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Knowledge Management Strategy Through Learning Management System in Senior High School: Case Study in Indonesia

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Abstract: - Knowledge management supports educational institutions in improving quality through their ability to manage knowledge. Currently, the use of technology in the knowledge management system is a strategy that schools must consider, including the existence of a Learning Management System. Therefore, this study aims to determine the knowledge management strategy through Learning System Management in Senior High Schools in Indonesia. This research uses qualitative analysis with a single case study. Through the results of this study, it was found that the knowledge management process in Indonesian high schools uses a Learning Management System, namely Moodle, which involves five processes: creating, sharing, structuring, using, and Auditing. Through the involvement of ICT in the form of a Learning Management System, it is expected that various knowledge and information can be appropriately stored and more efficiently.

Keywords: Knowledge management, ICT in Education, Learning Management System, Senior High School.

I. INTRODUCTION

Schools are places for students to study and develop themselves; schools with superior quality will attract many students and produce excellent and outstanding graduates. The right strategy is needed to achieve a competitive advantage, which means that human resources are required to create benefits to win the competition [1]. In practice, many schools encounter difficulties in achieving this goal. The underlying factors can be traced to internal elements or the management of intangible assets such as innovative ideas, expertise, skills, trust, reputation, public image, the ability to collaborate with others, and the perceived quality of graduates [2]. These internal factors need to be properly directed and managed to effectively contribute to organizational performance or outcomes [3]. Therefore, the importance of knowledge management and learning organization factors is evident [4]. This is supported by various studies on the ability of schools to manage knowledge [5, 6, 7, 8]. KM implementation in high schools can also promote an active and collaborative learning culture where students and teachers share knowledge and experiences. This can increase students' enthusiasm for learning and strengthen teacher-student relationships [9].

The implementation of digital technology facilitates routine processes that enhance knowledge management practices within industrial settings [10]. Thus, the literature often links knowledge management and digitization [10, 11, 12, 13]. Besides being determined by the quality of teachers, improving the quality of learning is also determined by the existence of modern technology and information and communication in learning [14The necessity of integrating technology, as mentioned earlier, demands that educators possess strong competencies in leveraging technological advancements to enhance and facilitate learning within schools. In today's world, the digital industry serves as a fundamental reference point for modern societal structures. Consequently, teaching methodologies and fundamental skill development are shifting toward the transformation of virtual learning platforms, complementing traditional classroom instruction through e-learning-based educational activities. [15]. Teachers must develop digital learning experiences that incorporate advancements in technology. [16]. KM is generally ideal to be implemented in educational institutions. However, more educational institutions need to implement KM by using technology primarily based on the Learning Management System. Therefore, this research seeks to review knowledge management strategies using the Learning Management System in one of the schools in Indonesia.

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II. LITERATURE REVIEW

2.1. Knowledge Management

Knowledge management (KM) involves a series of processes and actions that enable organizations to create, obtain, locate, structure, utilize, share, and transfer knowledge, information, and expertise within the organization. It facilitates the integration of these elements into managerial functions, including strategic planning, decision-making, and operational workflows [17, 18, 19]. An essential part of knowledge management itself is knowledge [20]. Knowledge itself is information stored as part of intellectual capital [21]. Learning is an evolving process that extends beyond individuals to organizational capabilities, requiring continuous movement to facilitate the transfer and dissemination of knowledge [22]. Therefore, knowledge management can be defined as a technique to improve and simplify procedures in creating, communicating, distributing, and considering knowledge from a company or organization [23]. Knowledge management systematically coordinates organizations and processes to increase value through reuse and innovation [24].

Knowledge can be categorized into two types: implicit and explicit [25]. Implicit knowledge resides within an individual's mind, shaped by personal experiences and professional activities. Meanwhile, explicit knowledge is systematically recorded and stored in various formats, including books, reports, documents, white papers, memos, training materials, spreadsheets, and similar resources [26]. According to the knowledge creation theory [23], knowledge evolves through a continuous process, thereby enhancing organizational knowledge through four stages: a) socialization, b) externalization, c) combination, and d) internalization. Socialization involves direct interaction between members of an organization to facilitate the sharing of implicit knowledge. Externalization entails the conversion of implicit knowledge into an explicit form, making it accessible to others within the organization. Combination refers to the integration of explicit knowledge into more intricate structures, whereas internalization transforms explicit knowledge back into an implicit form, enabling individuals to assimilate it into their daily practices [27]. Knowledge Management has five basic processes taken from Aronson (2001) [28], namely:

a. Knowledge Creating is knowledge from learning cases in the past, data analysis, or identifying knowledge stored in the organization that was previously unknown to the company and held in individuals.
b. Knowledge Sharing, the process of communicating knowledge to other parties, consists of Social Communication Infrastructure and Technical Communication Infrastructure.
c. Structuring where existing knowledge must be organized and structured so that it can be accessed and used efficiently and optimally by the organization, consisting of information mapping, information storage, and information retrieving.
d. Using is knowledge disseminated to information users and expertise that will then be applied. Includes Product, Service, and Process.
e. Auditing means how much knowledge can be used in the organization's products, services, and processes. Consists of Auditing Knowledge Asset and Measuring Intellectual Capital.Inserting Content Elements.

2.2. Learning Management System

A Learning Management System (LMS) is characterized as an intricate and multifaceted set of IT tools designed to develop and sustain course websites, serving as a fundamental component of blended learning [29]. From a comprehensive organizational standpoint, an LMS functions as an information system responsible for producing, distributing, and overseeing educational resources and learning materials within its IT framework [30]. The Moodle Learning Management System (LMS), widely adopted across various higher education institutions, provides educators with numerous tools to design and execute adaptable e-learning courses. These include adaptive content, sequencing, and assessment strategies. At the core of this approach, instructors have the flexibility to tailor their teaching methods based on students' unique characteristics, educational requirements, and learning preferences [31]. As an open-source platform, Moodle benefits from an extensive developer community that contributes to its continuous enhancement, offering multiple modules designed for effective learning management [32]. The LMS provides an integrated platform for learning materials, delivery, and management that learners, creators, and administrators can access. The LMS acts as the center point of the e-learning implementation. The LMS should accommodate various ways of delivering materials. The teacher's own LMS consists of: viewing learning materials, uploading additional materials, creating quizzes, checking quizzes, uploading practice questions, conduct discussions.

III. METHOD

This study employs a descriptive qualitative approach, emphasizing the observation of phenomena and routine activities within the research site or surrounding environment [33]. Therefore, this process is essential in the qualitative research approach, and good results are expected. This research was conducted at SMAN 1 Sleman. The data were obtained through interviews, observations, and document analysis. To ensure data validity, triangulation was applied, incorporating both technique and source triangulation. The data were analyzed using the Huberman model, which includes the stages of data collection, data presentation, data reduction, and conclusion formulation. The primary informants in this study were principals and teachers who were identified through purposive sampling.

IV. RESULTS

4.1 KM Implementation

There is a conversion of knowledge between tacit and explicit. This can be seen from the frequent workshops on learning media and teaching materials; several resource persons who are experts in their fields are also often invited to train teachers. The existence of explicit knowledge at SMAN 1 Sleman can be seen in documents, teaching materials, material summaries, books, or learning reports. In addition, a personnel strategy can be seen from communication through WhatsApp grub, e-mail, chat, video, or meetings. Discussions that occur between teachers in one subject are an indication that there is a distribution of information from one teacher to another. This is also the case with the socialization process at school after certain teachers have finished participating in activities. Information distribution occurs from one teacher to another, so personal knowledge can be transformed into organizational learning.

4.2 LMS Implementation

SMA Negeri 1 Sleman has been designated as an ICT-based school so that teachers are required to use the LMS. The school formed a special team to develop a Moodle-based LMS. The team also provides a guideline module for teachers. These guidelines are in the form of tutorials on using the LMS in the form of creating quizzes, adding content, etc. In addition to the module, there are various trainings so that the admin or school can monitor teachers who are having difficulties so that assistance can be provided. Before deciding to develop Moodle, SMA Negeri 1, Sleman used the Google Classroom application for learning. During the COVID-19 pandemic, the school thought that the Google Classroom application was less practical, so they tried to develop Moodle as a learning tool. However, at the beginning of Moodle development, it was only used by ICT people. It was only starting in 2021 that Moodle began to be used by all the teachers. The school has required teachers to use the LMS, especially to upload various teaching materials. However, some teachers still seem lazy in maximizing the LMS, so the principal takes a monitoring policy once a month, which will later be used in assessment and certification. The LMS is chosen over other platforms because it is considered more centralized and easy to monitor by the school. In addition, the features provided are also quite complete. The LMS used in this school is Moodle, a free application that is open source; only the domain is paid, and there are many tutorials for its use on the internet.

4.3 Knowledge Management Process Using LMS

a. Creating

The Creation process of teachers can be related to teachers obtaining materials for learning, which can come from textbooks, the process of discussion with teachers, and archives of previous content in the LMS. In addition, the Vice Principal for Curriculum stated that schools often hold training programs for teachers either from MGMP or bringing in various resource persons. Materials are made to be uploaded as YouTube links, assignments, and materials, especially those related to students. Meanwhile, the lesson plans, syllabus, or various administrations are directly submitted to the principal.

b. Sharing

The sharing process starts with the teacher uploading material to the LMS. Then, the teacher can share various materials with students and other teachers.

In addition, the sharing process also takes place directly when teachers meet each other in the office or can be done via chat.

c. Structuring

The process of organizing material on the LMS differs for each teacher; some are per theme, topic, or class. Teachers are welcome to be creative themselves.

d. Using

In addition to uploading learning materials, the LMS is also used by teachers to share knowledge. Teachers see and use teaching documents created by other teachers.

e. Auditing

Teachers find it more helpful to use the LMS. The features offered are more diverse. The system from the LMS is also more centralized than the application previously used by SMA Negeri 1 Sleman. In addition, teachers are better able to manage time from creating to Structuring, especially in uploading material. Much knowledge can be used in products, services, and organizational processes using the LMS. Teachers can see and learn from each other's knowledge, as well as discuss with each other through updated materials.

V. DISCUSSION

Based on the study results, the Implementation of Knowledge Management at SMA Negeri 1 Sleman has been running quite well. There is a knowledge conversion process, which combines various explicit knowledge or transfers from precise to implicit. Converting tacit knowledge into explicit knowledge requires creativity and the ability to express understanding in written form. This ability is needed so that teachers can communicate their knowledge in a format easily stored or accessed by other teachers at school [34]. For example, workshops on learning media and teaching materials are often held, and several resource persons who are experts in their fields are also frequently invited to train teachers. The existence of explicit knowledge at SMAN 1 Sleman can be seen in documents, teaching materials, material summaries, books, and learning reports. These documents are both electronic and physical. Electronic utilization is through LSM (Learning Management System), where teachers upload various learning files. The implementation of Knowledge Management is getting more substantial when the high school uses the help of a Learning Management System in the form of Moodle. According to Aronson (2001) [28], an essential component of Knowledge Management is technology for communication, collaboration, storage, and retrieval. Digitization technology helps routines that support knowledge management practices in industrial applications [10]. Thus, literature often links knowledge management and digitization [10, 12, 13, 35].

Teachers can upload teaching materials in the form of documents and YouTube links. In addition, teachers also send children's assignments. Previously, attendance was also integrated into Moodle but eventually separated. The design and appearance of Moodle are left to each teacher. So that teachers are free to map the material according to the teacher's creativity, either per topic or per class. To overcome teachers who have difficulty using the LMS, a peer tutor is formed with an expert in the group to help the teacher. There are five processes in implementing Knowledge Management strategies at SMA Negeri 1 Sleman: creating, sharing, structuring, using, and Auditing. Each approach utilizes technology in the form of an LMS to disseminate knowledge. The technology catalyzes greater information dissemination and big data analytics that have been applied to various supply chain issues in network design, risk management, inventory management, and retail. The digitalization ecosystem has generally adjusted from being perceived as a connected network between things to an extended relationship between things. [36].

The importance of knowledge management in the new era of digitalization is further reinforced by studies such as (2014) [37], which found that when the IT department is allocated with more decision rights and has more business knowledge, the knowledge creation capability drives the company in a better direction. Strategic risks that, in turn, generate operational and strategic benefits for the company [36, 38] recommended that when school districts integrate the use of LMS, they should make the LMS use functional requirements. They discussed techniques for managing LMS administration, including enabling profile features, curriculum following guidelines, assignment management guidelines, discussion boards, resources for writing, and updates from instructors. LMS users gain access to materials and information disseminated by instructors in synchronous or asynchronous settings [38, 39, 40]. SMA Negeri 1 Sleman has utilized the LMS optimally, especially in the structuring section, where the LMS helps teachers categorize each class's knowledge. In addition, this LMS helps understanding to be better stored.

This LMS can be used for discussions between teachers. However, due to limited access or access that can only be opened by the admin, the utilization of the discussion feature for teachers is not running optimally. Unfortunately, the biggest motivation for some teachers in using this LMS is not in terms of its benefits but the rules and assessments from schools that require its use. This can be caused by using this LMS, which seems complicated for

some teachers. Moreover, teachers at SMA Negeri 1 Sleman have diverse characteristics, especially in age. Therefore, the demands of using Moodle by older teachers are a little, just being able to upload material and give assignments or quizzes to students. Meanwhile, teachers with more abilities are expected to be able to use the LMS as a shared discussion space. In addition, because there are many LMS features and the application is still relatively new, some tools cannot be utilized optimally

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