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Article

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SAIS SERVICE QUALITY AND STUDENT'S SATISFACTION TOWARDS THE IMPLEMENTATION OF STUDENT ACTIVITY INFORMATION SYSTEM (SAIS): THE MODERATING ROLE OF SAIS SERVICE CONVENIENCE

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Abstract: Student Activity Information System (SAIS) was developed with the aims to efficiently record the applications of student's activity at the Faculty of Business and Management (FBM), Universiti Teknologi MARA (UiTM) Selangor, Malaysia and to assist the administrator to manage the students' activities effectively. By using different e-service quality dimensions, this study proposed a higher order factor of SAIS Service Quality with an attempt to determine a moderating effect of SAIS Service Convenience between the relationship of SAIS Service Quality and Student's Satisfaction. Quantitative data was gathered from 94 SAIS users and the data were analyzed by using SmartPLS 3.0. The analysis result showed that SAIS Service Quality and SAIS Service Convenience were positively influenced the student's satisfaction. Moreover, the result also revealed that the higher order factor of SAIS Service Convenience was not to moderate the relationship between the SAIS Service Quality and Student's Satisfaction. From the Higher Education (HE) perspective, this study provides an empirical validation of the Information System Service Quality Model particularly in the context of SAIS. Hence, the improvement of the e-service quality is essential for future enhancement of existing information systems in the higher education institutions.

Keywords: information system, student's activity, higher education, e-service quality, service convenience.

JEL: H80, I23, J24, L23, O31.

1 Introduction¹

Internet has changed the world beyond imagination. Many things that are being invested in today, were never even imagined many years ago. It changes the way of communication, marketing, dissemination of knowledge, sharing of ideas, online education, music, fashion, recipes and a lot more (Mandel and Hof, 2001). Almost all of our daily activities are associated and connected to the internet. Universities are among the organizations that heavily depend on the internet in daily activities. The universities around the world continuously produced and improved the tangible and intangible products where

the ideas, information, knowledge and skills are gathered through the internet.

Internet has created a paperless world. This green technology has turned hardcopy materials into softcopy materials where letters, forms, books, files and many other written information are stored digitally. It also allows us to access the information anytime, anywhere and whether it is online or offline. Furthermore, searching for certain topics is much easier and faster digitally as compared to reading physical books. Speed is one of the fundamental elements of the internet. Even though the speed levels are quite subjective to be compared with, recent technologies are incomparable to manual works. It reduces the time frame and the work force on any tasks.

The Faculty of Business and Management Integrated System (FBMIS) is developed due to the fact that

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mobile and ubiquitous devices are everywhere and available anytime. One of the project under FBMS is called the Student Activities Information System (SAIS). Several improvements have been made based on the feedback from the stakeholders such as students, Programme Coordinators, Head of Learning Centre as well as from officers of Student Affairs Office.

Since submission of proposals for all activities is compulsory, this system has replaced the traditional way of submitting the student's activity form. It eliminates all the necessary processes such as getting the signatures from the Programme Coordinators, Head of Learning Centre and Deputy Dean of Student Affairs. With the system, the validation and approval process, which was once a time consuming process, now can be access with a click of a button.

Since the system is available 24 hours, seven days a week, the students can send their applications anytime without having to visit the office or call to check the status. Once approved, they will receive the approval letter through email. Hence, the system has tremendously improved the processing time, the processing procedure, cost of printing and filing system of students' activities.

As students are the customers of the Higher Education (HE) system, the component of the service quality is very crucial and it has to be evaluated for every information system available (Suhaimi, Talib, Bachok and Saleh, 2018; Chang, et al, 2013). Since the development of SAIS provides many benefits to the institution, the need to get the customer's perception towards quality of service offered is essential. Moreover, the role of service convenience has emerged to be an integral part of a complete service package (Chang, et al., 2013).

Lack of complete service package study focus in Higher Education compared to other industries. This is a gap that needs to be addressed. Hence, this study was aimed to determine the moderating effect of SAIS service convenience towards the relationship between SAIS service quality and student's satisfaction for SAIS implementation. The service quality and service convenience were also developed as a second order factor model.

2 Literature review

2.1 Customer satisfaction

One of the business strategies that every organization should consider is to improve the service quality satisfaction of their users (Kitsios, Stefanakakis, Kamariotou and Dermentzoglou, 2019). A good service quality is essential for all sectors including the higher education institutions because it will help the organization to gain its competitive advantages. Generally, user's satisfaction is defined as a user's evaluation of the total utilization connection with a service, which directly influences behavioral intentions or post-action phenomena such as attitude change, repeat actions and loyalty (Johnson and Fornell, 1991). Oliver (1993) argued that positive and negative affective responses were partially by user attributions about overall users' satisfaction. Thus, any improvements of quality of service that is not based on user's needs will not lead to an improvement in user satisfaction (Sivadas and Baker-Prewitt, 2000).

Additionally, dissatisfaction can prompt customers spreading out negative feedback and it will give bad reputation to the organization (Muhamad Zulhelmi Abdullah Suhaimi, Salim Abdul Talib, Sabaianah Bachok and Maria Mohd Saleh, 2018). Many studies argued that customer's evaluation of service quality will influence customer satisfaction (Kitsios, et al., 2019; Muhamad Zulhelmi Abdullah Suhaimi, et al., 2018; Rizwan Ali, Leifu, Muhammad Yasir Rafiq and Mudassar Hassan, 2015).

2.2 E-service quality as second order factor

E-service quality can be described as overall users' evaluations and judgments concerning the excellence and quality of e-service delivery (Lee and Lin, 2005). In academic institutions, E-services provide an endless opportunity for the institutions to leverage its academic and management processes as well as new services. Parasuraman, et al. (1988) introduces SERVQUAL model, which is used to explain the development of a multiple-item scale for measuring service quality and to examine the scale's properties and potential of its application. SERVQUAL started with ten dimensions of service quality, generated

from various dimensions of service quality from literature reviews. These ten dimensions are made of tangibility, reliability, responsiveness, competency, communication, credibility, security, access, courtesy and understanding of the customer. Previous researchers who have developed e-service model are Heinonen (2006) and Essen and Conrick (2008) whereas e-service quality dimensions have been developed by Barnes and Vidgen (2002), (Santos, 2003), Raman, Stephenaus, Alam and Kuppusamy (2008), Lee and Lin (2005). These models have introduced different sub-dimensions of service quality such as ease of use, technical quality, content quality and so on. According to Nunkoo, Teeroovengadam, Thomas and Leonard (2017), previous studies argued on the multi dimensions of service quality, and these multidimensional constructs can be dealt using second-order factor model (Chen, et al., 2005). The model represents the hypothesis that the seemingly distinct, but related, sub dimensions can be accounted for by an underlying higher-order construct such as service quality (Nunkoo, et al., 2017).

This study adapts 4 dimensions for measuring SAIS service quality: Ease of Use, Information Quality, Reliability and Security. Ease of Use is defined as how easy the website is for users to find information within the website (Parasuraman, et al., 1988). The structure and layout of the website, functionality, accessibility of information, and understandable contents are the most important criteria that users often look for. Meanwhile, the information quality relates to user's perception of usefulness and quality of website content (DeLone & McLean, 2003). As the Internet is one of the faster means of communication and a platform for a huge warehouse of data and information, the development of SAIS website is relevant for the students as the users. Hence, the quality of information provided by the system becomes a highly important element towards student's satisfaction.

Reliability refers to the ability to execute the promised services accurately and consistently (Santos, 2003). This includes the frequency of updating the website, quick reply to user enquiries, and accuracy of information. According to Zeithaml, et al. (2000), security of the system is the extent to which the user is convinced of the site's safety from intrusion

and protection of personal information. Due to this, the system security is of a great worry to e-service users because the user's perceived security has an important role to ensure safe transactions and secured user's personal information.

Previous studies showed that service quality can be treated as a second-order factor. Nunkoo, et al. (2017) developed service quality as second order factor model and investigated its relationship with customer satisfaction and customer loyalty. His result indicated that the second order factor model is acceptable both empirically as well as conceptually and performs better than other competing models of service quality. Meanwhile, Narayan, et al. (2008) found that the service quality as second order factor influence customer satisfaction. Based on previous studies, the current study construct the following hypothesis.

H₁: SAIS Service Quality as a second order factor positively influences Student's Satisfaction towards SAIS Implementation.

2.3 The moderating effect of SAIS service convenience

According to Roy, Shekar, Lasser and Ohen (2018), service convenience is essential in increasing the relationship between service quality and customer satisfaction. Service convenience is related with time saving for the customer to engage with the service. In Higher Education (HE), any activities that involve students must get the approval from the student's affair office. Students will apply for the approval of the activities through the proposal submission to the faculty student's affair office. Since the approval stage take longer time, as it has to be validated by the course coordinator and head of the program. Therefore, using the online service will reduce time for the students to go to the office and get approval. Access convenience and transaction convenience were used to measure service convenience. Access convenience refers to the time and effort saved by customers while initiating contact with the institution and reaching the service location (Roy, et al., 2018). Meanwhile, Transaction convenience defines the time and effort that students can

save while submitting their proposal for approval to the institution (Roy, et al., 2018).

Previous research shows that service convenience has a direct relationship on service quality and customer satisfaction (Roy, et al., 2018; Sehgal, 2016; Kaura, Prasad, Chalasani and Sharma, 2015; Kaura, 2013). However, this study adapts service convenience as a second order factor model and as a moderator. The feedback from SAIS users and stakeholders have shown that the system reduced time for validation and approval process since everything was done online. Thus, the study believes that the service convenience can strengthen the relationship between service quality and customer satisfaction. Thus, the following hypotheses were developed.

H_2 : SAIS Service Convenience as a second order factor positively influences Student's Satisfaction towards SAIS Implementation.

H_3 : The positive relationship between SAIS Service Quality and SAIS Student's Satisfaction will be stronger when SAIS Service Convenience is high.

Based on the literature review above, this study proposed the following research model as shown in Fig. 1. This model consisted of SAIS Service Quality and SAIS Service Convenience as Higher Order Factor. There are four dimensions to measure SAIS Service Quality: Ease of Use, Information Quality, Reliability and Security. Moreover, Access Convenience and Transaction Convenience were used to measure SAIS Service Convenience and SAIS Service Convenience was adapted as moderator. This study has one independent variable, which is Student's Satisfaction towards SAIS implementation.

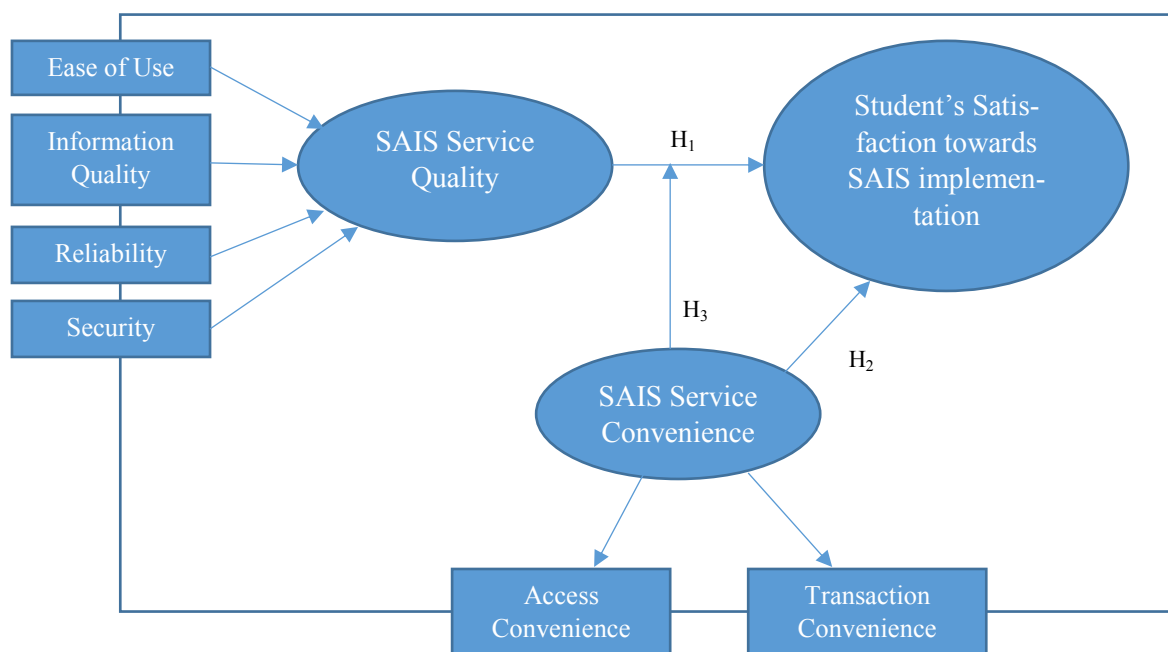


Figure 1. Service Quality-Convenience Satisfaction Model (Source: Author's own research)

3 Methodology

This study employed quantitative research technique. The unit analysis for this study was SAIS users who are also students at Faculty of Business and Management, UiTM Selangor, Malaysia.

The e-questionnaire was distributed to all SAIS users. The information about SAIS users were retrieved from the SAIS database. Based on the record, the total of first group of SAIS users were 185. However, only 94 users responded to the e-questionnaire. The G-power software was used to calculate the minimum sample size required for this study. Since the model had a maximum of 3 predictors (as shown

in Fig. 1), with the effect size as small (0.25) and the power needed as 0.8, thus the minimum sample size required was 77. Based on this, the total sampling requirement was fulfill for the study.

4 Results

4.1 Demographic details

The demographic details shows that the majority of the participants were female ($n = 71$) compared

to male ($n = 23$). The majority of these respondents were less than 25 years old ($n = 90$). Meanwhile, there were four users who were more than 25 years old. The result found that many of the respondents were junior students, that is, students from semester 1 to semester 3 ($n = 49$) and the rest ($n = 45$) of the respondents were students from semester 4 to semester 6. The details of the results are shown in Table 1.

Table 1. Demographic details (*Source: Author's own research*)

Demographic Item	Frequency	Percentage
Gender		
Male	23	24.47
Female	71	75.53
Age		
Less than 25 years old	90	0.96
More or equal to 25 years old	4	0.04
Semester		
Semester 1 to Semester 3 (Junior)	49	52.10
Semester 4 to Semester 6 (Senior)	45	47.90
Total of Respondents (N)	94	100

4.2 Measurement model

The SmartPLS 3.0 software was used to analyze the final data. The measurement model test began with the assessment of the convergent and discriminant analysis for reflective model. Four sets of convergent analyses were run in order to assess the items loading, Cronbach's Alpha (CA), Composite Reliability (CR) and Average Variance Extracted (AVE) values. The items loadings of each construct were more than 0.7, as stated in Table 2.

Moreover, the CR values, which is to show the degree to which the items indicated the latent construct, ranged from 0.902 to 0.975. The results also showed that the CA value was in the range of 0.849 to 0.969. Based on the results found in this study, the CR and CA requirements were met since the values exceeded the recommended value of 0.7. Additionally, the score value of AVE was in the range of 0.666

to 0.915. This showed that the AVE values exceeded the recommended value of 0.5. Therefore, the next step of measurement testing can be proceeded. The overall results of convergent validity for reflective measurement model are shown in Table 2.

Secondly, the formative convergent validity for higher order construct was tested as shown in Table 3. The redundancy analysis result of path coefficient is 0.625 and the value is sufficient for exploratory study (Hair, et al., 2017). Moreover, the Variance Inflation Factor (VIF) values for Ease of Use, Information Quality, Reliability and Security were all below the threshold of 5.0 (Hair, Ringle and Sarstedt, 2011). The results, therefore, did not indicate a multicollinearity problem. The result also revealed that the outer weight of each formative indicator was also significant. The overall results are shown in Table 3.

Table 2. Convergent Validity for Reflective Measurement Model
(Source: Author's own research)

First Order Construct	Second Order Construct	Items	Loadings	CA	CR	AVE
Access Convenience (AC)		AC1	0.834	0.892	0.926	0.757
		AC2	0.830			
		AC3	0.905			
		AC4	0.908			
Transaction Convenience (TC)		TC1	0.925	0.835	0.902	0.757
		TC2	0.926			
		TC3	0.746			
	Service Convenience	AC1	0.955	0.915	0.933	0.666
		TC1	0.915			
Ease of Use		EOU1	0.922	0.946	0.957	0.789
		EOU2	0.877			
		EOU3	0.840			
		EOU4	0.919			
		EOU5	0.903			
		EOU6	0.868			
Information quality		IQ1	0.937	0.936	0.954	0.839
		IQ2	0.921			
		IQ3	0.883			
		IQ4	0.923			
Reliability		RE1	0.909	0.849	0.909	0.769
		RE1	0.851			
		RE3	0.869			
Security		SEC1	0.908	0.969	0.975	0.867
		SEC2	0.928			
		SEC3	0.939			
		SEC4	0.939			
		SEC5	0.925			
		SEC6	0.945			
Satisfaction		S1	0.951	0.953	0.970	0.915
		S2	0.962			
		S3	0.955			

Table 3. Convergent Validity for Formative Measurement Model
(Source: Author's own research)

Construct	Items	Convergent Validity	Weight	t-value	VIF
E-Service Quality	Ease of Use	0.625	0.340	17.771	4.055
	Information Quality		0.238	23.119	4.414
	Reliability		0.164	19.579	3.212
	Security		0.352	22.907	3.342

The next procedure was to assess the discriminant validity by examining the correlations between constructs and their square root of the AVE. The results showed that the square root of the AVE (in bold value) is greater than the correlation with other con-

structs, as shown in Table 4. Thus, the Confirmatory Factor Analysis (CFA) reflects for acceptable convergent and discriminant validity and the final model can be tested.

Table 4. Discriminant Validity (Source: Author's own research)

Constructs	1	2	3	4	5	6	7
Access Convenience (1)	0.870						
Ease of Use (2)	0.783	0.888					
Information Quality (3)	0.744	0.815	0.916				
Reliability (4)	0.839	0.807	0.749	0.877			
Security (5)	0.724	0.737	0.821	0.718	0.931		
Student's Satisfaction (6)	0.797	0.832	0.808	0.871	0.746	0.956	
Transaction Convenience (7)	0.755	0.774	0.608	0.778	0.613	0.759	0.870

4.3 Structural model

The results of hypothesis testing by determining the significance levels of path coefficients are summarized in Table 5. This study showed that 80.1% of variance (R^2) for student's satisfaction towards SAIS implementation was explained by SAIS Service Quality and Service Convenience. The hypothesis testing result showed that there was a positive and significant relationship between SAIS Service Quality ($\beta = 0.636$, t-value = 6.190, p-value < 0.001, BCI LL = 0.284, BCI UL = 0.600) and Student's Satisfaction towards SAIS implementation. Meanwhile, SAIS Service Convenience ($\beta = 0.301$, t-value = 2.1978, p-value > 0.001, BCI LL = -0.011, BCI UL = 0.080) also showed a positive significant relationship towards SAIS Student's Satisfaction. Thus, H_1 and H_2 were accepted.

In addition, the Stone-Geisser approach was used to assess whether the predictor variable has a substantive influence on the exogenous constructs by exploring the effect of f^2 . According to Chin, Wynne and Marcoulides (1998), the higher the f^2 , the greater is the influence of exogenous constructs (Student's Satisfaction and SAIS Service Quality) with the values of 0.02, 0.15 and 0.35 can be respectively regarded as small, medium or large effect respectively.

The results of effect size showed that SAIS Service Quality has a large effect on Student's Satisfaction towards SAIS implementation. Using an omission distance (D) of 7, this study obtains a Q^2 of 0.667, thereby indicating that SAIS Service Quality model in this study has predictive relevance.

Table 5. Result of Hypothesis Testing (*Source*: Author's own research)

Hypothesis	Relationship	Std Beta (β)	SE	t-value	p-value	f^2	R^2	Q	BCI LL	BCI UL	Supported
H1	E-Service Quality \rightarrow Student's Satisfaction	0.636	0.103	6.190	$p < 0.001$	0.523	0.801	0.667	0.284	0.600	Yes
H2	Service Convenience \rightarrow Student's Satisfaction	0.301	0.101	2.978	$P > 0.001$	0.124			-0.011	0.080	Yes
H3	ESQ*SC \rightarrow Student's Satisfaction	0.014	0.026	0.557	$P > 0.001$	0.003			-0.127	0.026	No
<i>Note</i> : BCI - Bias Confident Interval											

The result of moderating testing revealed that there is no moderating effect of SAIS Service Convenience on the relationship between SAIS Service Quality and Student's Satisfaction towards SAIS Implementation ($\beta = 0.014$, $t\text{-value} = 0.557$, $p\text{-value} > 0.001$, BCI LL = -0.0127, BCI UL = 0.026).

5 Discussion and conclusion

With the rapid development of the Internet, many institutions have re-innovated the old process into the e-process. This e-process will help the institution to manage record effectively. The Faculty of Business and Management, UiTM Selangor, Malaysia has taken this initiative to develop SAIS. This system provides e-service for student to submit student's activity application through the online system. Therefore, this study was aimed to investigate the moderating role of SAIS Service Convenience of SAIS towards the relationship between SAIS Service quality and student's satisfaction for SAIS implementation. Whereas the SAIS Service Quality and Service Convenience were developed as the second order factor model.

This study found that SAIS service quality as a second order factor is acceptable based on the empirical test result, and it is also shown that student's satisfaction was strongly affected by the SAIS Service Quality. Thus, this study concludes that the SAIS Service Quality Factor is important for the higher institution to consider for improving their online service in order to increase the rate of customer satisfaction, whereby in this context, the students are considered as the online customer. The website criteria such as Ease of Use, Security, Reliability and

Information Quality are the important elements that can improve satisfaction among SAIS users. These findings are in line with the previous studies in e-service field (Muhammad Shoaib Farooq, Maimoona Salam, Alain Fayolle, Norizan Jaafar and Kartinah Ayupp, 2018; Duarte, et al., 2018).

Moreover, the findings of this study also showed that SAIS Service Convenience as second order factor has significantly influence student's satisfaction towards SAIS implementation. The SAIS Service Convenience is essential because it can lower the actual time and effort costs of the customer to interact with the service offer by the institution and improve consumers' satisfaction. As Kaura, et al. (2015) stated, when customers can conveniently and easily experience the benefits of the services, they are more likely to be satisfied, repeat the process and recommend to others.

In terms of moderating effect, this study found that Service Convenience as second order factor would not strengthen the relationship between SAIS Service Quality and SAIS student's satisfaction. This is maybe due to the general definition of service convenience and it would be suggested to further explore in the future, as this study only focuses two criteria: Access Convenience and Transaction Convenience. It is also recommended that future research investigate how the student's perception of E-Service Quality and Service Convenience change over time by employing a longitudinal research method and to further explore other online convenience conceptualization.

Moreover, future researchers can explore other appropriate e-service dimensions related with HES.

This can be done by exploring a more appropriate research model and theory related with e-service area. Due to limited resources and time constraints, this study employed convenience sampling method; however, future studies can overcome this limitation by using any other sampling technique. Secondly, sample size for this study was relatively small due to early implementation of SAIS.

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