

Analyzing the Quality of Academic Information Systems on System Success

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Abstract—Since the needs for academic management are always changing, the creation of academic information systems must focus on user benefits and satisfaction in order to gauge how successful academic management systems are. This research uses the Delone and McLean IS Success Model which is known as one of the system success models, so the aims to ascertain the effects of system, information, and service quality, as well as usage rate, on benefits and user satisfaction SIAKAD system. Respondents were determined using the Slovin formula and taken using proportionate stratified random sampling techniques as many as 100 people. Descriptive analysis was carried out to explain respondents' perceptions and evaluate the success of the system using Three levels of communication were used to measure the success of the system: technical, semantic, and effectiveness levels. The Delone and Mclean IS Success Model's variable relationships were investigated using SEM-PLS analysis. Hypothesis testing results indicate that User Satisfaction is significantly impacted by Information; System; and Service Quality, then Information Quality also significantly affects Usage; and Net Benefits are significantly impacted by User Usage and Satisfaction; however, neither System Quality nor Service Quality significantly affects Use or Use on User Satisfaction.

Keywords— Analysis; Delone and Mclean; SEM-PLS

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I. INTRODUCTION

The use of information technology has influenced all fields, ranging from the fields of trade or business, health, social, transportation and so on. The field of education is one of the fields affected by the use and development of technology. Today's universities, both state universities and private universities, cannot be divorced from the information system technology they employ to conduct business. This is done to meet the academic management needs that exist in each of these universities. One of the uses of technology that is commonly used by every university is the academic information system. An Academic Information System is an application or website that provides information regarding academic services which can be accessed anytime and anywhere via the internet. This Academic Information System is aimed at students and lecturers to support lecture activities. This Academic Information System also supports all information exchange related to the academic process [1]. Institut Agama Islam Nusantara Batanghari is one of them private universities in Indonesia have involved academic information systems to review the entire process of academic activities. Academic Information System (SIKAD) IAIN Batanghari has been used since 2022 which is used by lecturers and students IAIN Batanghari. This system was developed with the aim of assisting in organizing activities related to academic activities such as, registration confirmation, course contracts, student attendance, to the value of student study results. However, after a survey was conducted on the implementation of SIKAD IAIN Batanghari still has many complaints submitted by students regarding the implementation of the Academic System (SIKAD) at IAIN Batanghari among them, students still do not get fully updated information from the system, because the SIKAD system is still classified as a new system so that when compared to before the SIKAD system students prefer the process to be done manually rather than using the system, especially during registration, thus affecting the use of the system and impacted the satisfaction of users and the system using with its benefits. Seeing this, it is important to evaluate SIKAD from the student user side.

Evaluation is a collecting information activity related to what will be evaluated so that the results of an evaluation can be used to determine alternatives in decision making [2]. Evaluation activities are commonly used to find out the extent of implementation activities in an information system, both from the user, organization, and information system technology side. Evaluation of the use and application of information technology in an organization or agency needs to be done so that users are confident in the application or information system that has been implemented [3]. In addition, in the implementation of a system is always related to user acceptance and the success of the system. The success of a system can be seen from the extent of its usefulness to users and the benefits felt by users. The benefits obtained from the use of a technology will

influence someone to use the technology. Evaluation of an information system can be done by referring to several models, one of which Delone&Mclean model IS Success Model. The Delone&Mclean IS Success Model is frequently used by researchers to amount the result of system. The use of the Delone and Mclean IS Success Model is often used researchers to measure the success of the system. Some research that adopting a model for measuring the success of the system states that the variables used can produce Net Benefits for system use [4]. The model developed by Delone and Mclean in 2003, which is the result of an update of the Delone and Mclean (1992) model, aims to determine the success of implementing information systems based on six measurement variables—system; information; service quality, use; intention to use; user satisfaction; and net benefits—this model seeks to assess the effectiveness of information system implementation (figure 1) [5],[6].

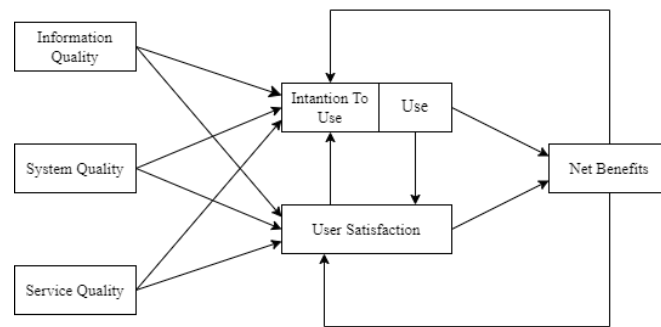


Fig 1. DeLone and McLean's (2003) Information Systems Success Model

Previous research that used the Delone&Mclean IS Success Model as a theory for measuring system success did not use the Use variable but used the Intention To Use variable to measure system success, namely research conducted by Tri Puspitasari et al., where the research aimed to identify key success factors in net benefit from the information system used to manage research and community service at Brawijaya University. The results of Structural Equation Modeling (SEM) analysis on 250 respondents show that the net benefits of information systems are determined by lecturers' satisfaction and intention to use information systems, meaning that the more satisfied lecturers are with information systems and the greater their intention to use existing information systems, the net benefits they receive the greater it is. Among the three factors that determine lecturers' satisfaction and intention to use the system, system quality has a greater influence than the quality of information and services [7]. Another research that is in line with Tri Puspitasari's research is research conducted by Nabilla Utmary where the research aims to evaluate the implementation of the Village Financial System (SISKEUDES) and identify factors that influence user satisfaction and actual use of SISKEUDES in 55 villages in Kota Pariaman. The research found that information quality had a positive effect on user satisfaction, and system quality, service quality had no effect on user satisfaction, while user satisfaction also had no effect

on actual use of SISKEUDES [8]. But, there are also several previous studies that use usage variables, namely research conducted by Lala Meilani and friends, where the research aims to analyze the quality performance of academic information systems and analyze the factors that influence usage, user satisfaction and the net benefits of SIAKAD at universities. Sultan Ageng Tirtayasa. The test results show that SIAKAD's success at the semantic and technical level is in the good category, while success at the effectiveness level is still in the quite good category. Then the results of hypothesis testing show that information quality, system quality and service quality have a significant positive effect on user use and satisfaction, use has a significant positive effect on user satisfaction, and user use and satisfaction have a significant positive effect on the net benefits of SIAKAD [6].

Then in research conducted by Neni Seliana et al., which aims to evaluate success, and analyze the factors that influence the successful use of e-learning at the Faculty of Engineering, Riau University. His research found evidence that the success of using e-learning at the Faculty of Engineering, Riau University from a semantic perspective was at the highest level, followed by technical and effectiveness aspects. The factors that influence the success of e-learning at the Faculty of Engineering, Riau University are the quality of information and the quality of service [9]. Then, there is a study that measures the success of information systems using different methods, namely research conducted by Medyantiwi Rahmawita Munzir and her friends. In his research, he measured the success of the system using the HOT-FIT method, and the aim of his research was to find factors that significantly influence human, organizational and technological factors that influence the success of implementing SIM KKN. This research found that the implementation of the KKN SIM at UIN Suska Riau was not completely successful because there were still objectives of implementing the KKN SIM that had not been achieved. In HOT FIT, the success of implementing SIM KKN at UIN Suska Riau was at a level of 54.5% and was included in the quite good category [10]. In the wake of making a comparison by explaining several previous studies and based on the problems raised in this research, this research aims to determine the influence of system quality, information quality, service quality, and level of usage on user satisfaction and benefits in its application. The SIAKAD system at IAIN Batanghari adopts six variables in the Delone & McLean IS Success Model.

II. RESEARCH METHOD

A. Research Model

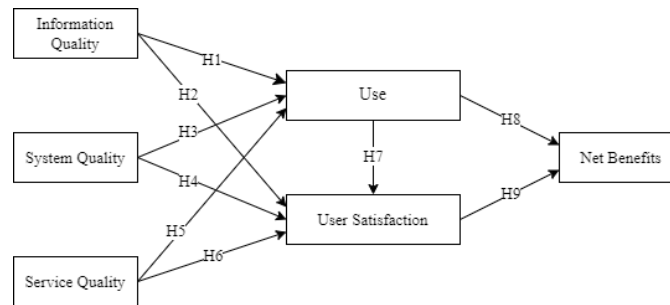


Fig 2. Research Model

This study is a part of the quantitative descriptive research approach. The results of literature studies, questionnaires, google forms, SmartPLS applications as materials and tools used in this study. The research model is built from several previous studies and hypothesis design were modified by removing the Intention To Use variable, drawing inspiration from the Delone&McLean IS Success Model (2003) and earlier research (figure 2) [6]. Based on the research model (figure 2), the hypothesis developed in this research will be supported with previous research which has examined the results of the relationship between variables in the Delone&McLean (2003) model (table 1).

Table 1. Hypothesis

Variables	Hypothesis	Previous Research Results	Citations
Information Quality	H1 Information Quality has a significant effect on Use	Information Quality has positive and significant influence on Use with value The beta coefficient is 0.341 and the T-statistic is 3.565.	[6]
	H2 Information Quality Significantly Affects User Satisfaction	Information Quality has a significant influence on User Satisfaction with a beta coefficient value of 0.173 and statistics of 2.131.	
System Quality	H3 System Quality has a significant effect on Usage	The quality of the system has a positive and significant influence on Use with a beta coefficient value of 0.162 and t-statistic of 2.170.	[6]
	H4 System Quality has a significant effect on User Satisfaction	System Quality has a significant effect on User Satisfaction with a beta coefficient value of 0.257 and t-statistics of 3.621.	
Service Quality	H5 Service Quality has a significant effect on Usage	Quality of Service has positive and significant influence on Usage with	[6]

Variables	Hypothesis	Previous Research Results	Citations
		coefficient value beta 0.230 and t-stats 2.744.	
	H6 Service Quality has a significant effect on User Satisfaction	Service Quality also has a positive and significant effect on User Satisfaction with a beta coefficient value of 0.189 and t-statistic of 2.983.	
Usage	H7 Usage has a significant effect on User Satisfaction	Use has a positive and significant influence to User Satisfaction with a beta coefficient value of 0.180 and t-statistics 3.388.	[6]
	H8 Use has a significant effect on Net Benefit	Use also has a positive and significant influence to Net Benefits with a beta coefficient value of 0.366 and statistics of 7.250.	
User Satisfaction and Net Benefits	H9 User Satisfaction has a significant effect on Net Benefits	Satisfaction Users have a positive and significant influence on Net Benefits with a beta coefficient value of 0.486 and a T-statistic of 10.503.	[6]

Next, there is a classification of information success of the system in the Delone and Mclean (1992) model to determine the success rate of an information system (figure 3) [6].



Fig 3. Categories Information Systems Success Delone and Mclean (1992)

Considering the findings of the study conducted by Shannon & Weaver which shows that in an information system has a level of communication that is formed and consists of 3 levels, namely, Technical Level, Semantic Level, and Effectiveness Level. The six variables that comprise the three levels of communication in the Delone and Mclean model are as follows: Technical success is measured by System Quality, semantic, and usage success is measured by Information Quality, and so on. Effectiveness is measured by User Satisfaction, Individual Impact, and Organizational Impact [6]. So in this study, each variable consists of several indicators. System Quality and Service Quality variables are used to measure implementation success from a technical point of view. Information Quality Variables to measure implementation success in terms of semantics. The variables Usage, User Satisfaction, and Net Benefit are used to measure effectiveness.

B. Research Framework

The steps carried out consist of 6 stages (figure 4). The first step taken is an interview with the purpose of finding out the problems that occur. Then identify the problems obtained after knowing

the results of the interview. The interview's results conducted are in the form of a problem that will cause a statement to be answered or a problem to be solved.

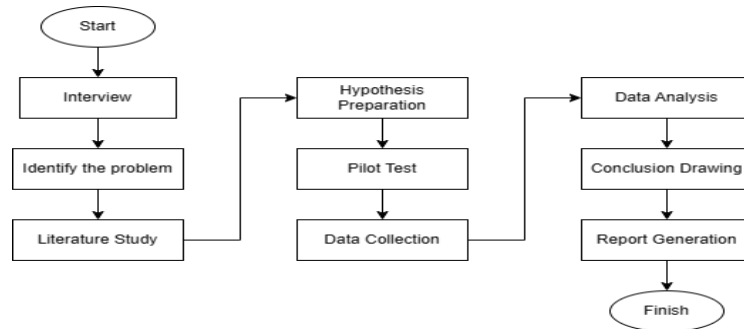


Fig 4. Research Framework

After knowing the problems that occur, the next step is to conduct a literature study to study and understand the literature obtained from books, the internet, electronic books, and journals related to research theory. Then the preparation of hypotheses is carried out based on theoretical conclusions obtained from literature studies. Furthermore, conducting research instrument tests using the pilot test method. Pilot tests are conducted to test the reliability and validity of research instruments. Then collect data using two ways, namely, online and offline. The collected data is then analyzed using two analysis techniques, namely descriptive analysis and SEM-PLS analysis. Then a conclusion is made after knowing the results of the calculations and data analysis that has been done. The final step is to create the report. The report is created using the findings of conducted research and is given in the form of a detailed description so that the reader can understand it.

C. Population and Sample

The population studied in this study is active S1 students from 7 study programs (table 2).

Table 2. Study Population

No	Courses	Number of Students
1	Sharia Economics	251
2	Sharia Economic Law	366
3	Islamic Education Management	459
4	Islamic Education	306
5	Early Childhood Islamic Education	300
6	Sharia Banking	39
7	Tadris English	40
Total		1.761

The determination of the number of research samples was calculated using the slovin formula [11], with a population of 1,761 and using an error tolerance limit of 10% (0.1). So that the number of samples was 99.94 which was rounded up to 100 samples.

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

$$n = \frac{1.761}{1 + 1.761 (0,1)^2}$$

$$n = \frac{1.761}{17,62}$$

$$n = 99,94$$

The population in this study has an unequal number and stratified proportionally so that the study sample was taken using *proportionate stratified random sampling* technique. The size of the proportion of the number of samples in each study program is obtained from the calculation results using the allocation formula (table 3).

$$ni = \frac{Ni}{N} \times n \quad (2)$$

Table 3. Research Sample

No	Courses	Number of Respondents
1	Sharia Economics	14
2	Sharia Economic Law	21
3	Islamic Education Management	27
4	Islamic Education	17
5	Early Childhood Islamic Education	17
6	Sharia Banking	2
7	Tadris English	2
Total		100

D. Data Collection Techniques

The methods used in this study to collect data included observation, interviews, and questionnaires. Observations were made on SIAKAD with the aim of knowing the features available in the SIAKAD system, and how the system is used. Then interviews were conducted with SIAKAD users with the purpose of finding out the problems that occur in the use of SIAKAD. Finally, this study distributed the questionnaire offline by meeting with respondents and online through a Google Form that was shared on social media.

E. Research Instruments

The study had a 20-item statement of six variables comprising three exogenous variables (information, service, and system quality) and three endogenous variables (user satisfaction, usage, net benefit) (table 4).

Table 4. List of Variables and Indicators

No	Variable	Indicators	Reference
1	Quality of Information	Presentation of information	[6],[9]
		Accuracy of Information	
		Timeliness of information	
2	System Quality	Completeness of information	[6],[12],[9]
		Ease of use	
		System usability	
3	Quality of Service	System reliability	[6],[9]
		Responsiveness	
		Reliability	
4	Use	Guarantee	[6]
		Empathy	
		Frequency of use	
5	User Satisfaction	Real use	[6]
		System output	
		Management services	
6	Net Benefits	System precision	[6]
		User expectations	
		Effect of work	
		Efficiency	

Based on the indicators that make up the variables, a questionnaire was developed consisting of 20 statement items which were used to obtain research data and were modified to answer the research objectives.

Table 5. Quality of Information

Quality of Information	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
INQ1	I feel that the data on the information displayed on each SIAKAD menu/page is easy to understand and in accordance with user needs (home page, information page, schedule page, grades transcript page).
INQ2	I feel that all the information displayed by SIAKAD is accurate for users according to academic activities.
INQ3	I feel that the display of data information displayed on each menu/page in SIAKAD is always up to date (home page, information page, schedule page, grades transcript page).
INQ4	I feel that all the activities I do at SIAKAD are neatly packaged and displayed in the form of information issued by SIAKAD.

Quality of Information (INQ) is how system users perceive the value of the results or output from the system [13] (table 5). The quality of information in a system can be measured in terms presentation of information, accuracy, timeliness, completeness, relevance, and consistency [14]. The quality of the information can be seen from the output or results obtained from the use of an information system (DeLone McLean, 1992). Presentation of information shows the quality of the data displayed so that users easily understand the information issued by the system. And

accuracy refers more to the suitability between information data and the activities carried out by users on the system. Then, timeliness shows that the information data displayed is in accordance with current conditions. Meanwhile, completeness refers to the information data displayed that is in accordance with the user's needs and activities while using the system.

Table 6. System Quality

System Quality	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
SYQ1	The appearance of each menu or page on SIAKAD is user friendly so I am comfortable using the system.
SYQ2	The features/menu available on SIAKAD are suitable for my needs.
SYQ3	SIAKAD is capable of carrying out the error recovery process quickly.

System quality (SYQ) is related to how well the system provides information and services to users and the extent to which system functions can easily and effectively meet user needs [14],[15] (table 6). System quality of a system is measured based on ease of use, functionality, reliability, flexibility, data quality, portability, integration and importance [13]. Ease of use shows user comfort in terms of appearance and stages of system usage. System usability refers to the suitability of available features with user needs. Then, system reliability shows the ability of the system's speed to overcome errors that occur.

Table 7. Quality of Service

Quality of Service	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
SEQ1	The SIAKAD management officers were alert in dealing with the problems I experienced regarding the use of SIAKAD.
SEQ2	SIAKAD management officers always resolve problems appropriately and quickly.
SEQ3	SIAKAD management officers always provide time guarantees regarding repairs to the problems I convey through my complaints.
SEQ4	The SIAKAD management officers were very friendly every time I complained about using SIAKAD.

Quality of Service (SEQ) is users' assessment of the suitability between what they expect and what they get from the system can influence user satisfaction [13],[15] (table 7). Service quality for a system refers to the quality of system support that users receive from the organization and IT personnel which is measured based on responsiveness, reliability, assurance, and empathy [14].

Table 8. Use

Use	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
U1.1	I use SIAKAD routinely. (3 times a week)
U1.2	I have been using SIAKAD for a long time. (1-2 hours per day)
U2	I paid tuition fees, course contracts, and found out study results using SIAKAD.

Usage is usually defined as the level of effort expended in interacting with a system, which can be measured by the amount of output produced by the system in a given period [15] (table 8). System usage refers to the total time spent on the system, reasons for using the system and the actual usage level [5].

Table 9. User Satisfaction

User Satisfaction	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
US1	I am satisfied with all the information released by SIAKAD.
US2	I am satisfied with all the services provided by SIAKAD.
US3	I feel helped in completing the academic process using SIAKAD.
US4	I feel that all the features and functions available are in line with user expectations.

User satisfaction is an important predictor of success, but it should be integrated with other approaches to build a conceptual [16] (table 9). User satisfaction is defined as the extent of a user's physical, cognitive, and emotional responses resulting from the use of a system, product, or whether a service meets the user's needs and expectations [17]. User satisfaction can be measured in terms of Effectiveness, Efficiency and Satisfaction with the system used [17].

Table 10. Net Benefits

Net Benefits	
<i>Symbol of Variable Constituent Indicators</i>	<i>Statement</i>
NB1	I feel that SIAKAD makes the entire academic process easier.
NB2	I feel that the entire process carried out to carry out academic activities is efficient and effective by using SIAKAD.

In the original model, the net benefit dimension is defined as an innovative variable that combines two impact dimensions (organizational and individual) into one [13],[5] (table 10). The net benefits felt by Users regarding the use of an information system can be defined as the impact or results obtained by users from using a system in accordance with their needs users and have an impact on the success of an organization [18].

This research questionnaire was made based on indicators on each research variable and measured using the Likert scale of four levels of measurement values [19] (table 11).

Table 11. Measurement Scale

No	Alternative Answers	Score
1	Totally Agree	4
2	Agree	3
3	Disagree	2
4	Strongly Disagree	1

Before collecting research data, this study tested the research's validity and reliability instrument. The test was conducted on 30 samples of respondents.

1. Test validity

Tests conducted to prove the correctness of each indicator of each variable on a research instrument [20],[21],[10]. The test is carried out by comparing between r-count and r-table with the provision that if r-count > r-table then the indicator on it is declared that the research tool is legitimate [22],[23]. The following is a formula commonly used to measure the validity of research instruments [1] :

$$r_{xy} = \frac{N \sum XY - (\sum X \sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}} \quad (3)$$

2. Reliability test

Testing activity is to find out how consistent the variables used so that they can be used as research instruments [20],[21],[10]. The test is conducted by examining the Cronbach's alpha value which is based on the provision that the value of Cronbach's alpha is above 0.6 so that the instrument can be said to be reliable[23]. The following is a formula commonly used to measure the reliability of research instruments [2]:

$$r_{11} = \left[\frac{k}{k-1} \right] \left[1 - \frac{\sum \sigma_i^2}{\sigma_T^2} \right] \quad (4)$$

Data analysis of this study uses descriptive analysis to explain respondents' perceptions and evaluate the success of the system. Then the SEM-PLS analysis was carried out to test the relationship between variables in the Delone&Mclean IS Success Model by going through two stages of testing, test the outer model for testing against the model of measurement and test the inner model for testing against the structural model.

III. RESULT AND DISCUSSION

A. Research Instrument Test

This research uses Microsoft Excel as a tool in testing research instruments. Testing a pilot test of 20 statement items will show a good level of validity with a significant 5% then obtained a value for the R table of 0.361. Later testing will also show a good level of reliability with Cronbach's alpha value above 0.6 (table 12).

Table 12. Pilot Test Validity & Reliability Test Results

Items	Indicators	R _{Calculate}	Cronbach's Alpha	Status
Quality of Information	INQ1	0,837	0,913	Fulfilled
	INQ2	0,926		
	INQ3	0,913		
	INQ4	0,898		
System Quality	SYQ1	0,822	0,728	Fulfilled
	SYQ2	0,781		
	SYQ3	0,821		
Quality of Service	SEQ1	0,905	0,902	Fulfilled
	SEQ2	0,901		
	SEQ3	0,775		
	SEQ4	0,931		
Use	U1.1	0,809	0,639	Fulfilled
	U1.2	0,871		
	U2	0,585		
User Satisfaction	US1	0,899	0,911	Fulfilled
	US2	0,941		
	US3	0,834		
	US4	0,879		
Net Benefits	NB1	0,974	0,925	Fulfilled
	NB2	0,962		

According to the results of testing the validity and reliability of the research instrument, all indicators and variables show valid and reliable results. So that the questionnaire in this study can be used to collect research data.

B. Respondents Classification

The classification of respondents in this study consisted of gender (table 13), semester (table 14), and study program (table 15).

Table 13. Respondents gender classification

Respondents gender classification		
<i>Respondents of Classification</i>	<i>Respondents</i>	<i>Percent of Respondents</i>
Males	32	32%
Female	68	68%
Total	100	100%

In table 14, respondents were male as much as 32%. Meanwhile, 68% of respondents were female. It was concluded that the largest number of respondents based on gender were women.

Table 14. Respondents semester classification

Respondents semester classification		
<i>Respondents of Classification</i>	<i>Respondents</i>	<i>Percent of Respondents</i>
Semester 2	28	28%
Semester 4	19	19%
Semester 6	39	39%
Semester 8	13	13%
Semester 10	1	1%
Total	100	100%

In table 15, it is explained that the largest number of respondents came from Semester 6, namely 39 people. In second place were respondents from Semester 2 with a total of 28 respondents. Ranked third in Semester 4 with a total of 19 respondents. In fourth place in Semester 8 with 13 respondents. And in the final ranking of Semester 10 with the number of respondents being 1 person.

Table 15. Respondents Study Programs Classification

Respondents Study Programs Classification		
<i>Respondents of Classification</i>	<i>Respondents</i>	<i>Percent of Respondents</i>
Sharia Economics	14	14%
Sharia Economic Law	21	21%
Islamic Education Management	27	27%
Islamic Education	17	17%
Early Childhood Islamic Education	17	17%
Sharia Banking	2	2%
Tadris English	2	2%
Total	100	100%

The demographics of the study program are only to ensure that the entire sample has been met and has been representative of each population. The demographics of the study program are based on the proportion of samples obtained from a portion of the population.

C. Descriptive Analysis Results

The success of the SIAKAD system in this study is measured based on the results of descriptive analysis using the provision of interval 4 levels of measurement scale with interval formula [7] (table 16).

$$interval = \frac{Highest\ score - Lowest\ score}{Number\ of\ Categories} \quad (5)$$

Table 16. System Success Categories

No	Category	Score
1	Very Not Good	1,00 – 1,75
2	Not Good	>1.75 – 2.50
3	Good	>2.50 – 3.25
4	Excellent	>3.25 – 4.00

Descriptive analysis shows variables, indicators, amount of data, percentage of respondents' answers, mean, and Standard Deviation (SD) values (table 17).

Table 17. Descriptive Analysis Results

Variables	N	Mean	SD
Quality of Information	100	3,333	0,536
System Quality	100	0,728	0,612
Quality of Service	100	0,902	0,638
Use	100	0,639	0,766
User Satisfaction	100	3,130	0,551
Net Benefits	100	0,925	0,586

In table 17 it is explained that according to user perception, System; Service Quality, Use and User Satisfaction from the implementation of SIAKAD is included in the good category because it has a value of average above 2.50. Then the Net Benefits and Information Quality of SIAKAD implementation are included in the very good category because they have an average value above 3.25. Thus, it can be concluded that the condition of successful implementation of SIAKAD is considered good for success in terms of technical and effectiveness, then for success in terms of semantics it is considered very good because it has an average value above 3.25.

D. Measurement Model Results (Outer Model)

After conducting descriptive analysis, the test continued using the SEM-PLS method through two testing phases, specifically testing the structural model (inner model) and measurement model (outer model). Tests for reliability, discriminant validity, and convergence must all be performed during the testing phase of the measurement model (outer model).

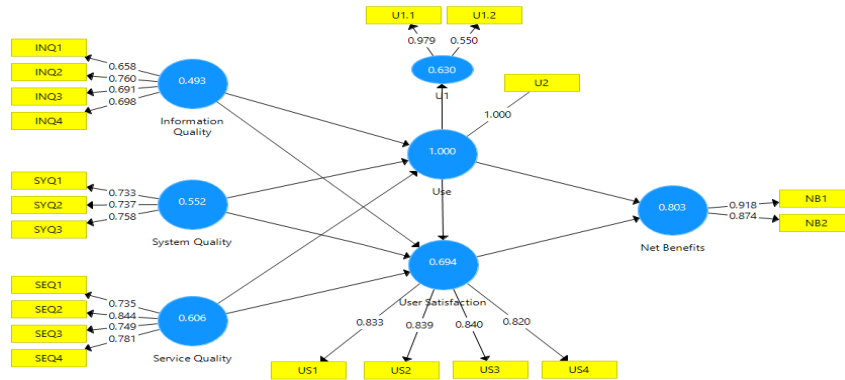


Fig 5. Outer Research Model

a. Convergent Validity

When performing the convergent validity test, two factors are taken into consideration: the Loading Factor; Average Variance Extracted (AVE) value. To be deemed valid, a study must satisfy convergent validity requirements and have a loading factor greater than 0.7 (Loading Factor > 0.7) [24],[25],[26],[27]. However, according to Ghozali & Latan (2015), a Loading Factor of 0.5 – 0.6 is still acceptable and the indicator can be said to be valid [28],[10]. This study used a Loading Factor value of 0.5. Then according to Ghozali & Latan (2015) for the recommended Average Variance Extracted (AVE) value above 0.5 (AVE > 0.5) [29],[26],[27],[30]. Convergent validity test results demonstrate that every variable has an AVE value above 0.5 and every indicator acquired a Loading Factor value above 0.5. As a result, the convergent validity values of each construct are valid (figure 5).

b. Discriminant Validity

Discriminant validity compares each Square Root of Average Variance Extracted (AVE) in Cross Loading where the construct value formed in each variable must be greater than the construct value of the other variables [27]. If each construct's AVE root value is higher than the realtion between that construct and the other constructs in the model, then the discriminant validity of the model is good [27],[31]. Testing of AVE root values in SmartPLS can be seen in the Fornell-Larcker Criterion test results. The value of AVE root in each variable has an AVE root value larger than the realtion between constructs and other constructs, as demonstrated by the Fornell-Larcker Criterion test results. Consequently, it can be said that each variable's cross loading value is legitimate and has a high degree of discriminant validity (table 18).

Table 18. Discriminant Validity Test Results (Fornell-Larcker Criterion)

	U.S.	INQ	SEQ	SYQ	NB	U	U1
U.S.	0,833						
INQ	0,612	0,702					
SEQ	0,570	0,441	0,778				
SYQ	0,639	0,461	0,587	0,743			
NB	0,737	0,564	0,548	0,582	0,896		
U	0,404	0,515	0,449	0,452	0,468	1,000	
U1	0,410	0,223	0,450	0,461	0,275	0,437	0,794

c. Reliability

The reliability test is carried out by looking at Cronbach's Alpha value and Composite Reliability value. However, according to Ghazali & Latan, when assessing a construct's reliability, it is more prudent to use Composite Reliability and the Rule of Thumb; the Composite Reliability value needs to be higher than 0.7 [27],[30],[32],[8]. Using Cronbach's Alpha will result in a lower value (under estimate) [25]. So, this study only uses the Composite Reliability value. The reliability test results demonstrate that every variable has a Composite Reliability value higher than 0.7. Thus, the conclusion is that the using of research instruments are proven to be reliable and in accordance with measurement standards so that they are declared reliable (table 19).

Table 19. Test Results Reliability (*Composite Reliability*)

Variable	Composite Reliability	Information
Quality of Information	0,901	Reliable
Net Benefits	0,795	Reliable
Quality of Service	0,860	Reliable
System Quality	0,787	Reliable
Use	0,891	Reliable
User Satisfaction	1,000	Reliable

E. Structural Model (Inner Model)

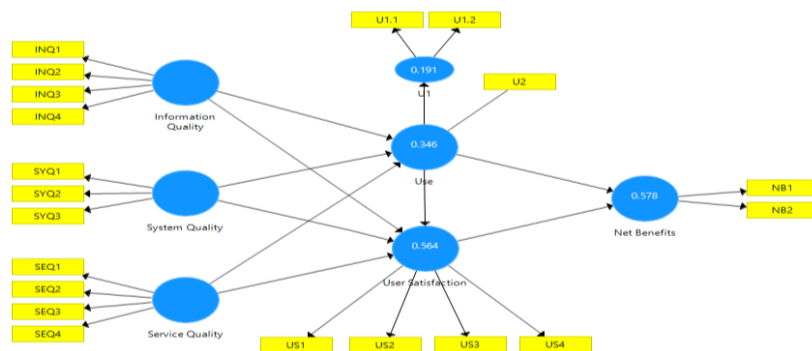


Fig 6. Inner Research Model

At the stage of testing the structural model (inner model) there are two components that become criteria in testing the model, namely, the R-Square value and the significance value [23] (fig 6). The significance value in this study is included in the results of the testing's hypothesis.

a. R-Square

The amount of the independent's influence variable on the reliant variable is indicated by the value of the R-square. Based on the R-square value, there are three categories of grouping: strong, moderate, and weak categories. If the R-square value is 0.75, it falls into the strong category; if it is 0.50, It belongs to the moderate category; and if it is 0.25, it falls into the weak category [25],[31]. The R-square value's result test (figure 6) prove that the Usage variable has an R-Square value of 0.346 and the User Satisfaction variable has a R-Square value of 0.564 which means that the diversity of Use and User Satisfaction can be explained by Information; System; Service Quality, with percentages of 34.6% and 56.4% so that the conclusion is that the structural model test results of Usage and Satisfaction are included in the Moderate category. Then the Benefit of Net variable has an R-Square value of 0.578 which means that the diversity of Net Benefits can be explained by User Satisfaction and Usage, with a percentage of 57.8% so that the conclusion is that the structural model test results of the Net Benefit variable are included in the Moderate category.

b. Hypothesis Testing Results

Hypothesis testing is the final stage of this study. This testing is to find out whether or not the research hypothesis used is accepted. The results of hypothesis testing are seen from the level of significance of between variables' relationship. The level of significance in this study was obtained from the bootstrapping result and the type of test used (two - tiled) with a t-statistic value of 1.96 and a significance level of 5% (0.05) [25],[33]. Then after knowing the significance of the relationship between variables, next to measures whether a hypothesis is accepted or rejected. by looking at the p-value. At significance $\alpha = 5\%$ or 0.05 if the p-value is less than 0.05 ($p\text{-value} < 0.05$) the hypothesis is accepted; if not, then it is rejected [27],[32],[33]. The hypothesis testing's results proved that there were 3 accepted hypotheses and 6 rejected hypotheses (table 20).

Table 20. Hypothesis Testing Results

	Hypothesis	T-statistics	P-values	Information
H1	Quality of Information → Use	3,775	0,00	Accepted
H2	Quality of Information → User Satisfaction	3,946	0,00	Accepted
H3	System Quality → Use	1,406	0,16	Rejected
H4	System Quality → User Satisfaction	3,876	0,00	Accepted
H5	Quality of Service → Use	1,667	0,16	Rejected
H6	Quality of Service → User Satisfaction	2,535	0,01	Accepted
H7	Use → User Satisfaction	0,580	0,62	Rejected
H8	Use → Net Benefits	3,033	0,00	Accepted
H9	User Satisfaction → Net Benefits	11,344	0,00	Accepted

Based on table 20 that User satisfaction is largely influenced with information quality, which is followed by system and service quality in terms of user satisfaction as well as Usage and User Satisfaction also have an influence that is significant on Net Benefits with a t-static value higher

than 1.96 and a p-value below 0.05. So the conclusion is that H1, H2, H4, H6, H8, and H9 are accepted and these results are in line with research. While System Quality and Service Quality do not have an effect that is significant on Usage, Usage does not have a significant effect on Net Benefits with the T-Statistic value is below 1.96 and the P-value is above 0.05. So it can be concluded that H3, H5, and H7 are rejected and these results are in line with research [6].

F. Research Results

According to the results of descriptive analysis and SEM-PLS analysis's results in this study, it was found that, Usage is a variable that has the lowest value of average and has an influence that is insignificant on User Satisfaction, System and Service Quality have an influence on Usage that is insignificant as well. Therefore, SIAKAD managers or developers must make System Quality and Service Quality a top priority to improve their performance. Because the Quality of Services provided related to SIAKAD has a strong influence on the level of SIAKAD Usage and System Quality is one of the determining factors for SIAKAD user satisfaction. This outcome is consistent with the findings of research by DeLone and McLean (2016) which states that quality of service is the main determinant of the success of information systems in the eyes of users [6].

IV. CONCLUSION

The 9 hypotheses in this research, there are 6 hypotheses that are accepted as having a significant relationship, namely the Information relationship; System; Service Quality on User Satisfaction and Net Benefits, as well as the relationship between Information Quality variables on Use and Use on Net Benefits. Meanwhile, the 3 rejected hypotheses had an insignificant relationship, namely the relationship between the System Quality variable, Service Quality and Usage and the Usage variable with User Satisfaction. According to user perception, the success of SIAKAD from a technical and effectiveness perspective needs to be further improved, while success from a semantic perspective is considered to be very good.

It can be seen from the results of the analysis that, Usage is the variable that has the lowest average value and has an insignificant influence on User and System Satisfaction; Service quality. Therefore, SIAKAD managers or developers must create a system; Service quality is a top priority to improve performance. Because the quality of services provided related to SIAKAD has a strong influence on the level of SIAKAD usage and system quality is one of the determining factors for SIAKAD user satisfaction. Then in the next research it is recommended to use other information system evaluation models and include lecturers as the research population. In this way, the research results can be compared and can be used as a reference for further research.

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