Development of Knowledge Management System to Improve the Performance of the New Student Admission System for Higher Education

M. Khairul Anam[1*)], Triyani Arita Fitri[2], Fransiskus Zoromi[3], Junadhi[3], Nu'man[3]
[1]Program Studi Teknologi Informasi, STMIK Amik Riau
[2,4]Program Studi Teknik Informatika, STMIK Amik Riau
[3]Program Studi Sistem Informasi, STMIK Amik Riau
[5]Program Studi Ilmu Keperawatan, STIKES Tengku Maharatu
Email: [1]khairulanam@sar.ac.id, [2]triyani@stmik-amik-riau.ac.id, [3]frans88@stmik-amik-riau.ac.id, [4]Junadhi@sar.ac.id, [5]numanjamil06@gmail.com

Abstract – The New Student Admission System (PMB) is the main door or core business of the University and requires a good management system. Every Academic Year STMIK Amik Riau forms a committee to carry out this PMB activity. The PBM committee consists of several parts, namely the promotion section, the registration section and the selection section. Each section carries out knowledge sharing or knowledge transfer in carrying out its duties. This knowledge sharing is only limited to informal or formal communication through meetings so that the knowledge sharing process has not been carried out optimally. The purpose of this study was (1) to measure the readiness of human resources in the application of knowledge sharing in terms of the dimensions of knowledge, culture, technology and dimensions and (2) to develop knowledge sharing features in the PMB system to support decision making quickly to increase the business value of the institution. The stages used in this KMS were The 10-Step Knowledge Management Roadmap while the evaluation of the application of KMS used the SECI model. The results obtained in this study are a system that helps new PMB officers learn the STMIK Amik Riau PMB system. so that the new PMB officer does not ask the old officer again.

Keywords – Knowledge Management System, PMB, SECI, STMIK Amik Riau

I. INTRODUCTION

Higher Education is an educational institution that prepares students to become members of society who have both the academic ability and skill [1]. STMIK Amik Riau is one of the universities in Riau province that has a vision to become a superior university in Sumatra by 2030 [2]. In order to be excellent, one of the indicators is the number of students at a college [3]. Various efforts are made by universities to improve services to prospective new students, ranging from promotional activities to New Student Admissions (PMB) activities [4].

The PBM committee consists of several parts, namely the promotion section, the registration section and the selection section, which is the vanguard in conveying the advantages of each study program owned by the college so that prospective students make their choice to register for one of the study programs. The quality of service in the PMB section is one of the determining indicators for prospective students to register themselves as new students in each academic year. Every year the team in charge of PMB activities always changes and there is a change in its duties and authorities. This change causes several problems such as officers having to learn the registration system again, having to be able to be required to understand the previous problems, and so on. Another problem which often arises in terms of communication and coordination is that it takes a long time to communicate and coordinate each section (finance, BAAK, and registration) because each section must check the data held by each section coordinator.

Currently, the STMIK Amik Riau registration website has three functions, namely as Information, PMB Scheduling, PMB Registration, and making PMB reports.

The results from the website which are the data of prospective new students to become students are used by several units. The finance department is still matching the data in the system with the finances provided by the PMB committee in the revenue section that has been inputted into Microsoft excel. Besides, the BAAK department is also still doing manual checking of the data received from finances and systems. Furthermore, in the PDPT section, it checks manually between the system and the registration file. The PMB system is currently well available and can be accessed for transaction activities by prospective students and the PMB committee. This system can be developed by adding a knowledge sharing feature that can minimize coordination and communication problems among departments.

Knowledge Sharing is a reciprocal process by which individuals exchange knowledge (tacit and explicit knowledge) and continuously jointly create new knowledge [5][2]. Every process of sharing knowledge is always related to how to collect and provide information or data to others [6]. Through the exchange of knowledge carried out both formally and, in those interactions, it can share knowledge or information with his fellow colleagues.

Knowledge sharing carried out in PMB activities is currently only informally and formally through meetings and there is no forum to channel knowledge as independent learning and quick decision making. Evaluation of the PMB system is carried out to see the knowledge management system which refers to the Inukshuk method [7]. The Knowledge Management System (KMS) is a tool that aims to support knowledge management, and is the development of an information management tool that integrates various aspects of computer science in supporting collaboration between the work environment and information and

document management systems [8]. The reason why the knowledge management system is analyzed is because KMS has a positive impact on the business continuity of the organization. This happens because KMS is an effective way to translate work experiences on an ongoing basis in the form of knowledge. KMS is also capable of transferring organizational knowledge across time and across space [9].

Research related to KMS has been widely discussed by other researchers, including [10] implementing KMS in the company PT Telekomunikasi Indonesia International to be more efficient in terms of costs, improve the quality of work and make it easier for employees to do work, such as conveying information between employees or employees can exchange information between parts, thus it provides more knowledge for each division, especially division of marketing and sales. Then [11] utilizing the website as a KMS tool is able to create educational innovations for universities. The Most Admired Knowledge Enterprise (MAKE) method was chosen to assess whether AMIK BSI Tangerang is an educational organization that is successful in managing KMS and sharing knowledge between website users, namely students and the academic community.

Based on the results of the analysis, there are a lot of important knowledge whose functions are to support PMB activities. In addition, the purpose of documenting this knowledge is so that the knowledge possessed by each team member does not just disappear and can also be shared with other team members, as well as the creation of a means in discussing and distributing problems and knowledge that is still memorized so that there is no repetition of mistakes that have been made.

II. RESEARCH METHODOLOGY

The stages of research carried out in the study can be shown in Figure 1 below:
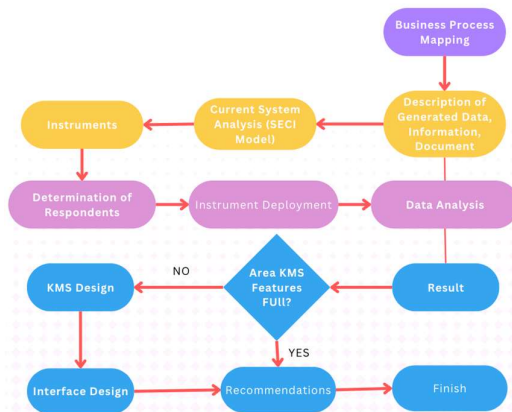

Figure 1. Flow of Research methodology

Based on the stages of research above, each of these stages can be explained as follows:

A. Business Process Mapping

The mapping carried out used the Work System Framework. The Work System Framework in figure 2 is a system where participants consist of humans or machines which carry out business processes using information, technology and other resources to produce a product or

service for internal or external customers.

Figure 2. Work System Framework

The following are the business processes in the admission of new students [12]:

The business process focuses on managing new student admissions starting from meetings or planning for new student admissions, campus promotions, registration fees, entrance tests, graduation announcements to becoming a student. Figure 3 shows the *use case* of the business process of new student admissions (PMB) STMIK Amik Riau. In this study, it was proposed that the Promotion and PMB sections be made into one. This was done so that coordination became easier. Based on previous research, the promotion and PMB sections at the Higher School and University levels were made into one. The results were quite satisfactory in carrying out New Student Admissions and promotion activities. In this proposed system, all reports from each section of the PMB were carried out in an integrated manner.
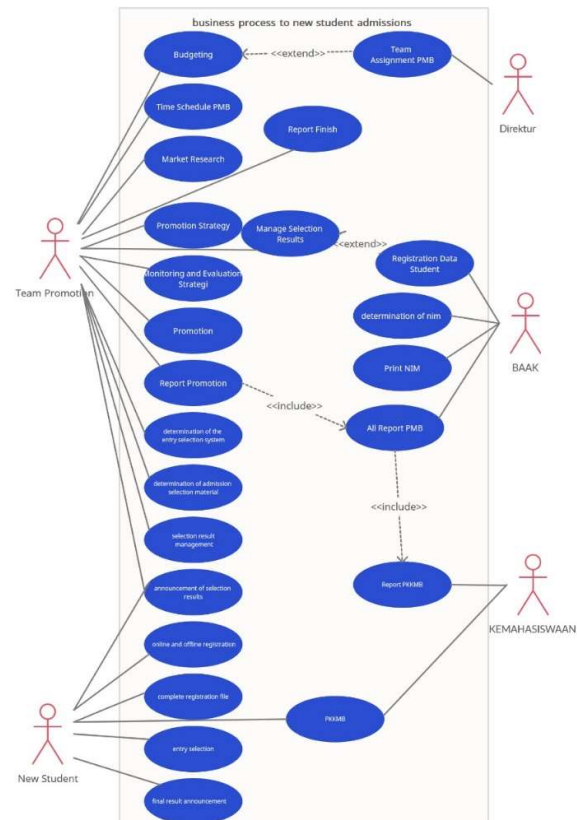

Figure 3. Use case of business process admission of new students

In the figure 3, use case there are 5 user levels, namely the promotion team, new students, Chair, BAAK, and Student Affairs. The levels in the system have different roles. To clarify the *use case* of the new Student Admissions Business process above, details were made to group the existing PMB business process activities and the updates that had been added as presented in table 3.

Table 1. PMB business processes

No	Sub Proses Names	Detail Activities
1.1	new student admission planning	- PMB Team Determination - Budgeting - PMB Time Schedule
1.2	Campus promotion	- Market Research - Promotion Strategy - Oversight and evaluation of strategies - Promotion - Promotional report
1.3	Prospective students' registration	- Registration through online as well as offline - Complete the registration file
1.4	Selection or entrance test	- Establishment of an entrance selection system - Determination of entry selection materials - Entrance selection
1.5	graduation announcement	- Management of selection results - Announcement of selection results - Entry selection report
1.6	becoming a student	- Student registration data collection - Determination of NIM - KTM Printing - Introduction to freshman campus life (PKKMB) - Reporting of freshman admissions

B. System Analysis

Knowledge management system analysis was carried out by using a seci model. A knowledge is created through the interaction between tacit and explicit knowledge. SECI has four models of knowledge creation that have been identified. The following is the explanation [13]:

- *Socialization*, the conversion from tacit knowledge into new tacit knowledge, carried out with social interaction and various experiences between members of the organization.
- *Externalization*, the conversion from tacit knowledge into new explicit knowledge.
- *Internalization*, the conversion from explicit knowledge to new tacit knowledge.
- *Combination*, the creation of an explicit knowledge by merging, categorizing, reclassifying, and synthesizing existing explicit knowledge.

The measurement and evaluation of current systems used qualitative methods to develop mathematical models, theories and hypotheses associated with this study. Table 2 presents the instruments used to make measurements of the current system.

Table 2. Research Instruments [14]

Dimensions	Indicators
Knowledge	I understand my task flow well
	I understand the theory relating to the assigned task
	I execute the theory that I got well

	I understand the rules relating to my work
	I have knowledge beyond the assigned tasks
	I always document my knowledge
	The knowledge I have helped me in completing the assigned tasks
Culture	I know the rules where I was assigned
	I have always been disciplined in carrying out my duties
	I made a report according to the specified time
	I always share my knowledge with my colleagues
	I received the information and knowledge that my colleague gave me
	The institution gives awards if my assignment is good
	Teamwork is very helpful in my tasks
Technology	I can use the PMB system well
	So far my understanding of the internet has been good
	I am used to using internet services to support my tasks
	I can upload and download the materials I get on the PMB system
	I always use internet media to share material with my colleagues
	The Internet was very helpful in my task
SOP	The SOP given by the Institution is in accordance with my duties
	The SOP makes my tasks more targeted
	The SOP provided by the institution provides an effective result on my task
	I always communicate the problems I face in the field with my boss
	I have good communication with colleagues and prospective freshmen
	The institution conducts *training* for assigned staff according to their needs and needs.
	Training provided is in accordance with the material of the institution's SOP

C. Questionnaire Distribution

The distribution of questionnaires on New Student Admissions (PMB) was given to several people in charge of PMB activities. The respondent data was the PBM committee for the 2021-2022 Academic Year. Committee members were lecturers or employees listed in the committee assignment decree issued by the university leadership. Sampling in this study used non-probability sampling which is a sampling technique that does not provide equal opportunities or opportunities for each element or member of the population to be selected into a sample [15]]. Non-probability sampling has several techniques, one of which is saturated samples. The use of sampling was saturated because the population was less than 30 people. Saturated sampling is the number of samples constituting the entire population [16].

D. KMS Model

Building knowledge management was based on the 10-Step Knowledge Management Roadmap which is divided into four phases [17]. These phases are:

- *Infrastructure Evaluation*
- *KM System Analysis, Design and Development,*
- *Deployment*
- *Evaluation*

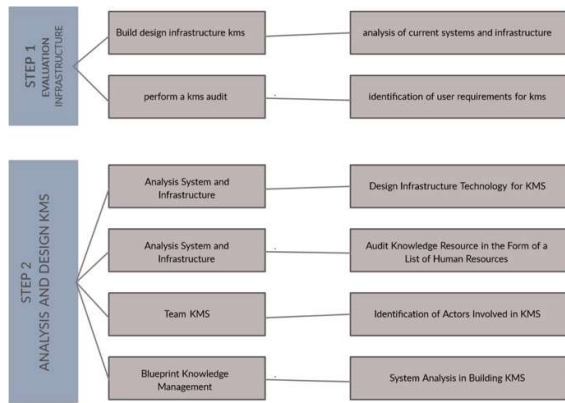The KMS model used in this study is shown in figure 4 below:

Figure 4. KMS Model

E. Process and Interface Design

Process Design is necessary if the analyzed system requires development or new builds. Process design was used to see the flow of data starting from the input process to the output process. Then designing the interface, the input, and the output utilized UML Tools.

a) Use case

The use case in this study was used to see the relationship between actors and the system used. Figure 5 shows the use case design of the developed PMB system.
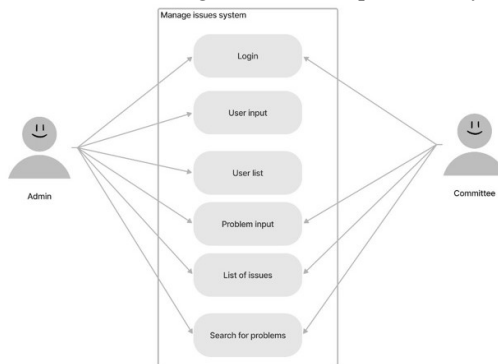

Figure 5. The Use of System Usage

b) User Interface Design

The design of the login page interface consists of two user levels, namely the committee and admin which can be seen in figure 6.

Figure 6. Login Page Design

The design of the user data input interface consisting of username, password, full name, and user level can be viewed in figure 7.

Figure 7. User Data Input Design

Figure 8 shows the interface design of the problem lists inputted by the committee if there are obstacles in carrying out tasks in the admission of new students, both new student admissions officers and interview officers. In this menu, there is also a search menu that is a characteristic of the knowledge management system which is useful for making it easier to find problems.

Figure 8. Design of the List of Issues

Then, figure 9 is the design of problem input consisting of problem and status. Status consists of two options, which are the problem has been handled and has not been handled.

Figure 9. Problem Input Design

F. Recommendations

The evaluation process carried out resulted in the mapping of the Knowledge Management System in the current PMB system. After obtaining mapping from KMS, the next step was to provide recommendations for KMS development in the PMB system by adding a knowledge sharing feature to the PMB system in universities.

III. RESULTS AND DISCUSSION

The followings are the results and discussions carried out in this study.

A. Questionnaire Results

The questionnaire, which was distributed to 17 respondents involved in the admission of new students, received data processed to determine readiness in implementing the new system. The validity results stated that as many as 28 instruments were valid and could be carried out in the next stage. The final result of the respondent analysis found that all respondents were ready to accept the new technology to be applied. The new technology applied is the development of a system, namely by applying a *knowledge management system* to the new student admission system.

B. Implementation of Knowledge Sharing
This section discussed the implementation of knowledge sharing features added to the existing PMB system.
- *User Data Input*

Figure 10 is a view to add users consisting of two levels, namely administrators and committees.

Figure 10. User Data Input

- *User Data*

The user data view seen in figure 11 is a list of users who can log in and use the features on this system.

Figure 11. User Data List

- *Login Page*

The login page in the study will later become a *single sign on* with the parent website of the new student registration of STMIK Amik Riau.

Figure 12. Login Page

- *Problem data input*

Then after logging in, the committee user level can input data on the problems faced while serving in the admission and interview section. Figure 13 shows the input data of the problem.

Figure 13. Problem Data Input

- *Problem data*

Then figure 14 is the data on problems inputted by the committee related to problems that occurred while on duty. In this menu, a problem search feature can also be done to make it easier to find problems. Then the edit sign is used to change the status from unhandled problem to has been handled problem after being solved.

Figure 14. Problem Data

C. Recommendations
The recommendations in this study were used for further development if STMIK Amik Riau develops a new student admission system. The followings were some of the recommendations given by researchers to the development team of the new student admissions system:
- In the newly created system, it is necessary to evaluate so that this system can run according to the desired expectations.
- This system must be integrated with the ongoing new student admission system so that users can more easily perform their duties.
- It is necessary to add a user level to the system such as the promotion section to facilitate coordination between the promotion team and new student admissions officers.

IV. CONCLUSION
The conclusion of this study was that the readiness of users to use KMS on the PMB system has been successfully measured. The presentation value of the measurement results provided recommendations that system users were ready to use the knowledge sharing feature in the PMB system. Then, the development of KMS by adding the Knowledge Sharing Feature to the PMB system had been done well based on the results of trials carried out to input problems that often arise in PMB activities and could be well documented in this system. Furthermore, *knowledge sharing* could be used as a means to exchange information or understanding between individuals, teams, communities or organizations to improve employee and organizational performance. In addition, the addition of the *knowledge sharing* feature had been able to reduce communication barriers among personnel assigned to PMB activities. Then this research is still in the development stage, so it needs to be carried out in the future. Here is the development that is expected for *Knowledge Sharing* feature. It could be used to document knowledge (knowledge, insights, latest trends and self-development tips) in various formats (text, pdf, video, audio, image). Besides, the *Knowledge Sharing* Feature can be developed into a knowledge library which can be accessed by all employees from the internal server (for security) and stores the knowledge library of internal activities.

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