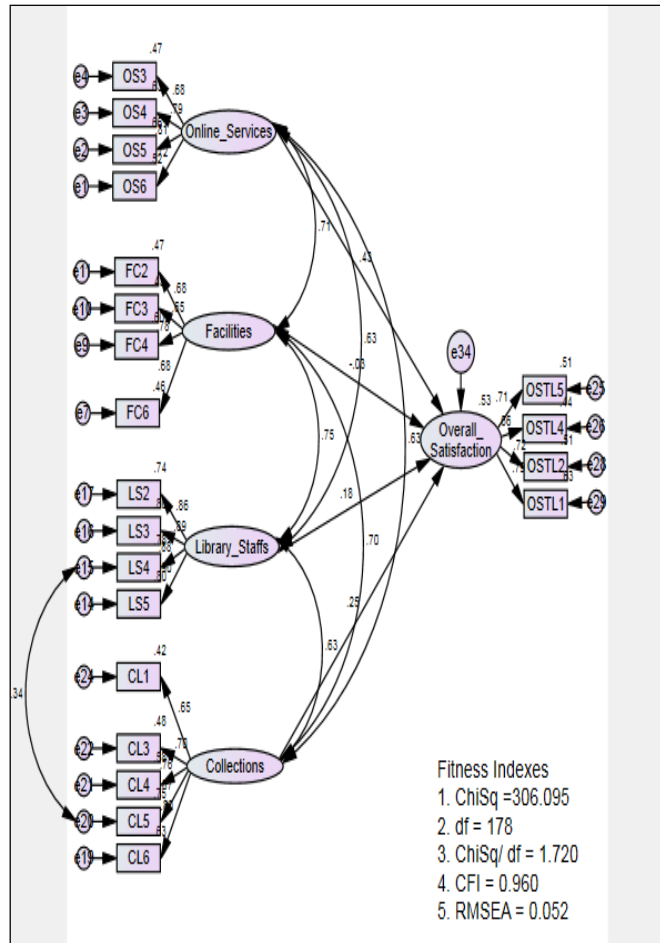
Figure 7(a): The Hypothesis Model (Initial)   Figure 7(b):The Final Structural Model

Table 8: The hypothesis testing result from the AMOS output

Construct	Path	Construct	Estimate	S.E	p-value	Hypothesis Result
Online Services	→	Overall Satisfaction	0.471	0.113	0.000	Supported
Facilities	→	Overall Satisfaction	-0.040	0.138	0.771	Not Supported
Library Staffs	→	Overall Satisfaction	0.146	0.075	0.053	Not Supported
Collections	→	Overall Satisfaction	0.237	0.088	0.007	Supported

Table 9: Result of Hypothesis Testing

Hypothesis	Hypothesis statement	Result
H_1	The Online Services has a significant effect on the Overall Satisfaction.	Supported
H_2	The Facilities has a significant effect on the Overall Satisfaction.	Not Supported
H_3	The Library Staffs has a significant effect on the Overall Satisfaction.	Not Supported
H_4	The Collections has a significant effect on the Overall Satisfaction.	Supported

31

The result of hypothesis H_1 and H_4 proves that the effect of online services and collection onto overall satisfaction towards library is significant at the level of significance, 0.05. However, the hypothesis testing's result of H_2 and H_3 reveals that the facilities and library staffs has no significant effect onto overall satisfaction towards library.

Conclusion

This reseach showed that, two of the hypothesis in this study contribute to the overall satisfaction towards library, i.e. "H_1: *The Online Services has a significant effect on the Overall Satisfaction*" and "H_4: *The Collections has a significant effect on the Overall Satisfaction*". However, another two hypothesis are not significant, which are "H_2: *The Facilities has a significant effect on the Overall Satisfaction*" and "H_3: *The Library Staffs has a significant effect on the Overall Satisfaction*". The most influence factor contribute to the student satisfaction towards university library is online services since it has the highest standardized regression weight (0.433), whereas the least influence factor is facilities (-0.038). In short, it can be said that online services play a vital role in students' satisfaction towards university library. Thus, we propose the library management to improve their service quality by upgrading the online services such as wireless access, library website service, and online book renewal process to mentioned a few, which might be effective in improving the students' satisfaction towards the library.

Acknowledgments

References

Ahmad1 S. I., Abiodullah2 M., & Irum3 J. (2011). Usage of Available Library Facilities by the Students at Under-Graduate Level. *International Journal of Academic Research, 3*(2), 17-25.

Applegate, R. (1997), Models of satisfaction, In A. Kent, (ed), In Encyclopedia of Library and Science: New York, Marcel Dekker. (U.SA.), pp. 199 -227.

Bakti, I. G. & Sumaedi, S. (2013). An Analysis of Library Customer Loyalty: The Role of Service Quality and Customer Satisfaction, A Case Study In Indonesia. *Library Management*, 397-414.

Basha, I. & Zubi-Al, A. (2010), "Six sigma in Libraries: a management perspective." *Canadian Journal on Computing Mathematics, Natural Sciences, Engineering and Medicine,* 1(3), 86 – 92.

Bolintineanu, A. (2020). Books consumed, books multiplied: Martianus Capella, Ælfric's Homilies, and the International Image Interoperability Framework. In *Medieval Manuscripts in the Digital Age* (pp. 205-215). Routledge.

Comeaux, D. & Schmetzke, A. (2007). " Web Accessibility Trends in University Libraries and Library School," in " Special Section on Accessibility and OPAC," Special issue*, Library Hi Tech* 25. No.4, 457-477

Khasiah, Z. & Kassim, N.A. (2006), "Users' perception on the contributions of UTN libraries in creating a learning environment." Research Report. Sha Alam University Teknologi

Larson, G. A. & Owusu-Acheaw, M. (2008). Undergraduate Students Satisfaction With Library Services in A Faculty Library in University of Education,Winneba. Ghana. *Webology, 5*(2).

Mahanta, P. K. (2020). Application and Utilization of ICT in the Degree College Libraries of Assam. *Library Philosophy and Practice*, 1-14.

Mugo, G. W., & Mathu, M. (2021). Assessment of Customer Service Provision for Enhanced User Satisfaction in Academic Libraries: A Case Study of St Paul's University Library, Kiambu County, Kenya. *International Journal of Current Aspects*, *5*(1), 20-34.

Nejat, M. & Mostafa, N. (2008). Service quality at University of Tehran Central Library. *Library Management*, 571-582.

Olanlokum, S. O. (1982). Attitude of Nigerian university students towards library use and services. *Lagos Librarian*, 10 (2), 106-123.

Oluebube, E. & Yusif, O. (2011), "User satisfaction with Library resources and services in Nigerian Agricultural Research Institutes". (online) Available: http://unlib.unl.edu/LPP retrieved 13/5/2013.

Omojuwa, R.A. (1993) "Directions in Adult Literacy Programming in Nigeria, Literacy and Reading in Nigeria," *Reading Association of Nigeria*, (7), 207-214.

Oyedum G.U. & Nwalo K.I.N. (2011). Perceptions by Undergraduate Students of the Environmental Conditions and Resources Availability in Selected University Libraries in Nigeria. *Afr. J. Lib.,Arch. & Inf.Sc., 21*(1), 73- 84.

Payne, L (2007). Library Storage Facilities and the Future of Print Collections in North America: North America

Pierce, W.S. (1980). Furnishing the Library Interior. Ohio: CRC Press, Pp. 52-53.

Sahu, A. K. (2007). Measuring service quality in an academic library: an Indian case study. *Library Review*, 234-243.

Somaraju, P. (1992). Role of University libraries in support of research (A case study of Andra University library). Visakapatnam: Andra University Press and Publications.

Yang, Y. Z. (2004), "Customer satisfaction with interlibrary loan service-deliverEdocs: a case study." *Journal of Interlibrary loan, Document Delivery and Information Supply,* 14(4), 79-89.

Zainudin Awang (2012). *Structural Equation Modelling Using AMOS Graphic*. Selangor: Penerbit Press Universiti Teknologi Mara.