

## Implementation of Digital-Based Management Information Systems in High Schools

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### ARTICLE INFO

*Keywords:* Management Information System, SIAPMAJU, Education Services

*Received:* 6, October

*Revised:* 26, October

*Accepted:* 28, November

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### ABSTRACT

This study aims to analyze the implementation of a digital-based management information system (MIS) at SMA Negeri 7 Purworejo using a qualitative approach. Data were collected through observation, interviews, and documentation involving the principal, vice principals, the head of administration, and students, and were analyzed using Miles and Huberman's interactive model. The findings show that the MIS has been implemented by teachers through digital learning planning, syllabus development, learning objectives, materials, activities, media, and evaluation using the SIAPMAJU application, with task division aligned with the school's organizational structure. Despite obstacles related to human resources, school conditions, and infrastructure, the SIAPMAJU-based MIS has generally been implemented effectively.

## **INTRODUCTION**

The development of technology has moved rapidly in all aspects of life. This development has exceeded the traffic of information. Various information is easily obtained. As in the world of education, school information can be distributed digitally via mobile phones or other devices (Ovcharuk, Ivaniuk, Soroko, Gritsenchuk, & Kravchyna, 2020). More complex information is also obtained digitally such as student attendance, learning progress, to learning outcome reports. This information is covered in the management information system.

Management Information Systems (MIS) are systems that are planned to collect, store, and disseminate data in the form of information needed to carry out various management functions (Asio, Leva, Lucero, & Cabrera, 2022). How the management information system works, starting from data processing then in the MIS in a centralized database where it can be accessed and updated by everyone who has the authority according to their goals. The MIS is ideally integrated with the educational curriculum in force in a country. If MIS technology is not balanced with the quality and quantity of qualified education, it can cause inequality from the development of technology. The relationship between education-based MIS technology and curriculum development always progresses in every field (Mir et al., 2023). Rapid technology makes the education curriculum. With the relationship between the curriculum and MIS technology that is so good, it is expected to develop the quality of education.

Indonesia, currently, has implemented an independent curriculum. A new curriculum that tries to follow the development of today's technology. This independent curriculum is expected to be able to straighten the orientation of technological development, especially in the world of education (Efendi & Suastra, 2023; Raehang, Aisyah, & Sallu, 2024). The role of MIS is very large in the global education system, for several reasons: (1) the development of MIS technology provides a very large opportunity to develop educational management and learning processes in schools, (2) specific student learning outcomes can be identified by utilizing this new technology, and (3) MIS has a very large potential to transform all aspects of education in schools and utilize them to achieve learning goals (Asio et al., 2022).

The government understands that new technology from MIS can be used in education. However, until now, there has been no standard either in terms of definition or implementation of digital-based MIS learning. This makes many schools have MIS learning concepts in various forms. As a developing country, many schools in Indonesia have an infrastructure with high technology including MIS (Idroes et al., 2023). Some places also do not have electricity and there is no digital-based management information system learning management. The implementation of MIS in learning still has obstacles due to several factors, namely: 1) lack of computer use, 2) teachers do not have knowledge and skills, 3) difficulty in integrating into learning, 4) lack of supervision from staff, and 5) lack of opportunities to participate in training (Swandi, Fauzan, Arsyad, & Rahmadhanningsih, 2024).

These constraints have an impact on the learning process implemented by teachers. Teachers need to leave conventional learning and think about more dynamic and interactive learning by using MIS. This is so that the quality of education in schools/institutions is maintained. For every institution, quality is the main agenda and improving quality is the most important task. In this context, the use of MIS in schools aims to: (1) increase the efficiency and effectiveness of data accurately and in real time; (2) facilitate management to plan, supervise, direct, and delegate work to all departments that have relationships or coordination; (3) improve the quality of human resources, because the work system unit is coordinated and systematic; and (4) increase productivity and cost savings in the organization (Asio et al., 2022). In other words, the use of MIS in education management and the learning process aims to facilitate education organizers and participants to encourage improvements in the quality of education.

The use of digital-based MIS at SMA Negeri 7 Purworejo includes attendance data, student data, correspondence services, personnel services, and assessments. The MIS is an integrated Android-based application with a minimum requirement of android version 6.0. The MIS is called SIAPMAJU. An android application created for service centralization. With the use of the MIS, management related to student affairs, curriculum, and administration becomes easier and more well-organized. This was expressed by the principal through the personnel staff that in the management of personnel data and school community data can be presented easily and quickly with the use of this information system.

Previous studies investigated the implementation of MIS Education in Improving the quality of education in an educational institution. The findings reported that the existence of MIS Education has met the needs of madrasahs and facilitated the learning and school service process (RAHMI). Purwaningsih's research highlights the implementation of MIS education in the form of the MISPATIKA application (Purwaningsih, 2022). Then, Ilman and Ikasari's research investigates the implementation of Management Information Systems (MIS) as an effort to improve operational efficiency in manufacturing companies (Ilman & Ikasari, 2023). On the other hand, Asnawi (2017) examines the influence of system quality, information quality, service quality and user participation on user satisfaction of the system. Dewi, Animah, & Mariadi (2021) analyzed the effectiveness of the implementation of MISDA at the Regional Secretary of Mataram City, especially the general section. In previous studies, the information system used was still partial or separate, so the data did not become one. The difference in the research that the researcher will conduct is more on the approach to utilizing MIS in integrated education management and smart device applications at SMA Negeri 7 Purworejo. Based on the background above, this study reveals the implementation of digital-based MIS utilization at SMA Negeri 7 Purworejo.

## LITERATURE REVIEW

### *Implementation of Digital-Based Management Information Systems in High Schools*

The implementation of digital-based Management Information Systems (MIS) in educational institutions has become an essential component in supporting administrative efficiency, data-driven decision-making, and the improvement of learning quality. MIS in schools is defined as an integrated system used to collect, process, store, and disseminate information to support management functions, including planning, organizing, directing, and controlling (Laudon & Laudon, 2016). In the context of secondary education, digital-based MIS plays a crucial role in simplifying administrative tasks, enhancing transparency, and improving communication among stakeholders such as school leaders, teachers, students, and parents.

Several studies highlight that digital MIS adoption in schools contributes to improved effectiveness of academic and non-academic processes. Turban et al. (2018) note that digital MIS enables automation of key school activities, such as scheduling, curriculum management, assessment reporting, and student attendance monitoring. In high schools, the integration of MIS into learning processes further supports teachers in preparing lesson plans, storing digital materials, and evaluating student performance. Systems such as e-learning platforms, digital gradebooks, and school administration applications have shown positive impacts on instructional quality and teacher productivity (Jabarullah & Hussain, 2019).

The success of MIS implementation, however, is influenced by organizational readiness, user competence, and infrastructure availability. According to the Technology Acceptance Model (TAM), acceptance of digital systems depends on perceived usefulness and perceived ease of use (Davis, 1989). In school settings, the digital literacy of teachers and staff becomes a determining factor for optimal system utilization. Studies by Kurniawan (2020) and Adeyemi (2021) emphasize that lack of training, resistance to technological change, limited internet connectivity, and inadequate hardware often hinder MIS integration in educational environments.

Digital-based MIS also supports governance and accountability. The system strengthens data accuracy and enables real-time monitoring of school performance indicators, aligning with educational quality assurance standards (UNESCO, 2019). For high schools, MIS serves not only as an administrative tool but also as a strategic instrument for enhancing institutional competitiveness in the digital era. Schools that successfully adopt MIS demonstrate improved communication, increased transparency in learning evaluation, and better coordination across departments.

Overall, the existing literature underscores that implementing digital-based MIS in high schools provides significant benefits in operational efficiency and educational quality. Nevertheless, its effectiveness depends on supportive infrastructure, adequate human resources, continuous training, and commitment from school leadership. Strengthening these components will ensure that MIS can function optimally as a foundation for digital transformation in secondary education.

## METHODOLOGY

This study uses a qualitative research design. This study was conducted at SMAN 7 Purworejo. Determination of subjects was carried out by applying the purposive sampling technique. Purposive sampling is a technique for taking data sources with certain considerations (Mallillin, 2022). The subjects of this study included the principal, vice principal for student affairs, vice principal for curriculum, head of administration, vice principal for facilities and infrastructure, and students.

This data collection used three techniques, namely: observation, interviews, and documentation. The qualitative observation method is an observation in which researchers go directly to the field to observe the behavior and activities of individuals in the field (Barma, Daniel, Bacon, Gingras, & Fortin, 2015). This research method is used to observe how the implementation of the quality of learning management with the SIAPMAJU application. The type of observation used is unstructured observation because in this party the researcher is free and flexible in observing events.

Interview is a process of question and answer or oral dialogue between the interviewer (interview) and the respondent or person being interviewed (interviewee) with the aim of obtaining information needed by the researcher (Pandey & Pandey, 2021). In the interview, the researcher asks questions about the research conducted to the informant. The questions asked are unstructured and open to elicit views and opinions from the participants which are of course very diverse. The goal is to dig deeper into information. In this study, the researcher used two types of interviews, namely individual interviews and group interviews.

The document method can be interpreted as a process of proof based on any type of source, whether written, oral, and illustrated. The documents analyzed are documents related to the quality of online learning education management in the curriculum, student affairs, public relations, and documents on the results of Online Learning Quality Management at SMAN 7 Purworejo. These documents are very important because they strengthen the findings and serve as a comparison in the subsequent triangulation process.

After the research data is collected, data validity testing is carried out to measure whether the data and the search process are correct. To obtain reliable data, researchers use the triangulation technique, namely a data validity checking technique that utilizes something else, outside the data, as a checking instrument and as a comparison to the data. One type of triangulation with sources that compare and check back information obtained through different times and tools.

Data analysis is the process of organizing and sorting data into patterns, categories, and basic units of discourse. In qualitative research, data analysis aims to produce detailed descriptions of situations, events, and a person's behavior. So, this data analysis is carried out starting from going into the field to collect data to systematically compiling the data. The collected research data are then analyzed using the flow model qualitative data analysis technique developed by Milles and Huberman which consists of three stages, namely data condensation, data presentation, and concluding (Miles, Huberman, & Saldaña, 2014).

## **RESEARCH RESULT**

Based on the research results and to identify several obstacles in mastering skills in Digital-Based Management Information Systems (MIS) at SMAN 7 Purworejo, the researcher will describe the findings in the following further discussion:

From the observation results, the researcher concluded that the policy on program creation in the implementation of education at SMA Negeri 7 Purworejo was made by experts in their fields who have the authority to do so that it does not cause problems in learning and the environment outside of education. Each administrator or vice principal staff in each structural sub-section of the school is an element implementing education policies in the school. This was expressed by the Vice Principal for curriculum as follows:

“Each field has its role structurally. We from the curriculum field are responsible for learning services and maintaining the quality of learning itself. Digital-based learning services have changed the educational landscape significantly. By utilizing technology, education becomes more inclusive, relevant, and engaging. However, to achieve the full potential of this technology, support is needed from various parties, including the government, schools, teachers, students, and the community.”

The deputy head of student affairs also said the same thing in his interview as follows: “In the implementation of student activities, this digital-based information system is very useful in the effectiveness of data collection and monitoring of student activities. Digital student services are an innovation that can improve the efficiency and effectiveness of school administration management. By utilizing technology, schools can provide better services to students and parents. However, it should be remembered that the success of implementing this system is highly dependent on the readiness of infrastructure, human resources, and support from all parties.”

The use of a Digital-Based Management Information System (MIS) in the implementation of education at SMA Negeri 7 Purworejo requires a team or expert staff as QC (Quality Control) acting as a research team (check) on every MIS program implementation agenda. With the presence of QC, it is expected to minimize errors and ensure that the digital-based MIS program runs well. In the statement by the Deputy Head of Facilities and Infrastructure who provided information related to this matter.

“Information system maintenance is the process of maintaining and repairing systems to ensure that they operate optimally, safely, and following user needs. This involves a variety of activities, from software updates to routine maintenance scheduling. By performing effective maintenance, organizations can ensure that their information systems operate optimally, safely, and support service objectives.”

Supporting elements of the MIS application must be carried out. There is a need for filling in/ updating data during the implementation of input in the MIS program so it is natural that the MIS input program task executors do not always carry out tasks quickly. There are times when in certain months (for example at

the beginning of the semester (July and August). MIS input officers will do a lot of input, for example, related to the implementation of new student admissions schools, or inputting class promotion data for all students, and others. This was expressed by the Deputy Head of Student Affairs.

“New student data collection is an important process in the world of education. This activity is not only about collecting data, but also becomes the basis for learning planning, resource allocation, and evaluation of educational programs. Personal Data: Full name, date of birth, gender, religion, address, telephone number, and parent/guardian data. Academic Data: School of origin, report card grades, academic achievements, and interests/talents. Health Data: History of illness, allergies, and special health conditions. Socioeconomic Data: Family background, parents' occupation, and family economic conditions. This data collection is through the school website or application; prospective students can fill out the registration form online.”

In this regard, with the presence of the MIS program QC team, the steps run faster. Data entry officers or operators no longer check their work and operators can focus more on the objectives or targets of input. On the other hand, the MIS program QC team focuses on researching and reporting the results to school management. For example: if QC checks the student affairs section, then QC reports the results to the Vice Principal for Student Affairs, and then the Vice Principal for Student Affairs reports to Top Management, namely the principal.

From the data, it can be concluded that with the MIS Program, a school MIS supervisory team is also needed. The team consists of each administrative staff of the Vice Principal so that it can accommodate reporting on the results of innovations in learning strategies at SMA Negeri 7 Purworejo from subject teachers. Teachers have implemented innovations in learning strategies, innovations in classroom atmosphere, innovations in learning methods, and innovations in student conditions in the classroom. This was expressed by the Vice Principal for Curriculum and the IT team of SMA Negeri 7 Purworejo.

“Information Systems Supervisors play a very crucial role in ensuring the smooth operation of information systems in an organization. Their duties vary widely, from planning, and implementation, to system maintenance. System Planning: Developing long-term plans for the development and improvement of information systems. Needs Analysis: Identifying user and business needs to determine appropriate technology solutions. System Design: Designing an efficient and effective system architecture. Budget: Developing a budget for system development and maintenance. System Analysis: Analyzing existing systems to identify areas for improvement. Application Development: Developing new applications or modifying existing applications. System Integration: Integrating different systems so that they work together.”

The researcher asked questions related to the steps taken by SMA Negeri 7 Purworejo related to the implementation of MIS at SMA Negeri 7 Purworejo. Then, the Deputy Head of Curriculum at SMA Negeri 7 Purworejo answered that the steps for implementing the MIS program at SMA Negeri 7 Purworejo were carried out in several stages. The first is to divide tasks into related structures to summarize the needs that should be needed when implementing MIS at school.

Then, the school structure summarizes the needs and at the same time, it can be a reference at the school structure meeting to take the next steps. With the summary data from the school structure, the principal forms a task implementation team. Then, the task implementation team carries out the tasks as they should. This was conveyed by the Deputy Head of Curriculum as follows:

“The implementation of information systems in schools is a strategic step to improve the efficiency of data management, improve the quality of educational services, and support a more effective teaching and learning process. By utilizing information technology, schools can automate various administrative processes, increase the accessibility of information, and facilitate collaboration between teachers, students, and parents.”

Then, the researcher asked again whether there were any obstacles related to the implementation of MIS at SMA Negeri 7 Purworejo. Then, the Head of Administration of SMA Negeri 7 Purworejo answered that the possibility of obstacles was influenced by several factors, including: 1) the quality of human resources, 2) the condition of the school area, related to SMA Negeri 7 Purworejo having a large area of more than 4 hectares, and 3) some internet facilities supporting MIS that are not sufficient/meet the needs. However, the school always anticipates so that it can always avoid obstacles that may occur.

In the implementation of education, there are activities carried out by each leader of an office/government agency, including schools, to evaluate and determine the performance of their teachers. The results of supervision of implementation are coordinated with the person responsible in their respective fields. Supervision is the initial step to measure the performance of implementation in schools, which is an integration between human resources and other resources to answer the demands of environmental development and be within the school management system (Rusdiman, Siburian, Purba, & Sinaga, 2022). To improve the efficiency and effectiveness of school performance, schools must continuously carry out internal supervision to show changes towards improvement. These changes must be arranged in a consistent and sustainable stage so that they can improve accountability and performance that is oriented towards achieving results.

The process of implementing education in utilizing MIS includes various things. First, an integrated and well-synchronized learning process. An integrated and well-synchronized learning process is a learning approach that integrates various aspects of learning, be it concepts, skills, or attitudes, into a coherent whole (Adesina, 2023). All learning elements are interrelated and support each other, so that students can gain a deeper and more comprehensive understanding.

The benefits of integrated and synchronized learning are a deeper understanding of students who can connect different concepts and see their relevance in real life. Improved critical thinking skills when students are trained to analyze, evaluate, and solve problems. The development of creativity is that students have the opportunity to express their ideas and produce original work (Tri Murwaningsih & Fauziah, 2022). Then, there is a high learning motivation where interesting and relevant learning makes students more motivated to learn.

Furthermore, better preparation aims for real life. This is in the form of students being trained to face challenges in the complex and ever-changing real world.

The implementation of integrated learning is exemplified by the completion of a project involving several subjects. For example, a project to make a documentary about the environment involving the subjects of Indonesian, Science, and Social Studies. Problem-based learning, namely students are invited to solve real problems that are relevant to their lives. Then, the use of case studies, namely students analyze real cases to understand the concepts being studied. In this situation, a balance is needed between available resources and human resources who have the skills to operate the school's MIS. This is done to implement an integrated educational MIS and can support the success of the world of education. According to previous research, the use of appropriate models' benefits teachers and students so that learning is effective and student achievement is met (Fauziah, Marmoah, Murwaningsih, & Saddhono, 2020).

Second, Digital data is centralized and single. This concept refers to a situation where all data owned by an organization is in one location or single server. This data is not duplicated or spread across multiple locations. A single storage location means that all data is in one place, be it a physical or virtual server. Then, centralized access means that all users who need data must access it through this central point.

All database systems at SMA Negeri 7 Purworejo use a centralized approach to storing data. A file server that stores all company files in one location. Although distributed, some cloud storage services also offer centralized storage options for certain data. The choice between centralized and distributed data depends on a variety of factors, including data size, performance needs, security requirements, and budget. There is no perfect solution for all situations, so it is important to carefully evaluate the needs of the organization before making a decision (Louis & Kruse, 2021).

Third, the acceleration of digital-based student services. Acceleration of digital-based student services refers to efforts to improve the efficiency, effectiveness, and quality of services provided to students by utilizing digital technology. This involves the integration of information and communication technology (ICT) into various aspects of education, from the learning process to school administration. This has a significant impact on the time required to complete administrative tasks so that educators can focus more on learning activities. Other research findings agree with this study. They revealed that ICT simplifies administrative work (Mogale, Rankhumise, & Mkhomazi, 2021). Improving the quality of services is done by providing easier and faster access for students to information and learning resources. In addition, other improvements include opening up opportunities for students, facilitating more personalized learning, increasing transparency in the management of student and school data, and adapting the education system to increasingly digital developments.

The form of implementation at SMA Negeri 7 Purworejo is an academic information system, e-report card, google classroom, and data-based analysis. Accelerating digital-based student services is an important step to improve the

quality of education in the digital era. By utilizing technology, we can create a more innovative, effective, and enjoyable learning environment for all stakeholders. Increasing school activities is one form of realization of development in all fields. This is influenced by several factors, including human resource (HR) capabilities, management, science and technology, and facilities and infrastructure. Human resource capabilities influence performance so that school activities are more varied (T Murwaningsih & Fauziah, 2023).

In addition, a factor that is no less important for schools is internal implementation to improve teacher performance. This factor is a supporter of operational activities, including community service activities. Supervision is the fourth managerial function after planning, organizing, and directing (Rusdiman et al., 2022). As one of the management functions, a supervision mechanism in a school is necessary. The implementation of a plan or program without being accompanied by a good and continuous supervision system.

Supervision is the last function of the management implementation process. This function is closely related to other management functions. Through the supervision function, the standard for the success of program implementation at SMA Negeri 7 Purworejo is in the form of a target for student graduation during their education of 100% graduation, the work procedures of the principal and teachers, and the success of students in their studies. The supervision function aims to make the use of resources more efficient, and staff tasks to achieve program goals can be more effective and improved at SMA Negeri 7 Purworejo. Good MIS governance is the key to achieving goals in order to create the desired conditions (Gupron, Yandi, Suprpto, & Sadewa, 2024). Schools that implement good MIS governance have been proven to be able to reduce costs when they have set a strategy. One of the steps to success is the placement of appropriate human resources and infrastructure as a supervisory step when handling a particular process.

## **CONCLUSIONS AND RECOMMENDATIONS**

The utilization of digital-based MIS in SMA Negeri 7 Purworejo has been implemented by every teacher with evidence that all subject teachers have made learning plans, including compiling syllabus, learning objectives, learning materials or contents, teaching and learning activities, learning media and learning evaluation. The utilization has been prepared in accordance with Permendiknas No. 41 of 2007 concerning process standards and adjusted to school conditions. The strategy in learning at SMA Negeri 7 Purworejo is influenced by the development of technological innovation, so teachers must create innovations in learning strategies, innovations in classroom atmosphere, innovations in learning methods, and innovations in student conditions in the classroom.

The use of digital technology-based MIS in the implementation of education at SMA Negeri 7 Purworejo has been proven to increase the effectiveness of performance and efficiency in time and funding so that students can be served with other developments. This MIS model should also be applied in other schools, by first assessing its suitability to local environmental conditions

and situations and then making the necessary adjustments. This study produced several interesting findings that can be explored through further research that is important for the development of educational management science, such as the importance of the role of leaders in the development of educational innovation. Future researchers can target similar research with the perspective of leadership, quality management, or educational innovation management. The use of educational facilities and infrastructure at SMA Negeri 7 Purworejo is also interesting to study from the perspective of educational facilities and infrastructure management in the context of the use of digital technology in the implementation of education in general. In addition, the importance of the role of teachers in the success of the use of digital technology-based MIS at SMA Negeri 7 Purworejo can also be studied from the perspective of teacher performance or teacher competence.

### **ADVANCED RESEARCH**

Future research on the implementation of digital-based MIS in educational settings can be advanced by examining the dynamic interaction between technological innovation, leadership practices, and organizational readiness. Building on the findings at SMA Negeri 7 Purworejo, future studies may explore how school leadership influences the adoption, optimization, and sustainability of digital MIS, particularly through strategic decision-making, capacity building, and innovation-oriented school culture. Research can also investigate MIS effectiveness from the perspective of quality management, focusing on how digital systems enhance monitoring, evaluation, and continuous improvement processes. Additionally, studies on the management of facilities and infrastructure could provide insights into how schools adapt their physical and digital ecosystems to support technology integration. Further inquiry into teacher performance and competence may reveal critical factors that shape teachers' ability to utilize MIS effectively, including digital literacy, pedagogical innovation, and professional development support. Integrating these perspectives would offer a comprehensive understanding of digital MIS implementation and contribute to developing more robust educational management models in the digital era.

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