Improving Academic Services Based on Management Information Systems at the SMPIT Khairul Imam Medan

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Abstract. This study aims to determine the improvement and effectiveness of management information system-based academic services at SMPIT Khairul Imam Medan. The design used in the research is planning, implementation, observation, and reflection. Improvements in academic services can be proven from the results of initial observations which were originally carried out conventionally with an achievement of 1.4 with the unfeasible category, then improvements were made by applying technology through cycle 1 to cycle 2 and the results of receiving academic services increased to 4.20 with a very decent category . Through these two stages of the cycle, an increase of 56% was obtained from the original condition. Next, the average n-gain score reached 0.7 or the equivalent of 66.7% which was categorized as quite effective, so it can be concluded that the management information system is quite effective in improving academic services at SMPIT Khairul Imam.

Keywords: Academic Services, Management Information Systems.

1 Introduction

Parents today must be critical in choosing schools for their children, ranging from schools with national standards to international standards (cooperation schools). Data from the Ministry of Education and Culture shows that the total number of education units in North Sumatra reaches 17,272 schools for elementary, junior high, high school and vocational school levels, of which the junior high level equivalent consists of 3,803 schools [1]. For the city of Medan, the junior high school level has reached 482 schools consisting of 48 schools with state status and 434 schools with private status. The large number of educational units makes the competition between educational institutions increasingly tight so that it requires leaders to innovate so that their institutions can survive in the current technological era. The operational system that has been carried out conventionally, sooner or later must change to a technology-based system. This change is not something that is difficult for the community to accept, because almost all circles of society have been side by side with technology. This can be seen from the results of the national socio-economic survey data in 2019. The data explains that the average population of North Sumatra aged 5 years and over in the use of cellular phones is 80.08% with details of 83.94% in urban areas and 75.43% in rural areas. Then, the average population of North Sumatra who owns a cellular phone is 60.66%, with details of 67.58% in urban areas and 52.33% in rural

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areas. Meanwhile, the average population of North Sumatra who uses a computer (PC/desktop, laptop/notebook, and tablet) is 14.17% with details of 18.60% in urban areas and 8.84% in rural areas [2].

The data shows that more than 50% of people who use and have cellular phones, especially in North Sumatra, both in urban and rural areas and 14.17% of people who use computers are still dominated in urban areas. In addition, most people have also used internet network access. As recorded in the data from the Central Statistics Agency of North Sumatra in 2019 that the average child aged 5 years and over using internet access is 41.38% of which 50.80% are residents in urban areas and 30.04% are residents in rural areas [2].

The average internet network access user in urban communities is more than 50% and rural communities reach 30%, meaning that our society is no longer familiar with the use of internet-based technology. If you have used technology followed by internet access, then people can easily obtain information from various parts of the world so that technology and internet networks become a necessity in society and technological advances make people able to adapt so they are not outdated.

The use of technology in the field of education has been widely applied, for example the Basic Education Data Application, e-Raport, Continuous Professional Development Management Information System, Computer Based National Examination, and others. This application has been integrated with the Ministry of Education and Culture, only internal. This means that it cannot be accessed by the public, it can only be accessed by school operators and teachers. This system is very helpful for schools, especially in collecting data needed by the Ministry of Education and Culture. In addition, these systems are also used to improve services to all existing educational units.

The application provided by the Ministry of Education and Culture has not been able to fully meet the needs of education unit services to the public using education services, especially private schools. Such as the SMPIT Khairul Imam which currently still performs conventional academic services such as: acceptance of new students, provision of learning materials, subject roster, academic calendar, classroom data, student data, alumni data, educator data, and others. Services in this field are provided in the form of applications or websites that are managed by the ministry of education and culture, but can only be accessed and known by the school's internal parties. Therefore, private schools must plan and provide their own other academic services that are still needed, especially those that can be accessed by the community and become an attraction (promotion).

Academic services such as acceptance of new students, teaching and learning activities and the provision of other academic information is one of the most important services today. In accordance with the instructions of the Minister of Education and Culture that the registration of new student admissions at the Kindergarten, Elementary, Junior High, High School and Vocational Schools for the 2020/2021 academic year is carried out online or this system is always referred to as online [3]. In line with this regulation, it was followed by a circular letter from the ministry of education and culture number 4 of 2020 stating that the educational process must be carried out from home [4], then it was conveyed again in its circular letter number 15 of 2020 regarding guidelines for organizing learning from home when coronavirus disease 2019 (COVID-19) [5].

The academic services that will be provided by SMPIT Khairul Imam are based on a management information system to improve services to students, parents, and the community.

Implementation of a management information system in an organization can provide optimal services to the community, especially in terms of providing useful information and is needed by the community [6]. In addition, the use of MIS has an influence on consumers, such as: attracting new consumers and retaining existing customers, lowering offers, providing better quality, appearance and service, and offering new products and services to service users [7].

Besides being able to provide optimal services, SIM can also minimize school operational costs and service users. Transferring data electronically from computer to computer between two different organizations will save costs and time because transactions can be sent from one information system to another through computer networks [7]. With minimum costs and time used, it really helps the community during the current COVID-19 period.

On the other hand, if an organization does not have a MIS, it can have effects such as (1) the organization continues to run, but for some executive or high-end customers, this facility brings its own satisfaction; (2) the organization concerned may go out of business in today's era of information globalization; (3) the organization concerned may lose its competitive advantage over other similar companies; (4) SIM does not make an important contribution to the creation of an efficient and effective work process, but its existence is needed as a medium for supporting administrative activities; (5) without a good driving license, the company will experience difficulties in carrying out its business activities; (6) without a sufficiently sophisticated SIM, it is difficult in this global competition to be able to compete with big companies from abroad who are starting to make a lot of profit in the country [8]. Then, today's service industries such as finance, insurance, and real estate, as well as personal services such as travel, medicine, and education cannot operate without information systems. [9]. Meanwhile, all complex and complex problems in learning, management, and social interactions that affect organizations or educational units, especially during the COVID-19 period, can be resolved through a management information system [10] and the use of management information systems is very effectively implemented as part of the management of the education unit [11] as well as many leaders who use management information systems to improve the efficiency of their agency's administrative work [12]. Therefore, SIM is a necessity that must be owned by an organization to be able to survive in today's technological era and continue to innovate in order to be able to improve the quality of organizational services.

Innovation is part of human nature which always wants to develop in a better direction, including in providing quality services. The process of educational innovation should start from the awareness of education unit actors, including education unit stakeholders in an effort to find solutions to problems related to the implementation of the educational process which is their responsibility.

2 Research Methods

Research design is the entire process needed in planning and implementing research [13]. Action research has a special research procedure. The procedure forms a spiral-like cycle consisting of planning, action, observation, and reflection [14]. This section will also describe the steps and processes in the form of details of the activities that will be carried out during the research. The design can be described as follows:

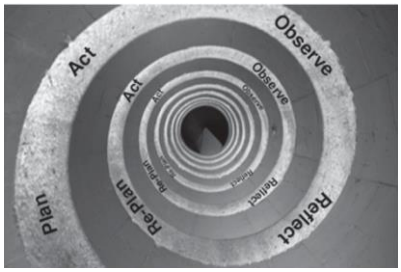

Fig. 1. Action research design [14].

The data analysis used in this study is the one sample t-test and the normalized gain test.

$$t = \frac{\bar{x}-\mu_0}{\frac{s}{\sqrt{n}}}, \text{[15]}. \quad (1)$$

Information:
$\bar{x}$ = Average x_i
μ_0 = Hypothesized value
s = Standard deviation
n = Number of sample members

$$\langle g \rangle \equiv \frac{\%\langle G \rangle}{\%\langle G \rangle_{max}} = \frac{\left(\%\langle S_f \rangle - \%\langle S_i \rangle\right)}{\left(100 - \%\langle S_i \rangle\right)}, \text{[16]} \quad (2)$$

nformation:
$\langle g \rangle$ = Avarage normalized gain
$\langle G \rangle$ = Avarage gain
$\langle S_f \rangle$ = Score final
$\langle S_i \rangle$ = Score initial

N-Gain Criteria:
$\langle g \rangle \geq 0.7$ = High
$0.7 > \langle g \rangle \geq 0.3$ = Middle
$\langle g \rangle < 0.3$ = Row

Then to calculate the percentage of service effectiveness, it can be measured as follows:

Table 1. Category of N-Gain effectiveness interpretation

No.	Percentage (%)	Interpretation
1.	< 40	Ineffective
2.	40 – 55	Less effective
3.	56 – 75	Effective enough
4.	> 76	Effective

3 Research Results and Discussion

Pre-cycle activities provide an overview of the initial conditions of SMPIT Khairul Imam in SIM-based academic services. Based on the observations obtained, it shows that SMPIT Khairul Imam does not yet have academic services based on management information systems. This can be seen from the results of the assessment in the 2019 quality report card as shown in the table below:

Table 2. Details of the quality report cards of SMPIT Khairul Imam in 2019

Standard/Indicator/Sub Indicator		Achievements 2017	Achievements 2018	Achievements 2019
Number	Standard/Indicator/Sub Indicator	Score	Score	Score
7.4.	Schools manage management information systems	2.04	2.04	2.04
7.4.1.	Have a management information system in accordance with the provisions	2.04	2.04	2.04

Source: SMPIT Khairul Imam quality report card for 2019

Table 3. Quality report achievement category

Category	Lower limit	Upper limit
Go to SNP 1	0	2.04
Go to SNP 2	2.05	3.7
Go to SNP 3	3.71	5.06
Go to SNP 4	5.07	6.66
SNP	6.67	7

Source: SMPIT Khairul Imam 2019 quality report card

Table 2 is a description of the condition of the Management Information System (SIM) of SMPIT Khairul Imam in 2019. With an acquisition value of 2.04, it shows that the SIM that should exist in every education unit, is in fact not yet available to provide academic services to students.

The development of information technology in the world of education has made everything can be done online, learning can be done with the Learning Management System (LMS), e-books, video conferencing, online new student admissions which are changes from outside the network. This information technology encourages the birth of other innovations, especially in services in educational units.

One of these services is applied in the academic field, as is the case at SMPIT Khairul Imam. Previously all academic services were carried out conventionally and offline because they did not have a driver's license in accordance with the findings of the researcher before starting the research. Then, research was conducted by applying SIM in an effort to improve academic services. The research was successfully carried out in 2 stages, namely cycle 1 and cycle 2.

The implementation of the first cycle begins with the planning of the school's collaboration with a private company, namely PT. Bumi Tekno Indonesia and Google. This collaboration aims to

improve academic services at SMPIT Khairul Imam. Collaboration is carried out by establishing cooperation with the two companies. This collaboration is in different fields in each company. For PT. Bumi Tekno Indonesia provides a SIM in the form of a school website, while Google provides an LMS for online learning activities at SMPIT Khairul Imam. In this first cycle, the successful collaboration was with PT. Earth Techno Indonesia. Then, to analyze this situation, the researcher observed the level of academic service provided by the school to students whether it was good or not.

The observations that have been made have obtained poor results from the implementation of 11 academic service indicators that were tested on 121 students. The average of each indicator is 2.60 or still in the less feasible category. The contributing factor is the large amount of academic service content provided by SMPIT Khairul Imam so it requires a lot of information and data to be published. Then the provision of LMS is constrained by the ability of researchers to use computer programming languages and foreign languages (English). In addition to this, another factor is also due to the lack of cooperation with LMS providers, namely collaborating with Google. Where this LMS is a medium that will be used for distance learning (PJJ). This collaboration has not been established because the school data information does not match the data at the ministry of education, as well as evidence of school accreditation there is a discrepancy in the name. For this reason, the researcher considers it necessary to do cycle 2 for improvements to the constraints that exist in cycle 1.

Furthermore, in cycle 2 the researchers began to complete incomplete information and data by inputting school profile data, teacher administration, academic calendar information, updating school news information, learning e-book data, syllabus data, new student admission information, data educators and education personnel, facility data, and student list data, as well as other academic related data and information. Then the researchers continued to collaborate with Google by registering SMPIT Khairul Imam on the website https://edu.google.com/, then getting a trial period of 14 days while waiting for the school data to be checked by Google.

The refusal of this collaboration occurred twice, so that re-registration for SMPIT Khairul Imam was not allowed or the case was closed. However, the researchers continued to communicate with Google so that in the end they provided a solution to improve school data at the ministry of education and culture and asked to improve the name of the school in the national accreditation body. All this data is sent to Google in the form of a URL to the Google Team email, so they can verify it's correct.

Finally, SMPIT Khairul Imam obtained approval to cooperate with Google so that schools have private LMS. This LMS facilitates each school member with a personal account with unlimited capacity and provides a variety of online-based learning services. So that the results of observations in cycle 2 obtained an average of 4.20 for each service indicator. The results of observations from each indicator increased by an average of 1.61. Comparison of observations in cycle 1 and cycle 2 can be seen in the table below.

Table 4. Quality report achievement category

No.		Indicator	Indicator	Cycle 1		Cycle 2		Delta
				Score	Average	Score	Average	
A	1	New Student Admission	Facilities/media for New Student Admission are available online.	2.95		3.76		
	2		Easy-to-understand media usage guide	2.99		3.97		
	3		Coloring on media content is very good	2.69	2.82	3.88	3.98	1.16
	4		Visual images (graphics) on the media are very good	2.62		3.44		
	5		Learning media can be run without damage	2.83		4.83		
B	1	Online learning	Facilities/media for distance learning are available.	2.70		4.31		
	2		Material according to the topic of discussion	2.60		4.53		
	3		Materials support the achievement of learning objectives	2.22		4.54		
	4		The material is in accordance with the current development of science and technology	2.82	2.62	4.36	4.32	1.70
	5		Presentation of material arranged in order (hierarchical)	2.64		4.07		
	6		Giving examples or illustrations that are easy to understand	2.54		4.40		
	7		The duration of use is in accordance with the material presented	2.83		4.04		
C	1	Graduation announcement	Easy to login	2.82		4.04		
	2		Value data and information provided is clear and correct	2.42		4.40		
	3		The results of the graduation announcement can be downloaded or printed	2.83	2.80	4.17	4.23	1.43
	4		Graduation announcement is published on time	3.12		4.30		
D	1	Graduate data	The personal data listed is easy to complete	2.40		4.28		
	2		The list of graduate names is easy to find	3.09	2.74	4.61	4.45	1.70

No.		Indicator	Indicator	Cycle 1		Cycle 2		Delta
				Score	Average	Score	Average	
			with the searching menu					
E	1	Teacher and Employee Data Collection	Teacher data is available and complete	2.61	2.61	4.18	4.03	1.42
	2		Employee data is available and complete	2.61		3.88		
F	1	School Identity	School profile is very complete	2.44	2.40	4.31	4.15	1.75
	2		The information listed is in accordance with school conditions	2.36		3.99		
G	1	Academic Calendar	The academic calendar can be accessed online through the school's website	2.92	2.50	4.24	4.19	1.69
	2		Information on national holidays available	2.28		4.17		
	3		Exam implementation information is available and appropriate	2.30		4.17		
H	1	Subject Roster	The subject roster can be accessed online through the school website	2.05	2.46	4.25	4.24	1.78
	2		Letters, numbers and symbols on the media are written clearly	2.87		4.22		
I	1	Teaching Administration	Availability of learning and teaching equipment	2.85	2.86	4.19	4.24	1.38
	2		Administrative documents can be downloaded	2.86		4.28		
J	1	School Information	All information about the school can be accessed through the website	2.66	2.49	4.26	4.18	1.69
	2		There are comments/input fields, and share links to social media	2.25		4.22		
	3		This media provides what students need	2.88		4.25		
	4		Easy to understand spelling and grammar	2.16		4.00		
K	1	School Documentation	The information system is equipped with documentation	2.22	2.27	4.26	4.25	1.98

No.	Indicator	Indicator	Cycle 1		Cycle 2		Delta
			Score	Average	Score	Average	
2		Very good audio quality	2.16		4.30		
3		Video quality is very good	2.53		4.32		
4		Animation quality is very good	2.18		4.13		
TOTAL			2.60		4.20		1.60

Table 4 shows the average of each academic service indicator of SMPIT Khairul Imam. In cycle 1, the average value of the 11 indicators is 2.60. This shows that there has been a change compared to the conventional academic system or the original SMPIT Khairul Imam did not have a SIM, but after the first cycle the school began to recognize and be able to have a SIM. Then continued improvement in cycle 2 and the average value of each indicator increased by 32% so that the average value in cycle 2 was 4.20. Then, from the analysis of the data it was also known that in cycle 2 managed to get 30.46% of students answered properly and 69.42 students answered very well so that the SIM SMPIT Khairul Imam was very feasible to use. This analysis can be seen from the diagram below.

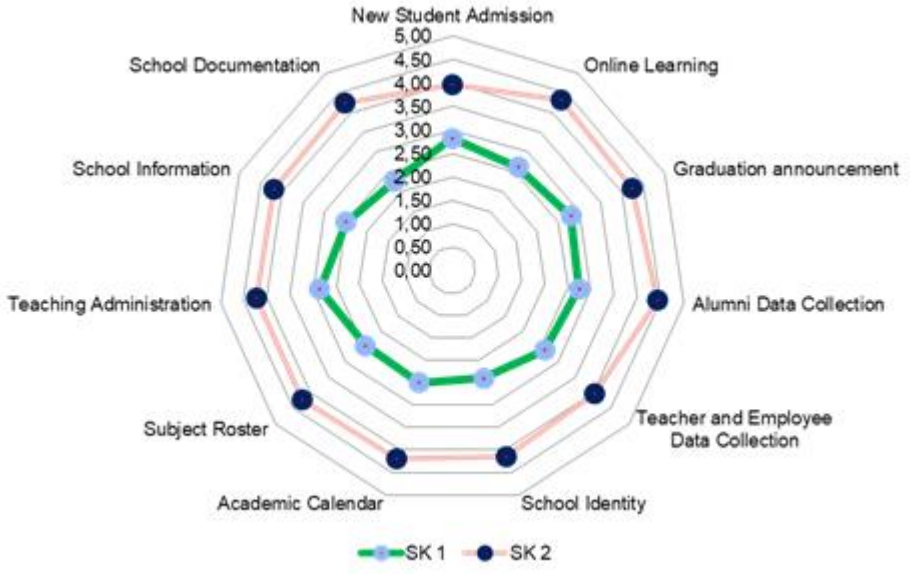

Figure 2. Comparison of academic service indicators

The difference data from the 11 indicators in Figure 2 above, the researcher obtained a significance (sig.) of 0.473 which means that the data for the average difference of the indicators is normally distributed. Then, the calculated t value is 26.975 with 11 degrees of freedom and the sig (2-tailed) value is 0.000. From these results, it is known that t count is greater than t table (26.975 > 2.201) which means that there is a significant difference between the data in cycle 1 and cycle 2. Furthermore, the average gain score is 0.7 or high category with a percentage of 66.7% which is categorized as quite effective. From these results, it can be concluded that

academic services at SMPIT Khairul Imam can be improved effectively by using a management information system.

Improving SIM-based academic services at SMPIT Khairul Imam as well as achieving the expected goals, namely schools have SIMs as an assessment in quality report cards, management can be done online, services that have not been provided by the ministry can be fulfilled, learning activities can be carried out remotely, and the creation of new innovations in schools. In addition to this, the use of costs for the procurement of this SIM is very low even with the availability of this SIM being able to minimize school operational costs.

4 Conclusion

Based on the results of the research that has been done, it can be concluded that the acquisition value on the quality report card is 2.04 which indicates that the SIM is not yet available to provide academic services to Khairul Imam SMPIT students. Then, the results showed that in the first cycle the results of SIM-based academic services at SMPIT Khairul Imam were still categorized as less feasible with an average score of 2.60 so that improvements were needed in the second cycle. Furthermore, the results showed that in the second cycle the results of SIM-based academic services at SMPIT Khairul Imam were very feasible with an average score of 4.20 so that no improvement was needed for the next cycle. And finally, through these two stages of the cycle, Normalized Gain (N-Gain) was obtained of 0.7 or high category with a percentage of 66.7% with a fairly effective category, so it can be said that academic services at SMPIT Khairul Imam can be improved by implementing Information Systems Management and able to achieve the goals expected by the school. Thus, the improvement of SIM-based academic services at SMPIT Khairul Imam is quite effective.

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