User Satisfaction Evaluation of E-Learning as a Learning System at Heritage School

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Abstract— This study examines the effectiveness of using E-learning in Heritage school. In education, the issue of using information and communication technologies for teaching and learning is of great importance. This study will provide a literature review and scientific background to the study by reviewing the impact of E-learning, particularly its use in teaching and learning in education. At the moment, the school is using an E-learning system called Learning Management System. This study will analyze the user's satisfaction for the information quality, system quality, service quality, and its use, by using the PLS-SEM application. The results of this study will determine if the user's are satisfied and if the system needs to be improved.

Keywords— *E-Learning, Information Quality, System Quality, Service Quality, Use, User Satisfaction*

I. INTRODUCTION

The growth of education is a top priority that is the root of the problem that must be addressed. Education has an important role in realizing and providing human resources as a figure of the growth rate of development for the country. The development of technology and science has a strong relationship with the growth of education, due to advancing science and technology [1].

Development in the regular education sector is to create education and educational resources that must be carried out systematically and continuously, in order to produce maximum results. And also the role of the private sector and the government in taking their time to prepare the means for educational growth. One of the tools used is the Learning Management System (LMS), which can help users manage, create, and distribute educational materials [2].

The high understanding of the importance of education causes people to try to become quality human resources. This situation has led to many educational institutions such as schools, which provide education for the community. This situation has led to the interest of the public, such as students, the importance of education because many other enthusiasts have decided to add to their educational knowledge. Because of this, the growth of education is increasing rapidly so as to increase competition [1].

With high competition among schools, it is challenging and time consuming to find solutions to repair or improve facilities. If a school cannot find a solution, then the school will experience setbacks or fail to compete with other schools. Consumers can leave the school and look for another school. Therefore, Heritage school must be able to provide quality facilities to users. Quality describes something that is shown by the Heritage School, to retain users and user loyalty. The level of user satisfaction with a quality can determine the success of the Heritage School. Quality that can satisfy users requires a good management system. Heritage School is obliged to always try their best to improve or improve the quality of their facilities [1].

II. WRITING LAYOUT

A. Customer Satisfaction

Satisfaction is an emotional state, their post-purchase reactions can be anger, dissatisfaction, annoyance, neutrality, excitement and excitement. Satisfaction is influenced by the comparison of services received with expected services, as well as the customer's short-term emotional reactions to the provision of certain services [3].

Indicators to measure customer satisfaction are:

1. Service quality is as expected.
2. Satisfaction with similar products.
3. No complains.

B. Information System Concept

A system can be understood as a series of procedures, methods and work methods carried out in order to achieve certain goals or objectives. And information is a form of data that has undergone a document completion process to have a certain function. And data is raw information that needs to be processed or recorded if you want to use it. How and what kind of data will be needed, it all depends on the form, needs and desires of each organization [4].

C. Knowledge Management

Knowledge Management (KM) can be defined as the process of implementing an approach to help capture, organize, manage, and disseminate knowledge. Knowledge Management (KM) is important for today's organizations, because it can help speed up the work of the organization's employees, and also informs the organization what actions should be taken to be able to perform best practices in solving problems or increasing its competitiveness. In taking action for the benefit of the organization, the organizations themselves must know what they have and what they must do. This term is called knowledge. This term is important for organizations to effectively and efficiently use their resources and all the information they have [5].

A good Knowledge Management practice is when organizations can capture, store, and use that knowledge and convert it into value that they can use to their advantage, manage their risks, and also generate something new [6].

D. E-Learning

E-learning is a form of distance learning using a computer network and does not require face-to-face meetings. The teaching process is equipped with communication, monitoring and evaluation functions. It is defined as teaching and learning activities that are supported and developed with the help of technology and digital media and are included in distance learning methods [7].

E. DeLone and McLean Model

DeLone and McLean's model is one of the most well-known models for evaluating IS success in terms of technology adoption and outcomes [8]. The

original model, which was proposed in 1992, consists of six different, interrelated, and interdependent success factors, namely, *system quality, information quality, use, user satisfaction, individual impact, and organizational impact.* The figure below, shows the original DeLone and McLean model that was developed in 1992.

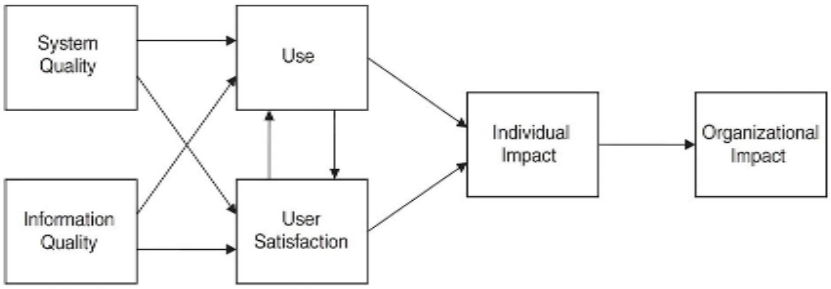

Figure 1. DeLone & McLean Model (Original).

Many scholars have extended and refined the original D&M model or have offered relevant criticisms. They argue that the original model devised in 1992 required incorporating more factors than necessary and that suitable alternatives exist. DeLone and McLean reviewed the criticisms and analyzed the many contributions from the field, then proposed an updated model. The updated version adds *intention to use* and *service quality* variable and replaces *individual impact* and *organizational impact* variable in the original model with *net benefits* variable. The figure below, shows the updated DeLone and McLean model [9].

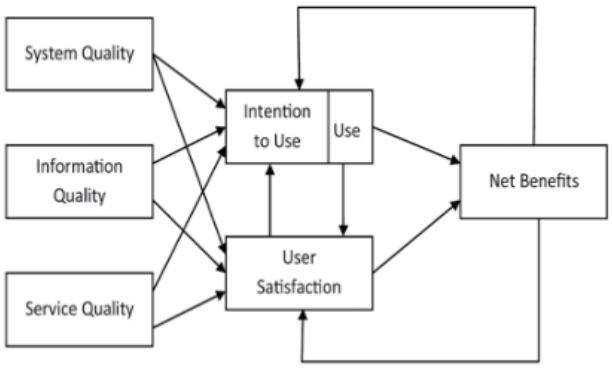

Figure 2. DeLone & McLean Model (Updated).

F. Information Quality

Information Quality refers to the performance of the information system, the quality of the information focuses on the information produced by a system [9].

G. System Quality

System Quality can measure the characteristics of the information system itself, the better the system, the higher the quality of the information produced for user needs [9].

H. Service Quality

Service Quality means the quality of support that users receive from the system being used [9]

I. Use

Use is the way users use information system functions to meet user needs [9].

J. User Satisfaction

User Satisfaction is an assessment of user experience in using information systems. If the user is satisfied, this will affect the intention to reuse the system [9].

K. Previous Research

Research or studies that are thematically and methodologically relevant can be presented together with the studies of other researchers. Prior research is important research that contributes to ongoing research and clarifies the position. Related studies present the results of previous studies related to this study [10]. The purpose of a literature review is to review and monitor previous studies or research related to the phenomenon or problem being studied. The literature review helps provide a comparative understanding of the phenomenon under study with the same or similar previous results [11]. The table below contains the prior studies that have been studied.

Table 1.
Previous Research

No.	Researcher (Year)	Title	Method	Result
1.	Ade Mubarok, Noneng Tia Aprilia, Sari Susanti (2020)	Analisis Kepuasan Pengguna Layanan Google-Forms Sebagai Media Survey Online Menggunakan DeLone & McLean (https://ejournal.bsi.ac.id/ejurnal/index.php/ji/article/view/7967)	DeLone & McLean	To see the relationship between the variables on the satisfaction of Google Forms service users in the city of Bandung.
2.	Pujo Hari Saputro, Djoko Budiyanto, Joko Santoso. (2015)	Model Delone and Mclean Untuk Mengukur Kesuksesan E-Government Kota Pekalongan (http://e-journal.uajy.ac.id/15357/)	DeLone & McLean	With this model, it is hoped that the components that support or hinder the use of E-government can be identified, so that in the future it is hoped that this can become evaluation material for improvement.
3.	Ruth Johana Angelina, Aji Hermawan, Arif Imam Suroso. (2019)	Analyzing E-Commerce Success using DeLone and McLean Model (https://garuda.kemdikbud.go.id/documents/detail/1202426)	DeLone & McLean	This study aims to analyze the relationship between system quality, information quality and service quality on user satisfaction and usage. In addition, this study aims to analyze the relationship between

				user satisfaction and usage on net benefits.
4.	Winarso D, Arribe E, Rahmayuni S. (2019)	Analisis Kesusksesan Sistem Informasi Akademik (SIAM) Menggunakan Metode DeLone dan McLean (https://ejurnal.umri.ac.id/index.php/JIK/article/view/1414)	DeLone & McLean	To determine the success rate of implementation SIAM and to find out the variables that affect user satisfaction and usage. It is necessary to analyze the successful implementation of SIAM using the Delone and Mclean methods.

III. METHODOLOGY

A. Time and Location

This research will begin with questionnaires using a Likert scale. Questionnaires - these questionnaires relate to information quality, system quality, service quality, use and user satisfaction.

B. Procedure

This questionnaire was designed using Google Doc, and then distributed via the WhatsApp application. Questionnaires will be distributed to 121 LMS users in school. As a result of distributing the questionnaires, 121 respondents were collected.

C. Questionnaire

The data collection process will be carried out based on the DeLone and McLean models, and using quantitative methods using a Likert Scale, which is used to represent participants' levels of agreement to each statements [12]. How to collect respondent data will be carried out through a questionnaire that will be given to users who interact directly with the LMS system. The tables below contains the hypothesis generated to achieve the objectives in this study and variables along with their indicators.

Table 2.
Hypothesis table

H1	→	"Information Quality" has a positive impact on "use"
H2	→	"Information Quality" has a positive impact on "user satisfaction"
H3	→	"System Quality" has a positive impact on "use"
H4	→	"System Quality" has a positive influence on "user satisfaction"
H5	→	"Service Quality" has a positive impact on "use"
H6	→	"Service Quality" has a positive impact on "user satisfaction"
H7	→	"Use" has a positive impact on "user satisfaction"

Table 3.
Variables and Indicators

No.	Variable	Indicator	Code	Description
1.	Information Quality	Complete information	IQ1	The information provided by the LMS was complete.
		Information that is relevant and facilitate the needs	IQ2	The information provided by the LMS was appropriate and exact.
2.	System Quality	User-friendly	SS1	The level of ease of use of the LMS.
		Response time	SS2	Accuracy level when delivering information on the LMS.
		Reliability	SS3	Users can rely on the LMS without any problems (errors) that may occur in the system.
3.	Service Quality	Responsive	SQ1	Appropriateness of the information needed can be received properly.
		Assurance	SQ2	Feeling safe and comfortable when sending and receiving data in the LMS.
4.	Use	Daily use	U1	Using the LMS for each users' needs.
		High frequency of use	U2	How often the LMS is used.
5.	User Satisfaction	Information satisfaction	US1	Level of satisfaction obtained through the LMS.
		Meet expectations	US2	Data and information obtained from the LMS has reached users' expectations.
		Overall satisfaction	US3	Overall satisfaction when using the LMS.

IV. RESULTS AND DISCUSSION

Of the 121 respondents who filled out the questionnaire described below, which are divided into three characteristics.

1. Status → The status of the respondents is divided into two parts, namely 24 teachers (Red) and 97 students (Blue).

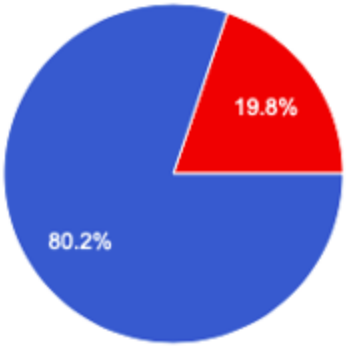

Figure 3. Status of the respondents.

2. Gender → The gender of the respondents is divided into two parts, 61 men (Red) and 60 women (Blue).

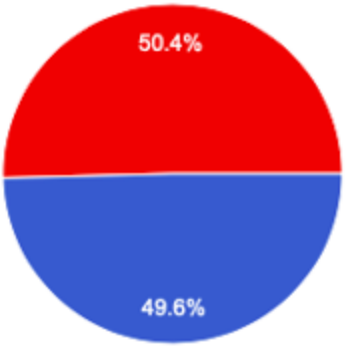

Figure 4. Gender of the respondents.

3. Age → The ages of the respondents were distributed into seven sections, namely ages 5-12 as many as 52 people, 13-15 years as many as 26 people, 16-19 as many as 19 people, 22-29 as many as 6 people, 30-39 as many as 11 people, 40-49 as many as 6 people and 50 years and over as much as 1 person.

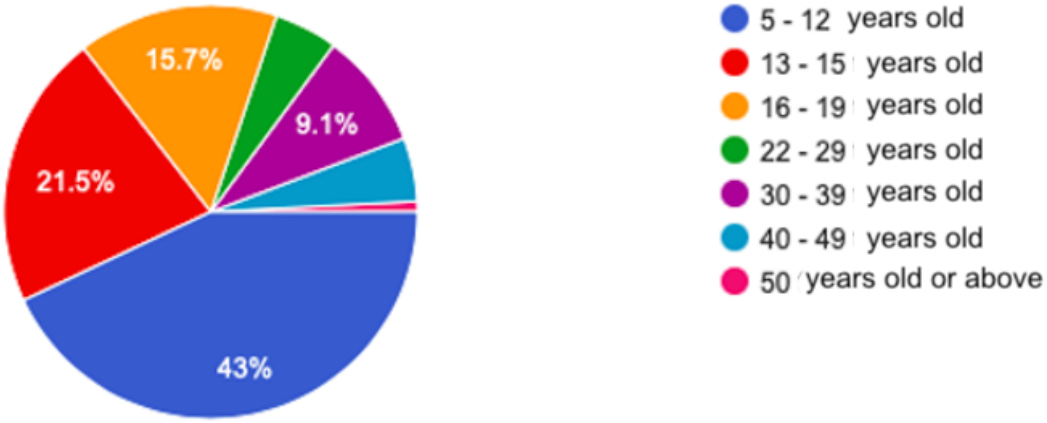

Figure 5. Age of the respondents.

4. Level → The levels of the respondents were distributed into three parts, namely the SD level of 69 people, the SMP level of 34 people, and the SMA level of 41 people.

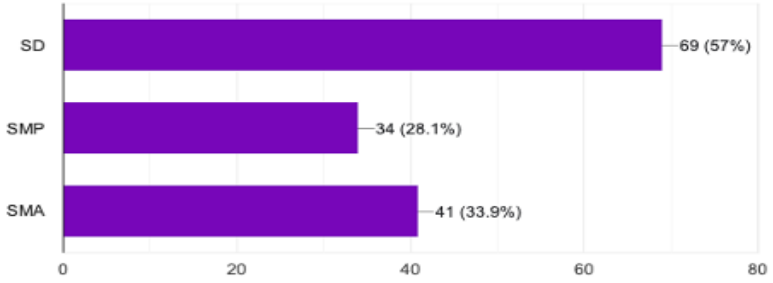

Figure 6. Level of the respondents.

A. Outer Model

In variant-based SEM models or PLS-Path Modelins, there is what is called the Outer Model. The Outer Model is also known as a measurement model which aims to determine the relationship between latent variables and their indicators. This test uses the PLS algorithm procedure. The analysis phase of the model is measured by validity and reliability tests [13]. There are 2 criteria for measuring validity, namely convergent validity and discriminatory validity. Convergent validity is a set of indicator indices that represent 1 latent variable. The magnitude of the convergence value is known from the load factor of each item. An indicator can be defined as meeting the convergence test if the value is above 0.7 [14]. According to the test results recorded in 'Table 5', it appears that all variable items have a value above 0.7. Therefore, variable items are declared valid to measure their respective structures. However, 3 indicators, namely SS2, SS3 and SQ1 were removed because they had values below 0.7. The indicators are deleted to ensure all indicators have a value above 0.7.). The tables below shows the before and after revision.

Table 4.
Outer Loading (before revision)

No.	Variable	Indicator	Code	AVE	Outer Loading	Validity
1.	Information Quality	Complete information	IQ1	0,781	0,891	Valid
		Information that is relevant and facilitate the needs	IQ2		0,877	Valid
2.	System Quality	User-friendly	SS1	0,388	0,923	Valid
		Response time	SS2		0,497	Invalid
		Reliability	SS3		0,252	Invalid
3.	Service Quality	Responsive	SQ1	0,634	0,565	Invalid
		Assurance	SQ2		0,974	Valid
4.	Use	Daily use	U1	0,671	0,803	Valid
		High frequency of use	U2		0,835	Valid
5.	User Satisfaction	Information satisfaction	US1	0,646	0,820	Valid
		Meet expectations	US2		0,757	Valid
		Overall satisfaction	US3		0.833	Valid

Table 5.
Outer Loading (after revision)

No.	Variable	Indicator	Code	AVE	Outer Loading	Validity
1.	Information Quality	Complete information	IQ1	0,781	0,891	Valid
		Information that is relevant and facilitate the needs	IQ2		0,876	Valid
2.	System Quality	User-friendly	SS1		1,000	Valid
3.	Service Quality	Responsive	SQ2		1,000	Valid
4.	Use	Daily use	U1	0,671	0,803	Valid
		High frequency of use	U2		0,835	Valid
5.	User Satisfaction	Information satisfaction	US1	0,647	0,824	Valid
		Meet expectations	US2		0,761	Valid
		Overall satisfaction	US3		0,826	Valid

The validity of discrimination is evaluated by cross-loading, and is done to ensure that each concept from each latent model is different from the other variables. Based on the results recorded in 'Table 6', it can be concluded that all variables individually show the highest correlation compared to the correlation of other variables.

Table 6.
Cross - Loading

	Information Quality	System Quality	Service Quality	Use	User Satisfaction
IQ1	**0,891**	0,240	0,207	0,440	0,410
IQ2	**0,876**	0,310	0,421	0,353	0,446
SS1	0,310	**1,000**	0,222	0,233	0,382
SQ2	0,352	0,222	**1,000**	0,511	0,507
U1	0,456	0,197	0,420	**0,803**	0,386
U2	0,289	0,186	0,418	**0,835**	0,550
US1	0,462	0,351	0,440	0,449	**0,824**
US2	0,260	0,275	0,340	0,386	**0,761**
US3	0,418	0,291	0,433	0,539	**0,826**

From the results of the cross loading estimation calculation presented above, it can be concluded that all variables individually show the highest correlation compared to the correlation of other variables. Thus, in the case of this research, the requirements for the validity of the distinction are fulfilled.

Another test consists in evaluating the external model by looking at the reliability of latent variables, measured against two criteria, namely Cronbach's alpha from the indicator block measuring variable and Composite Reliability.

Table 7.
Cronbach's Alpha dan Composite Reliability

	Cronbach's Alpha	Composite Reliability
Information Quality	0,719	0,877
Use	0,511	0,803
User Satisfaction	0,729	0,846

The results above in 'Table 7' show that the value of Cronbach's alpha and composite reliability of all variables is greater than 0.7 except for "Use" (0.511).

B. Inner Model

The Inner Model visualizes a relationship between latent variables based on substantive theory. Evaluation of the internal model can be done by looking at the structural model which consists of hypotheses between the latent variables of the research model [13]. Using the bootstrap procedure in SmartPLS, standard error, path coefficient and T-statistics can be obtained. The author can also evaluate the statistical significance of the research model by testing the hypotheses for each path of relationship [15]. The coefficients for each hypothetical path and the T-statistic values obtained from the SmartPLS output are shown in 'Table 8'.

Table 8.
Path coefficients dan T - Statistic

	Original Sample	Sample Mean	Standard Deviation	T - Statistics	P Values
Information Quality→Use	0,294	0,296	0,078	3,794	0,000
Information Quality→User Satisfaction	0,197	0,200	0,089	2,222	0,026
System Quality→Use	0,395	0,394	0,074	5,379	0,000
System Quality→User Satisfaction	0,229	0,223	0,078	2,924	0,003
Service Quality→Use	0,054	0,054	0,104	0,521	0,603
Service Quality→User Satisfaction	0,195	0,197	0,072	2,716	0,007
Use→User Satisfaction	0,324	0,329	0,090	3,608	0,000

Hypothesis test:

- H1 → "*Information Quality*", based on "*Use*" gives a path coefficient value of 0.294 and a T-statistic value of 3,794 which means it is less significant with a P-value of 0.000 (T-statistic > T-table 1.64). Thus H1 has been proven practically and declared rejected.
- H2 → "*Information Quality*", based on "User Satisfaction" gives a path coefficient value of 0.222 and a T-statistic value of 2,222 which means it is less significant with a P-value of 0.026 (T-statistic > T-table 1.64). Thus H2 has been proven practically and can be accepted.

- H3 →"*System Quality*", based on "*Use*" gives a path coefficient value of 0.395 and a T-statistic value of 5,379 which means it is significant with a P-value of 0.000 (T-statistic > T-table 1.64). Thus H3 has been proven practically and can be accepted.
- H4 →"*System Quality*", based on "User Satisfaction" gives a path coefficient value of -0.229 and a T-statistic value of 2,924 which means it is less significant with a P-value of 0.003 (T-statistic > T-table 1.64). Thus H4 has been proven practically and can be accepted.
- H5 →"*Service Quality*", based on "Use" gives a path coefficient value of 0.054 and a T-statistic value of 0,521 which means it is less significant with a P-value of 0.603 (T-statistic > T-table 1.64). Thus H5 has been proven practically and declared rejected.
- H6 →"*Service Quality*", based on "User Satisfaction" gives a path coefficient value of 0.195 and a T-statistic value of 2.716 which means it is less significant with a P-value of 0.007 (T-statistic > T-table 1.64). Thus H6 has been proven practically and can be accepted.
- H7 →"*Use*", based on "*User Satisfaction*" gives a path coefficient value of 0.324 and a T-statistic value of 3,608 which means it is significant with a P-value of 0.000 (T-statistic > T-table 1.64). Thus H7 has been proven practically and can be accepted.

Based on the results of the above analysis, below are recommendations for improving the system:

- *Information Quality* of the information system is running well. This proves that information systems play a large role in supporting needs. Improvement in this aspect can be done with a system that provides accurate and clear information, as well as guarantees that the information is up to date.
- *System Quality* of the information system is running well. This proves that the information system has worked well in supporting user activities. To improve the system, information system reliability can be increased so that unwanted obstacles do not occur when users are using the system. Response time can also be increased so that user activity is not hampered.
- *Service Quality* needs to be improved based on aspects of Use and User Satisfaction. Information system response time needs to be increased so that users do not need to take long to meet their needs. Things to improve are by updating the system server and system security. Data and information privacy also needs to be improved so that no leaks occur when users send and receive information.
- The *use* aspect of the information system *User Satisfaction* is good. This proves that the expectations of the organization and the users are achieved, so that the users feel satisfied or quite satisfied when using the information system. Things that can be done to make improvements are to update the interface so that the appearance of the user interface can be more attractive and more user friendly.

The following figure is an SmartPLS output image for the research model which shows how much influence the independent variables have on the dependent variable. The following below is the image output from the SmartPLS application, which shows the impact of the independent variable on the dependent variable.

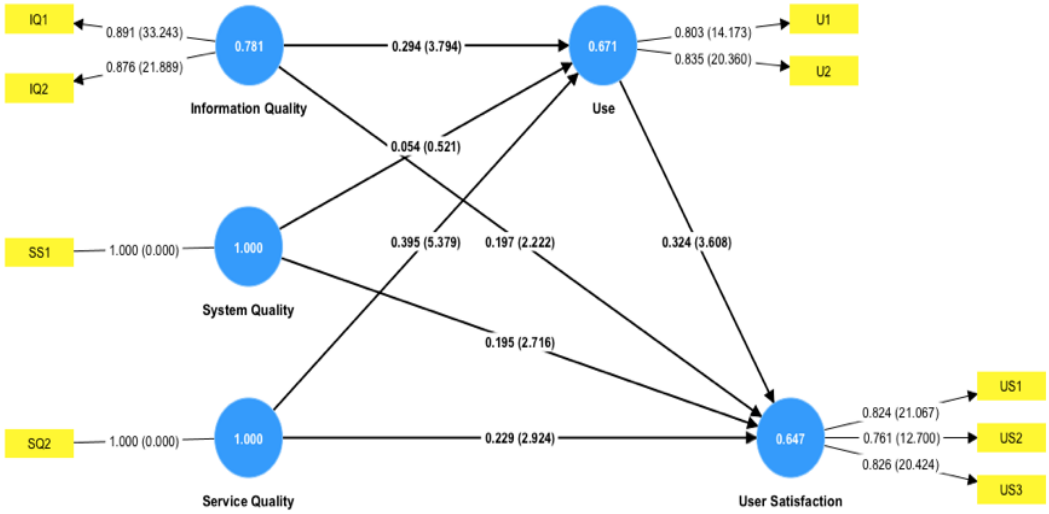

Figure 7. Output Research Model via SmartPLS.

V. CONCLUSION

The analysis above was carried out to determine the relationship model between factors. The results of structural equation modelling (SEM), show that all the relationship between each variables are acceptable except one relationship, and that is *Service Quality* with *Use* which is declared unacceptable.

It is hoped that researchers can consult with the school admin/IT team when building/improving project information systems, the school admin/IT team also needs to pay attention to critical issues such as user needs and school needs and be more thorough and detailed when evaluating and improving the system.

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