



Development of I-Graciass Adoption and Implementation Model at Telkom Education Foundation Lemdikti Knowledge Management Systems Based

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Abstract

I-Graciass is one of the digicampus programs under the Directorate of Digital Transformation, Synergy & Performance (DTSP) of the Telkom Education Foundation (YPT) in the form of a smart app & information system as an integrated academic and non-academic management information system. Based on the Vision-Mission, Strategy and Tagline of YPT as The Leader of ICT Education Provider in Indonesia as well as the spirit of carrying out digital transformation in the foundation, so that I-Graciass becomes mandatory to be adopted and implemented in all Higher Education Institutions (Lemdikti) under the guidance of YPT. However, the facts on the ground of the process of adopting and implementing I-Graciass in each Lemdikti are not easy things. For this reason, this research was carried out in order to facilitate the process of adopting and implementing I-Graciass through the method of climbing Knowledge Management Systems (KMS) in all YPT Lemdikti, especially for new universities such as Telkom Institute of Technology Surabaya and other new universities that will later be established by YPT. The results of this study show that the factors that influence the success of the I-Graciass Adoption process at IT Telkom Surabaya and other Lemdikti consist of technical and non-technical aspects that can refer to the implementation of best practices in the previous lemdikti. In addition, to support the success rate of adoption and implementation, an effective knowledge transfer process is needed through the use and development of the right KMS for an organization and its end users.

Keywords: Technology Adoption, I-Graciass, KMS, Transfer of Knowledge

1. INTRODUCTION

Telkom Education Foundation or known as Yayasan Pendidikan Telkom (YPT) is one of the subsidiaries (affiliates) of PT. Telkom Group which is engaged in the implementation of education ranging from daycare, playgroups, kindergartens, primary & secondary education institutions to higher education institutions. Currently, there are four (4) Higher Education Institutions



(Lemdikti) namely Telkom University Bandung, Telkom Purwokerto Institute of Technology (IT Telkom Purwokerto), Telkom Institute of Technology Surabaya (IT Telkom Surabaya) and Telkom Jakarta Institute of Technology (IT Telkom Jakarta). As an ICT-based education provider, the Telkom Education Foundation (YPT) has prepared to face the digital era by forming a special directorate, namely the Directorate of Digital Transformation, Synergy & Performance (DTSP) to strengthen the ICT field which is a competitive advantage.

Currently, the Directorate of Digital Transformation, Synergy & Performance (DTSP) has a main program, namely digital transformation programs to realize YPT's vision to become a quality and international standard educational foundation. The success of the digital transformation program is supported by the digicampus concept which begins with preparing an integrated campus and inter-campus network infrastructure and data centers to run all information system services used to be realized in stages towards three points of digicampus, including smart application and information systems, smart learning, and smart building.

The three digi points, the first digi point, namely the smart app & information system which is currently the main focus of the Telkom Education Foundation so that the development of an integrated information system that has been developed in-house development using the I-Graciass framework by DTSP can be adopted not only at Telkom University Bandung, but also by all other Lemdikti such as IT Telkom Surabaya, IT Telkom Purwokerto, Akatel Jakarta and universities that will later be established such as IT Telkom Makassar, IT Telkom Medan and IT Telkom in other cities in accordance with the vision and target of YPT to implement and utilize the I-Graciass for Telkom Campuses.

I-Graciass itself is an integrated academic and non-academic management information system that covers almost all higher education business processes, which consists of 81 user groups, 93 applications and 2113 pages in the form of menus and functional features. As a new university, IT Telkom Surabaya is required to be able to adopt and implement it quickly and precisely in order to carry out all business processes and services. Of course, it is not an easy thing for IT Telkom Surabaya and other Lemdikti in facing challenges and obstacles in the process of adopting and implementing I-Graciass. On the other hand, the existence of YPT's plan to monetize I-Graciass to universities outside YPT is a point of interest for researchers considering the successful adoption and implementation of I-Graciass in the internal environment of Lemdikti YPT itself is the main key to success before commercializing I-Graciass to external parties.

2. METHODS

In this study, the author divided into several stages, namely conducting literature studies, observations and interviews as stages of formulating research problems, then after obtaining literature and supported by literature and conditions in the field, the author designed research models and instruments, then the author collected data both through supporting documents and interviews with informants, after that the author carried out the processing and analysis process of the data that has been collected then reaches a conclusion.

2.1. Literature Studies

The research team has conducted a literature study related to the topic of technology adoption and previous I-Graciass research as presented in the introductory section. In addition, the research team has conducted a literature study related to previous research related to the topic of knowledge management systems and the adoption of information technology as follows:

2.1.1 Previous Research on I-Graciass

The researcher reviewed several studies on I-Graciass, including research conducted by Zahirah [1] to find out what factors influence the successful implementation of I-Graciass Telkom University, especially in the registration service module by adopting the success model from DeLone and McLean. Meanwhile, research from Ibnu Asror, et al [2] measured the maturity level of I-Graciass using ITIL V.3 domain service strategy and service design using a service maturity framework. Meanwhile, in Tarandhika's research, et al [3] it is almost the same as Zahirah's research, namely looking for factors based on the previous researcher's adoption model, the difference is that Tarandhika's research adopts the UTAUT model, then modified to find out what factors affect user considerations for using the Telkom University mobile I-Graciass application.

Research by Rio, et al. [4] conducted an audit of telkom university's I-Graciass system using the Cobit 5 domain DSS (Deliver, Service and Support) framework and provided several suggestions and recommendations on several audit findings. Research by Andi, et al [5] conducted a risk analysis of information technology based on risk management using ISO 31000 which focuses on hardware and network infrastructure in the I-Graciass system of Telkom University, from the study found several risks that can be anticipated or prevented from bad risks.

While several other studies also conducted user satisfaction analysis of the I-Graciass system, such as research by Trisno and Yuliani [6] found that there

was a gap in satisfaction, the media could not satisfy users on the motives of information and personal identity as well as motives of integrity and social interaction. As researched by Trisno and Yuliani, the research of Shinta, et al. [7] also analyzed user satisfaction case studies of telkom university engineering faculty students on I-Graciass system services using web usability methods and canoe models.

From some of the literature above, there has not been much research that discusses knowledge management with case studies of the I-Graciass system, so researchers are interested in deepening research on the I-Graciass system which has now begun to be adopted by several universities under the YPT using the knowledge management method.

2.1.2 Technology Adoption Research and Knowledge Management System

Based on the online version of the Big Dictionary Indonesian, Adoption has the meaning of accepting proposals or reports and can also be interpreted as voting [9]. Meanwhile, according to Rista, in her research, it is said that Adoption is a process of applying new ideas or new technologies to adopters (adopters) after receiving innovations delivered by others. Rogers [10], in his theory called Diffusion Of Innovations (DOI) states that there are several stages that are passed by adopters in the process of adopting a technology, there are 5 stages:

1. Awareness Stage (Awareness).
2. Interest Level (Interest).
3. Assessment Stage (Evaluation).
4. Trial Stage.
5. Adoption Stage.

So, it turns out that before the adopter uses a technology (adoption) must go through the previous 4 stages, including conducting an assessment and trying a technology.

From several literature studies that have been carried out by researchers, there are several models or theories that explain the adoption of information technology, including the Technology Acceptance Model (TAM), Theory of Reason Action, Theory of Planned Behavior, Task Technology Fit Theory and the development of the latest theory or model of information technology adoption is the Unified Theory of Acceptance and Use of Technology (UTAUT). So that it can be defined that the adoption of information technology is a process of implementing new ideas in the form of innovations in the field of information technology that are widespread in society, as for the stages of the adoption process as previously stated.

Researchers also conducted a literature review of basic concepts and theories around knowledge and knowledge management as well as several Knowledge Management System (KMS) research which became the main topic of this research. First, according to Collison (2013) knowledge management has 3 components [11], namely: 1) People, manifested in the form of Human Resources (HR); 2) Technology, realized in the form of technology used /adopted; 3) Process, manifested in the form of a process of occurrence of knowledge. Second, the research conducted by Bechina & Ndelea (2009) on the factors that affect the effectiveness of KMS is avoided from 4 factors [12] namely: system quality, information use, information quality and user satisfaction. Third, research conducted by Kiniti & Standing (2013) on 6 problems and challenges of implementing Wiki as KMS [11] namely, wiki purpose, wiki usability, integrating the wiki into established work practice, social issues, role of management and organizational culture of collaboration and knowledge sharing. Furthermore, a similar study conducted by Biswas (2017) in minimizing the risk of failure to adopt a technology or KMS [12][13][15], companies need to choose a system based on functional, non-functional, or transitional requirements. In addition, it is necessary to ensure that the selected KMS has met all the requirements of the Knowledge Management Process which consists of knowledge discovery, knowledge capture, knowledge sharing and knowledge applications.

2.1.3 Knowledge

a. Source

1. Tacit (pengetahuan yang berbentuk know-how, experience, skill, understanding, rules of thumb).
2. Explicit (written knowledge, tearsip, spread both printed and electronic and can be used as a learning material (reference) for others.

b. Shape

1. Declarative (substantive knowledge that focuses on beliefs about the relationships between know-what variables such as law, hypothesis, propositions, formulas, etc.).
2. Procedural (a godhead that focuses on know-how beliefs that link the sequence of steps or actions of a business process to desired or undesirable results.

c. Area

1. General (general knowledge that many individuals have and can be transferred easily to the rest of the individual).
2. Specific (the specific knowledge possessed by a very limited and expensive number of individuals to transfer can be divided into contextual specific and technical specific).

2.1.4 Knowledge Management

- a. **Knowledge Flow:** Data → Information → Knowledge → Policy.
- b. **Related disciplines:** Organization Management, Business Process Management, Data Mining, Information Systems, Journalistic, Psychology.

2.1.5 Knowledge Management Process

- a. Discovering → the development of new tacit or explicit knowledge from data and information or from the synthesis of previous knowledge.
 - 1. Combination (discovery of new explicit knowledge).
 - 2. Socialization (discovery of new tacit knowledge).
- b. Capturing → the process of taking explicit or tacit knowledge that exists within people, artifacts, organizational entities.
 - 1. Externalization (capturing knowledge from tacit to explicit).
 - 2. Internalization (capturing knowledge from explicit to tacit)
- c. Sharing → the process by which explicit or tacit knowledge is communicated to other individuals
 - 1. Socialization (facilitating the sharing of tacit knowledge in cases where new tacit knowledge is being created as well as when new tacit knowledge is not created).
 - 2. Exchange (as opposed to socialization, focuses on sharing explicit knowledge. It is used to communicate or transfer explicit knowledge between individuals, groups, and organizations).
- d. Applying → the process by which individuals can utilize the knowledge that other individuals have without having to learn or acquire that knowledge. Like for example: Direction and Routines.

2.1.6 Knowledge Management System

- a. **Knowledge Discovery System**
 - 1. Combination (discovery of new explicit knowledge).
 - 1. KM Mechanisms such as: meetings, telephone conversations, documents, collaborative document creation.
 - 2. KM Technologies such as: databases, web base access to data, data mining, information repositories, web portals, best practices, and learning.
 - 2. Socialization (discovery of new tacit knowledge).
 - 1. KM Mechanisms such as: cross-departmental rotation of employees, conferences, brainstorming retreats, cooperation projects, initiations.
 - 2. KM Technologies such as: video conferencing, electronic discussion groups, email.
- b. **Knowledge Capture Systems**
 - 1. Externalization (capturing knowledge from tacit to explicit).

1. KM Mechanisms such as: models, prototypes, best practices, learning.
2. KM Technologies such as: expert systems, chat groups, best practices, and learning databases.
2. Internalization (capturing knowledge from explicit to tacit).
 1. KM Mechanisms such as: learning by conducting, job training, learning by observation, face-to-face meetings.
 2. KM Technologies such as: computer-based communication, AI-based knowledge acquisition, computer-based simulation.

1. Knowledge Sharing Systems

1. Socialization
2. Exchange
 - a. KM Mechanisms
 - b. KM Technologies

2. Knowledge Application Systems

1. Direction
 - a. KM Mechanisms
 - b. KM Technologies
2. Routines
 - a. KM Mechanisms
 - b. KM Technologies

Knowledge Management Systems (KMS) are any type of Information Technology system that retrieves and stores scientific treasures to improve, provide understanding, collaboration, and alignment of business processes. KMS can be in a team or organization, but it can also act as a knowledge base center for users. There are many types of KMS, but they all have some characteristics in common, among them:

- a. FAQ content.
- b. Forum or community feature.
- c. How-to articles and tutorials.
- d. Education, academies, and training programs [14].
- e. Certificates.
- f. Case studies.
- g. Webinars.

2.1.7 Research Opportunity

Based on the title, background, and literature review above, the researcher wants to research related to the research topic of technology adoption and implementation, in this case I-Graciass is not only from an end-user perspective but rather an organizational perspective through its main approach of knowledge transfer based on knowledge management system (KMS).

Basically, between I-Graciass and KMS are two different and stand-alone systems, where I-Gracias is one of the academic management information systems, while KMS itself is a medium and tool in the process of knowledge transfer. However, both have a correlation where I-Graciass is a separate knowledge, while KSM serves as a means so that the knowledge can be transferred, understood, adopted, and implemented by the organization properly.

This research is part of a pre-designed research roadmap related to KMS with I-Gracias's case studies, starting from the stages of identification, analysis, planning, making, monitoring, evaluation, to the stage of developing the KMS. However, in this study, the researcher's focus is more towards the identification and analysis of KMS at the Telkom Education Foundation (YPT) in this case related to the adoption and implementation of I-Graciass throughout Lemdikti with case studies at ITTelkom Surabaya. So that the input picture from this research is in the form of identifying knowledge management and transferring knowledge I-Gracias. The process picture of this study is in the form of an analysis of KMS needs for Lemdikti YPT [16], while the output picture is in the form of an effective KMS model to be recommended to YPT.

2.2. Interviews and Observations

The results of previous literacy studies can be submitted as a reference by the research team making observations and interviews to several stakeholders as related resource persons ranging from the authorities at YPT such as leaders / experts at DTSP and DHE, then at representatives of ITTelkom Surabaya such as the Head of SISFO and the Head of Study Program. The interview process was conducted virtually on Zoom [16]. After that, the research team has made a draft of the questions that will be asked during the interview and communicated with stakeholders related to the object of this study, namely the Directorate of Digital Transformation, Synergy & Performance (DTSP) of the Education Foundation, Senior Leader Representative of ITTelkom Surabaya. For the observation process of I-Graciass by the author obtained data that I-Graciass consists of 81 user groups, 93 applications and 2113 pages both in the form of menus and functional features. With the complexity of the I-Graciass system, it requires guidelines, manual books, user interfaces and user experiences that are effective and efficient to facilitate the process of adopting and implementing I-Graciass at ITTelkom Surabaya and other Lemdikti.

The authors also made observations on several pages of companies that provide KMS services, such as: 1) Optimizely: <https://help.optimizely.com/>, whose basis offers a variety of features, including: academics, certifications, developer documentation, community forums, and others. 2) SurveyMonkey: <https://help.surveymonkey.com/>, whose basis allows users to obtain

information based on topics or keywords. 3) Microsoft: <https://support.microsoft.com/>, whose knowledge base is organized into visual videos, training, and facilitating to communicate with product managers. 4) Canva: <https://support.canva.com/>, whose knowledge base is very easy to navigate and search for. 5) Evernote <https://help.evernote.com/>, whose base includes many things, such as: resources that can provide benefits but also provide clear directions on how to contact company. 6) Google Analytics <https://support.google.com/analytics/>, whose knowledge base offers its own predictive search engine. From this observation, the author gets an overview of the KMS system that has been running.

2.3. Designing Models and Research Instruments

The model design in this study was obtained from literacy studies in previous similar research journals both related to technology adoption research and knowledge management system research that had been presented in the previous literature review section. In figure 1 below, it is explained that according to Bechina & Ndelea (2009) there are 4 factors that affect the effectiveness of KMS [12] namely: system quality, information use, information quality and user satisfaction.

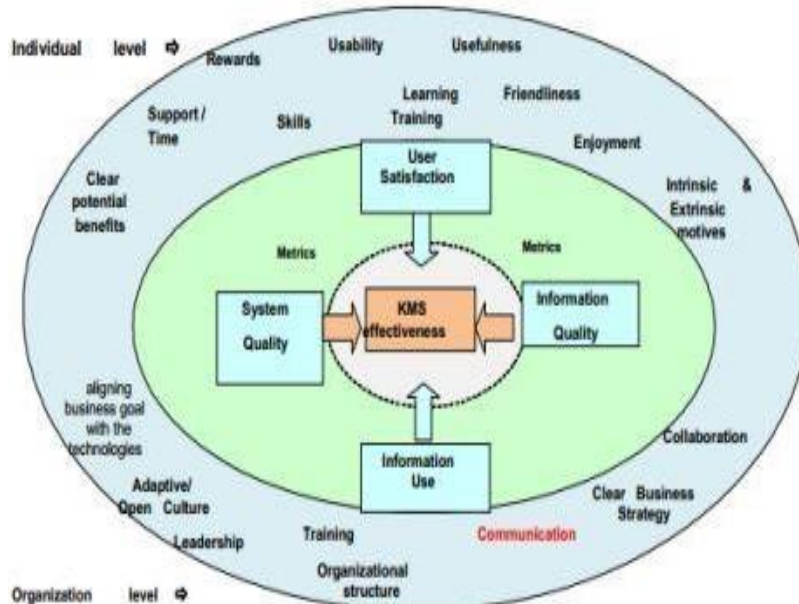


Figure 1. Factors affecting the Effectiveness of KMS

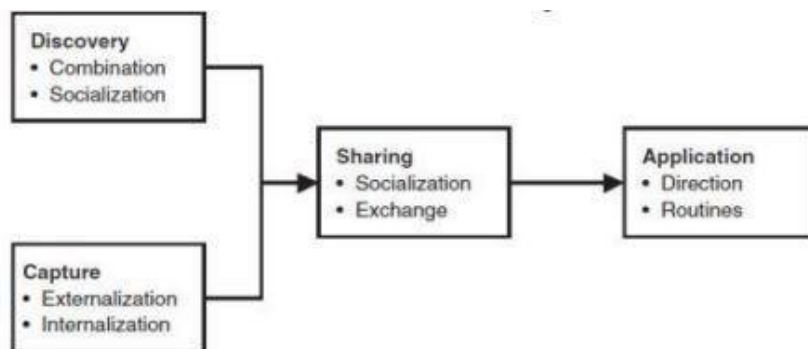


Figure 2. Knowledge Management Process

Meanwhile, in figure 2 above, it also explains the Knowledge Management Process consisting of knowledge capture, knowledge discovery, knowledge sharing, and knowledge applications as presented in the research of S. Biswas (2017.) Based on the two things above and other related journal references, the researcher designed a picture of the model and research instrument as shown in figure 3 below.

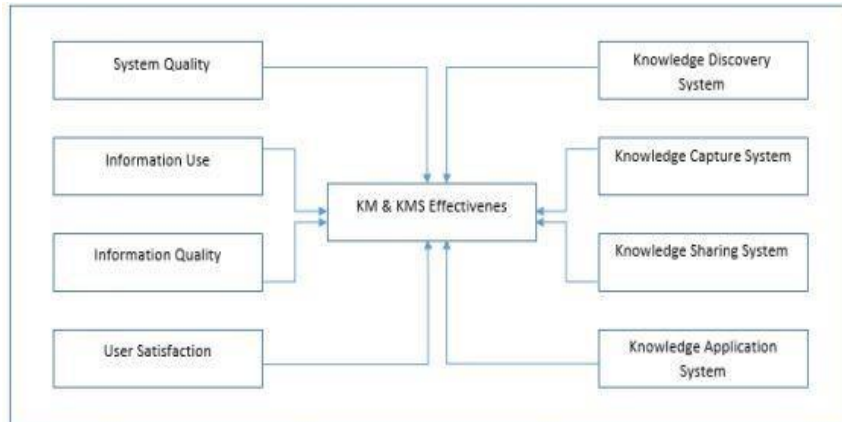


Figure 3: Overview of The Research Model

In figure 3 above, it shows an overview of the research model consisting of 8 free variables and 1 bound variable, while the research instrument is in the form of a questionnaire consisting of 9 question criteria with each criterion consisting of at least 3 question items. There will be at least 27 question items that will be distributed to respondents as an effort to collect quantitative data in this study.

2.4. Data Collection

In this study, data collection was carried out through online Forum Group Discussion (FGD) activities conducted by the Research Team and expert both from the DTSP Telkom Education Foundation and from ITTelkom Surabaya itself. Here's some documentation of the FGD's persistence.

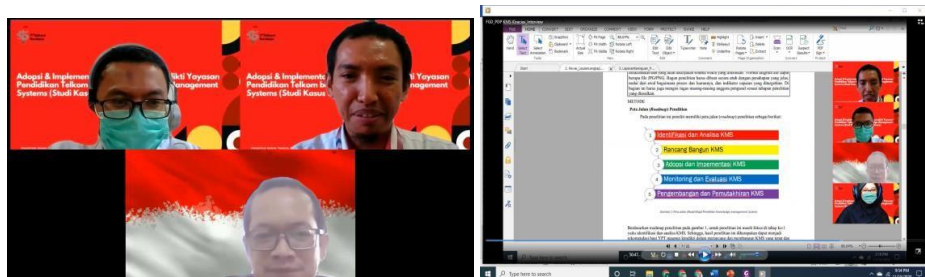


Figure 4: FGD with DTSP-YPT

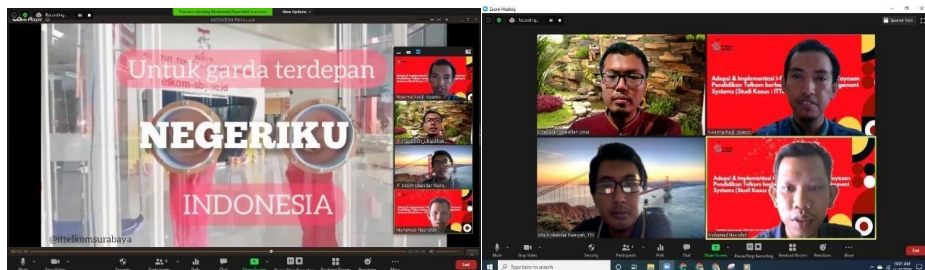


Figure 5: FGD with Representatives of SL ITTelkom Surabaya

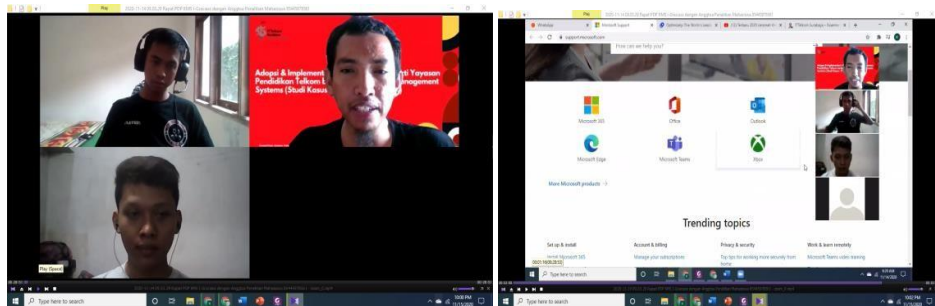


Figure 6: FGD with Student Research Members

2.5. Data Processing and Analysis

Before the data processing and analysis process, researchers collect initial data to carry out validation and reliable tests on questionnaire instruments that have been made before collecting the data. Furthermore, the data that has been

validated and collected is carried out various statistical tests to test the hypothesis of each variable then analyze and interpret the results to answer the purpose of this study.

3. RESULT AND DISCUSSION

This research produced several important findings in the practice of adopting I-Gracias as one of the Knowledge Management Systems at the Telkom Education Foundation, including:

3.1 Factors affecting the success of the I-Graciass Adoption process at IT*Telkom Surabaya and other Lemdikti

Based on the results of interviews conducted by researchers on several speakers from both the Telkom Education Foundation and IT*Telkom Surabaya who are considered experts and represent in the I-Graciass adoption process, there are two (2) factors, namely Technical and Non-Technical.

1. Factors are everything related to the textual aspects of the I-Gracias application, such as:
 - a. Masterplan and Blueprint of I-Graciass Design and Development.
 - b. Arsitektur Enterprise dan Framework Development I-Graciass.
 - c. Infrastructure, Software Architecture, HR-IT.
 - d. Manual Book, Troubleshooting and Maintenance.
 - e. Non-technical Factors.
1. Non-technical factors are as many as things that are not directly related to the I-Graciass application, such as:
 - a. Leadership Commitment.
 - b. Availability and Conformity of SOTK.
 - c. Standardization of Business Processes and Services.
 - d. Organizational culture.

3.2 How to implement I-Graciass that is fast and precise at IT*Telkom Surabaya and other Lemdikti

Based on the best practice experience of implementing I-Graciass at IT*Telkom Surabaya from the results of the previous FGD with YPT and IT*Telkom Surabaya as follows:

- a. Install Master I-Graciass in the YPT Data Center and Lemdikti Backup Server respectively.
- b. Cleansing Data I-Graciass for Telkom Campus.
- c. Group Priority Services, User Access Rights.
- d. Apply the Standard SOP that has been set by YPT in the Menu and Features of I-Graciass.

- e. Exploration according to the functional needs of each work.
- f. Running in parallel existing User Users according to their respective users.

3.3 An effective approach to carry out the knowledge transfer process in order to help the successful adoption and implementation of I-Graciass at IT Telkom Surabaya and other Lemdikti

To adopt a system, Telkom Education Foundation must categorize the needs of the system into three broad categories which include functional, non-functional, and transitional requirements. Functional requirements are things that a solution must do, which can be described as an act of work, where nonfunctional requirements refer to the things that a solution should have, which often describes the quality of the system. The third requirement is the transioanl requirement which suggests measures to smooth out the implications of the new system.

The I-Graciass Adoption System in this study applies the concept of a KMS system containing four main KM processes supported by seven sub-processes. The main KMS process is knowledge discovery, knowledge capture, knowledge staring and knowledge application, which is supported by subprocesses such as combination, socialization, externalization, internalization, exchange, direction and routine. This can be seen in the following figure.

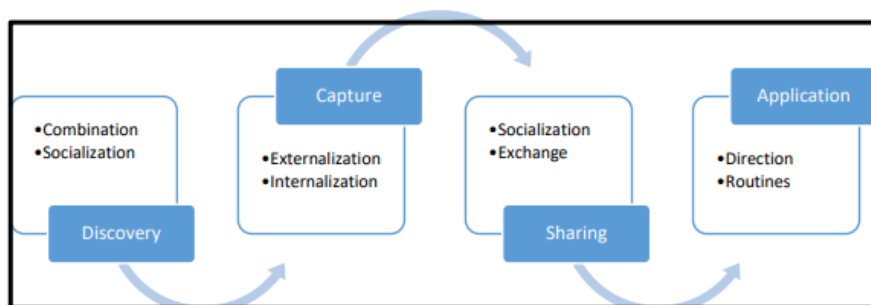


Figure 7: Knowledge Management System Process

3.3.1 Knowledge Discovery

The development of new tacit or explicit knowledge from data and information or from the synthesis of previous knowledge. It can be obtained from the process of combination (discovery of new explicit knowledge) and socialization (discovery of new tacit knowledge).



Figure 8: Manual Book I-Graciass

3.3.2 Knowledge Capturing

The process of taking explicit or tacit knowledge that exists within people, artifacts, organizational entities. It can be obtained from the processes of Externalization (capturing knowledge from tacit to explicit) and Internalization (capturing knowledge from explicit to tacit).

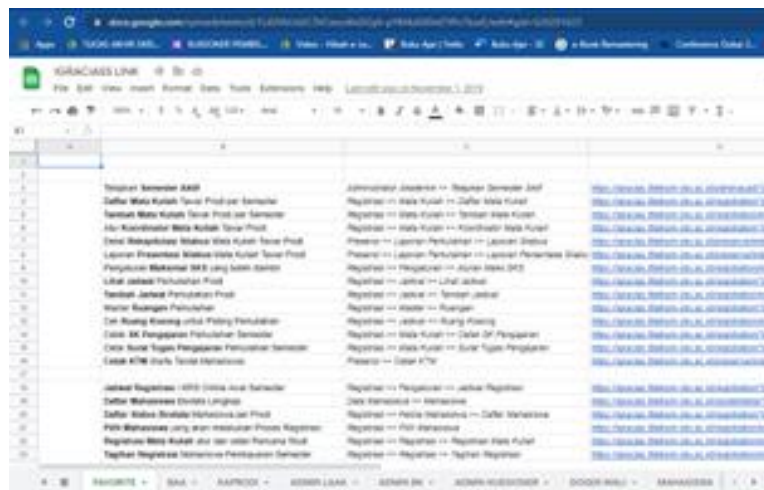


Figure 9: Short Link I-Graciass

3.3.3 Knowledge Sharing

The process by which explicit or tacit knowledge is communicated to other individuals. It can be obtained from the Process of Socialization (facilitating the sharing of tacit knowledge in cases where new tacit knowledge is being created as well as when new tacit knowledge is not created) and the Exchange process (as opposed to socialization, focusing on sharing explicit knowledge. It is used to communicate or transfer explicit knowledge between individuals, groups, and organizations).



Figure 10: Tutorial Youtube I-Graciass

3.3.4 Knowledge Applying

The process by which the individual utilizes the knowledge possessed by another individual without acquiring, or learning, that knowledge. It can be obtained from the Direction and Routines process.



Figure 11: Support KMS Application

3.4 Development and Adoption of Knowledge Management System

Based on the data and findings, the authors have a plan to develop the direction of their research as shown below:



Figure 12: KMS I-Graciass Research Roadmap

In addition to some of the important findings and roadmaps of the above research in the proper and effective practice of I-Graciass adoption and implementation through the utilization and development of KMS, there are several novelties of this study compared to previous studies [17][18] especially in the context of research on adoption and implementation of technologies that generally use an adoption approach through the Delone & McLean model, TRA, TPB, TAM, UTAUT and others. Meanwhile, in this study, the approach is through the development of a technology adoption model which is correlated with the use of kms types as shown in figure 3 in ata. In addition, in previous KMS research [19][20] in general, it was more focused on the KMS model and its manufacturing and implementation techniques without conducting a study of technology adoption of KMS. Meanwhile, in this study, an adoption study of the right and effective KMS was carried out so as to help make it easier for KMS developers and users to implement and adopt technology that will be used in organizations and end users.

4. CONCLUSION

Knowledge Management System (KMS) is a technology that is newly popular in this digital era. The KMS system must be well designed so that it can be adapted to the needs of the organization. If all system procedures are followed properly, then the success rate of the new KMS system may increase significantly. The success of a KMS depends on how its users use the system. If users, in this case employees of the organization behave collaboratively, share valuable knowledge with their colleagues and other important people in

the organization, then the success rate of KMS will increase. In addition, if each member of the organization is motivated to use and apply the knowledge gained from KMS, then the organization can become an effective organization in implementing KMS, which can provide a comparative advantage over its competitors in the long run. This study has shown some evidence of how knowledge management systems (KMS) as the I-Gracias system should be adopted and implemented. Further research is expected to conduct research with a model approach and other adoption factors to KMS which will be utilized according to the needs of the context of the organization and its users. In addition, it is necessary to check whether the strategy of implementing KMS can bring success to Higher Education Institutions under the auspices of the Higher Education Foundation by using performance metrics checks (Performance Metrics).

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