

Implementation of ICT-Based Management Information Systems in Increasing the Effectiveness of Students' Learning at State Vocational School 1 Gelumbang

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Article History: Received on 29 October 2023, Revised on 30 November 2023,
Published on 2 January 2024

Abstract: This study aims to describe and analyze the implementation of an ICT-based management information system as well as the supporting and inhibiting factors in increasing the effectiveness of student learning. This research is qualitative and was conducted at SMK Negeri 1 Gelumbang, Muara Enim Regency, south Sumatera Province. techniques for collecting data from observations, interviews, and documentation. The results of this research show that the application of management information systems at SMK Negeri 1 Gelumbang in learning activities is generally ICT-based. The application of a manual or physical-based management information system is only carried out to overcome the obstacles that occur in the delivery of information on learning activities. The application of an ICT-based sim can be seen in all computerized data, management, and delivery of information on learning activities by using Google Classroom, WhatsApp groups, Telegram, PowerPoint, learning videos (YouTube), Quizizz, Wordwall, Web-Learning, and blogs so as to increase effectiveness in learning. To overcome the obstacles of ICT-based learning that cannot be overcome, the delivery of information is done manually or physically in the form of hard copies of materials, learning assignments, evaluations, and library books.

Keywords: ICT, Information System, Management

A. Introduction

It is undeniable that one of an organization's primary resources for boosting its competitiveness versus rivals is information these days. To improve and gain a competitive edge (added value) in the market against other similar organizations, an organization looks to implement information technology or systems to increase effectiveness and efficiency in the management process (Triwiyono & Meirawan, 2013). This also holds for educational institutions like schools. An important factor in the general growth of Indonesians is education.

The goal of education is to equip human resources to handle innovations that will make them more and more competitive. As a result, it is crucial to expand science education since a high-quality education can raise a country's level of intelligence. To offer the basis that education needs today, it must acknowledge its role as a producer of educational services. Education establishments need to be cognizant of the ever-more-complex demands of society. In addition to ensuring quality through the fulfillment of appropriate standards, the expectations of education also include high performance, efficiency, and productivity components backed by value and information and communication technology (ICT). It is a reliable unit that needs to be carefully incorporated into the management framework.

A management information system is an all-inclusive and synchronized set of information subsystems that may convert data into information using a variety of techniques to meet preset standards or objectives. Additionally helpful in guaranteeing the flow of efficient and high-quality information is this management information system, which focuses on the availability of technology and information backed by human resources qualified to operate it. The educational management information systems, according to (Rochaety et al., 2010) in their book *Educational Management Information Systems*, are a combination of information technology applications and human resources to choose, store, process, and retrieve data to support the field decision-making process. instruction.

According to Permendikbud Number 34 of 2018, all SMKs and MAKs must adhere to management standards, one of which is the installation of a management information system (SIM) (Permendikbud, 2018). It is hoped that with this management, they will be able to offer high-quality instruction and learning to prepare graduates who will meet the demands of the business and industrial world in the future and meet the stated objectives. Applications that assist educational activities are anticipated to arise from the current Educational Management Information System (SIM). This educational management information system must be implemented with a balance of human resources and ICT operating experience.

ICT (Information and Communication Technology), as it is usually known, is a significant technological advancement in the field of education today. One element that is inextricably linked to educational activities is the presence of an information system. According to (Suradji, 2018), information is produced through technology processing data; information cannot be made without controlled data. The steps in the data processing process are gathering, gathering, processing, and storing data before producing high-quality information. ICT is employed in practically every part of life, and in the future, it is anticipated that its influence will grow worldwide. Mustafa in (Yusman, 2010) states that the main purpose of ICT application is to speed up the acquisition and processing of information to facilitate the making of quicker and more accurate judgments. When ICT is applied properly, it can be

beneficial for commercial and industrial operations that demand ICT proficiency from potential employees.

According to John Naisbitt in (Yusman, 2010), a nation that leads the globe in information technology will likewise be more powerful overall. Mustafa went on to say in (Voenlin, 2019) that he was aware that different policies were put in place by the Directorate of Vocational High School Development (Dit PSMK) to foster ICT in the vocational school setting. The Dit PSMK ICT Program's primary goal is to hasten the training of qualified ICT workers. Its secondary goal is to supply teachers with the necessary skills for both material mastery and ICT-based teaching techniques.

Teachers can use ICT to support a wide range of teaching and learning tasks, such as administration, communication, resource development, lesson planning, delivery of materials, evaluation, activities in and out of the classroom, autonomous learning, and professional development for teachers. It can be challenging to put into practice teachers and students using ICT for learning at its best. In the past, teacher-centered learning and the traditional method of knowledge transfer were practiced, with a blackboard serving as the primary tool. With textbooks serving as the primary source of information, teachers remain the only professionals in their sector with expectations for their assessments and learning materials.

ICT use for education by educators and learners At least three requirements must be satisfied: (1) accessible access to technology, including internet connections, for both teaching staff and students; and (2) easy access to digital information (teaching materials). Recognized by educators and students alike, pupils need to be equipped with the know-how to use resources and technology to assist them in meeting academic goals. The demands of a globalized society drive the education sector to adjust technology advancements to raise learning standards. The use of information technology and the provision of the Internet in the learning process can be used as facilities to improve educational services.

Government Regulation Number 19 of 2005 states that to meet national education requirements, there must be sufficient infrastructure and facilities, including the use of information and communication technology (Peraturan Pemerintah, 2005). Managing education as a management information system employing ICT resources is one of the key elements in raising the caliber of education in this globalized period. This will increase learning's inventiveness, creativity, effectiveness, and efficiency. Information becomes more and more important as globalization spreads around the globe.

Putting in place an ICT-based management information system is essential and can provide you with a competitive edge. For modern education management, using ICT is not simply a status symbol or way of life; it also strengthens governance,

accountability, and the public perception of educational institutions, all of which improve output quality and performance (Indrayani, 2011).

The advent of a computer technology combination comprising hardware and software in the late 1980s marked the beginning of the adoption of ICT in the field of education. Since then, there has been a new development in the field of education: an attempt has been made to employ computer equipment that can be used for communication to greatly enhance the field's performance (Rochaety et al., 2010). In addition to computers and their connections (hardware and software), the modern educational system needs skilled human resources (brainwave) to run it. Learning has replaced the term "teaching" as the term for the instructional process. The process of receiving, digesting, and subsequently processing information to produce output in the form of learning outcomes is known as the learning system. The interaction between an individual's internal and external conditions occurs during information processing. While external conditions refer to outside stimuli or the environment that affect an individual throughout the learning process, internal conditions are those that exist within the individual and are required to produce learning results.

ICT encompasses more than simply computer operation; it also involves using technology to interact and communicate in a learning process that is dynamically evolving and becoming more sophisticated. Learning becomes more engaging and productive when ICT is used in the process. Information and communication technology is defined as a unit of related hardware and software (Permendiknas, 2008), which regulates the integration of ICT into the National Education System and outlines the Standards of Infrastructure for Vocational High Schools (SMK) and Vocational Madrasah Aliyah (MAK). Schools must thus have fully functional spaces for the management and access to information and communication, including computer labs that students will utilize to develop professional staff capable of keeping up with scientific and technological advancements.

However, the use of ICT in Indonesian education is currently restricted to government-funded projects that provide educational institutions with electronic devices. These projects are not yet fully beneficial for the advancement of education because there are insufficient management concepts for ICT and insufficient human resources who are truly competent to use them. As stated by Geger Riyanto (Asmani, 2011), ICT for education should be defined as the availability of channels or facilities that can be employed for the transmission of instructional content. The Ministry of Education and Culture (Kemendikbud), working with the Center for Educational and Cultural Data and Information Technology (Pusdatin), is one of the organizations working to increase the use of ICT in Indonesian education. They are also working to improve the effectiveness of ICT in learning by developing human resources. The idea of education is focused on how to pique students' interest and

motivation to learn in a fun way by using one of the methods of applying ICT in learning. Educators must be competent in ICT and competent in carrying out ICT-based learning activities.

To build dependable and competitive human resources, the education governance system internally relies heavily on the institutional development and application of ICT, while also maintaining a focus on human dignity and values. a method of teaching that helps pupils understand the purpose of learning so that the knowledge they acquire will be beneficial to them both now and in the future.

Rustaman states (Wiranata, 2021) that to accomplish learning objectives, the teaching staff, students, and reciprocal communication engage in interaction activities. This process is known as the learning process. However, learning is a process of interaction between students and teaching staff as well as learning resources in a learning space, according to (Wahyudi et al., 2015). For the learning process to be successful and efficient, it must be planned and executed. Teaching staff and students are two components of the learning process that cannot be separated, according to the two arguments given above. Teachers need to be proficient in learning management to maximize the use of classroom resources, foster a culture of continuous learning, and give students stimulation to keep them engaged in class activities.

This research is intended to describe and analyze the extent to which the application of an ICT-based management information system has increased the effectiveness of students' learning as well as what are the supporting factors and factors. This is because it is important to increase the effectiveness of learning to produce quality output by the expected objectives. challenges in putting ICT-based management information systems into practice.

SMK Negeri 1 Gelumbang was selected as the study's site because it has integrated ICT into its curriculum to support instruction and develop a superior and globally competitive generation. This is reflected in the school's vision statement, which reads, "To become a community service center to prepare a superior generation." Character, entrepreneurial spirit, environmental insight, and global competitiveness." To current learning demands, the use of ICT in the classroom at SMK Negeri 1 Gelumbang has been improved. This is based on the Ministry of Education and Culture's Circular Letter number 15 of 2020, which addresses the implementation of home learning during the COVID-19 emergency. The school has a variety of ICT infrastructure and gadgets to facilitate the use of ICT in the classroom, including servers, computer labs, PCs, laptops, wireless internet networks, LCD projectors, and more. In addition to utilizing ICT-based learning, SMK Negeri 1 Gelumbang has prepared infrastructure and ICT-oriented human resources as part of its efforts to enhance the caliber of ICT-based learning.

ICT gadgets, such as laptops, internet networks, and cellphones, are already used by teaching staff to conduct instruction, according to observations obtained during the initial study. The majority of teaching staff can use ICT as indicated by the provision of various teaching materials/materials in the form of videos, PowerPoints, web-based teaching materials, and other types related to e-learning.

Planning, organizing, monitoring, and formative evaluation are the first steps in the implementation of this learning management information system. These steps are overseen by each member of the teaching staff and are subsequently recorded in a learning journal as documentation for the school, particularly the curriculum department. The issue, though, is that some students do not own cell phones, which makes it difficult to supply information systems for learning activities. In addition to the fact that not all students own cell phones, many of them live in rural areas and frequently encounter power outages, unsupported internet networks, and a deficiency in ICT expertise and comprehension. In addition to the challenges listed above, another issue is that teachers are unable to apply ICT-based learning as effectively as possible because they lack the necessary knowledge and abilities to understand ICT, especially how to use it for instruction. Some teachers still lack the ICT skills necessary to use ICT effectively, which makes it difficult for them to manage learning activities. As a result, students are not encouraged to actively participate in the learning process offered by teaching staff; instead, they tend to be passive and are not encouraged to carry out activities that provide the experience necessary for concept development, even though it is expected of them to have the knowledge, skills, and positive attitudes that are demonstrated as learning outcomes. This skill enables one to live both inside and outside of the classroom, where formal education is imparted, in an autonomous, perceptive, imaginative, and critical manner. Similarly, all educators must be focused on honing their skills in utilizing ICT as a tool to enhance the educational process and promote the success of the educational sector.

The researcher intends to carry out additional research to characterize and assess the degree to which ICT-based Management Information Systems are implemented in boosting the efficacy of student learning at SMK Negeri 1 Gelumbang, based on the description of the results of the initial study above.

B. Methods

SMK Negeri 1 Gelumbang, situated on Jalan Raya Palembang Prabumulih KM 50 Talang Taling Village, Gelumbang District, Muara Enim Regency, South Sumatra Province, is the location of the research. The study was conducted in August and September of 2021. In this study, purposive sampling – that is, a sampling strategy with specific considerations – was combined with a non-probability sample method

to gather informants. Individuals who participate actively and directly in the educational process at SMK Negeri 1 Gelumbang, including (1) the principal; (2) deputy principals representing the departments of curriculum, infrastructure, community relations, student affairs, and quality assurance; (3) IT personnel; (4) a total of 83 teaching staff members; (4) students, divided into 40 groups, including class X with 12 groups totaling 428 students and class 2 groups with 58 students.

The sample is chosen by the researcher based on his judgment after taking the sample's features into account. Because it aims to examine how the installation of an ICT-based Management Information System (SIM) boosts the efficacy of students' learning at SMK Negeri 1 Gelumbang, this study employs a descriptive qualitative methodology. The topic from which the data can be acquired is the data source in this study. The data sources explored in this research consist of main data sources in the form of words and actions, as well as additional data sources in the form of documents and others. Data collection techniques are one of the most important parts of research. This research uses data collection procedures which include:

1. Observation
2. Documentation
3. Interview
4. Data Recording

C. Results and Discussion

1. Implementation of an ICT-based management information system in student learning activities at SMK Negeri 1 Gelumbang

A management information system, also known as ICT-based information management, is a system that facilitates a variety of functions, including communication, information sharing, management governance, and the utilization of technology in the form of hardware or software to assist users in carrying out their daily tasks. The head of SMK Negeri 1 Gelumbang, who serves as a manager and leader in academic activities including creating the curriculum for the PK (Center of Excellence), supporting self-directed learning platforms, and other initiatives, exemplifies the applicability of this idea.

The principal collaborates with the teaching staff, infrastructure, curriculum, and education departments while organizing, coordinating, and supervising learning activities. This backs up the view that management is the process of working with others to accomplish a shared objective or finishing a task jointly (Ahmad & Munawir, 2018).



Figure 1. The principal acts as a leader and manager and coordinates with all areas of the school's academic activities

Based on the findings of the data analysis and observations, SMK Negeri 1 Gelumbang uses ICT to communicate information about its learning activities. ICT devices provided by the school, such as servers (main computers), wifi-routers (wifi signal transmitters), UPSs (uninterruptible power supplies), PCs, laptops, LCD projectors, printers, and scanners, have supported the management information system of ICT-based learning activities. This supports Gordon B. Davis' theory of management information systems (MIS), which was published in (Prasojo, 2013). According to Davis, MIS is always connected to computer-based information processing.

The curriculum field is the one that oversees learning activities as well. Based on data analysis conducted in this field, ICT-based SIM has been put into practice. This bolsters the notion put forth by Widodo (Sutojo, 2015), according to which implementation is a process that calls for the use of a variety of resources by both individuals and groups, including people, money, and operational capabilities, to accomplish predefined goals. formerly by decision-makers.

This is evident from the fully automated planning and data management. the gear that powers Android smartphones, servers, printers, scanners, laptops, WiFi, and UPS. Standard Microsoft Office Word and Excel applications are the software utilized. In the curriculum sector, Brainware, or human resources, comprises the deputy principal, three employees – two teachers and one education staff member – and two IT employees with strong credentials in network engineering and informatics.

According to (Gunadi, 2017), the curriculum sector has performed the tasks and functions of a management information system, namely data collection, data storage, data processing, and data programming, as evidenced by the information flow from the curriculum sector to teaching staff. The curriculum sector sends material to the teaching staff using Google Forms, e-books (PDF), and WhatsApp groups.



Figure 2. Activities in the field of ICT-based curriculum

In the meanwhile, each class teacher uses Telegram and a class group on WhatsApp to communicate with pupils about the lecture program. To manage data, assessment information, and student learning outcomes, SMK Negeri 1 Gelumbang uses servers for ANBK (computer-based national assessment) activities. Although the school has not yet used servers, socialization and workshops for teaching staff have been conducted, and the school will make an effort to use them. The server will be used to manage e-reports including statistics and information on student learning outcomes for the current academic year, which is 2021–2022.



Figure 3. Server use in ANBK activities

One staff person working in the curriculum sector oversees the learning journal activities, which are completed in the form of Google Forms. Every week, students fill up journals with information about the material and assignments they are given. Teaching staff uses ICT to deliver information on assignments, daily assessments, and learning materials for online learning. Laptops, PCs, Android smartphones, LCD projectors, and printers are examples of the hardware used. Teaching staff (subject teachers) utilize learning platforms like Google Classroom, blogs, web learning, YouTube, PowerPoint, e-books (pdf), learning videos, and WhatsApp applications to manage the information delivery of ICT-based learning materials.

Students at SMK Negeri 1 Gelumbang are receiving ICT-based learning materials by the teachings of Skinner and Austin (Putra, 2013), who claimed that computer-based learning models can boost students' motivation for learning by boosting their self-confidence. This is evident from a review of data in the learning diary, which is completed by teaching staff each week and contains assignments, resources, and daily evaluations as well as proof of student work and attendance records. (Image 4.4) A Google form was used by curricular professionals to develop an ICT-based learning log for teaching staff.

Teaching staff plans how to communicate the learning material found in the RPP (learning implementation plan) before instruction begins. Teachers have already planned the lessons using the available materials, allowing students to view the posts during the designated subject hours. Based on ICT, offline learning activities are also conducted. Teaching personnel utilize LCD projectors to present power points and instructional movies to communicate information and ideas in general.

Assessment is one component of learning activities that also uses ICT. Summative and formative evaluations are used for assessment at SMK Negeri 1 Gelumbang. ICT-based teaching staff (subject teachers) administer daily tests as formative assessments using Google Forms, the Quizzizz app, and Wordwall. Google Classroom is used to deliver this information, and students can use Telegram or WhatsApp to get in touch with one another if they are having issues.

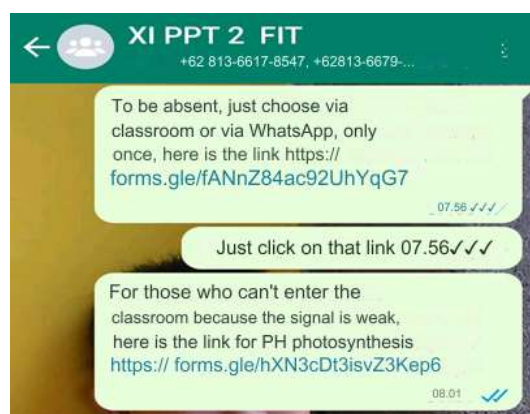


Figure 4. Delivery of daily assessment information and communication to students

The curriculum department established a committee to oversee the implementation of summative exams known as the PAS (end-of-semester assessment) and PTS (mid-semester assessment), which are administered by committee decree. The faculty members draft questions, enter them into a Google form, construct a link out of them, and send them over WhatsApp to the committee. The committee will then insert the link by the curriculum sector's established activity plan. Subsequently, the committee will provide this link to every homeroom teacher, who will then forward

it to the pupils. According to the findings of the data analysis and the preceding discussion, SMK Negeri 1 Gelumbang's overall learning activities have integrated an ICT-based management information system.

2. Supporting and inhibiting factors in implementing ICT-based management information systems in learning activities at SMK Negeri 1 Gelumbang

The availability of ICT devices, both those owned by teaching staff and students and those provided by the school, is a supporting factor for implementing an ICT-based management information system in learning activities at SMK Negeri 1 Gelumbang. This information was obtained from data analysis.

The communication of information to teaching staff is still done manually, aside from the use of ICT. For example, lesson plans and subject teacher placement are done by sticking printouts on the notice board in the teaching staff room. This is done to get around the difficulty some educators have opening files saved on laptops or Android cellphones. Environmental factors include heavy rain and lightning, which can harm ICT devices or the central WiFi network; power outages, which prevent learning activities from continuing because the provider's signal is lost; and disruptions to academic data input and management activities. Aside from the usage of ICT, information is still communicated to instructional personnel manually. Lesson plans and subject teacher placement, for instance, are completed by pasting printouts onto the bulletin board located in the teaching staff room. This is done to overcome the challenge that some teachers encounter while trying to open files from Android smartphones or computers. Environmental factors include power outages that stop learning activities because the provider's signal is lost, strong rain and lightning that can damage ICT equipment or the central WiFi network, and disruptions to academic data input and management operations.

The assessment aspect has been beset by several issues, including teaching staff members who have not been able to create Google forms for ICT-based assessments optimally, teaching staff members who have had delays in gathering links for the committee, students who are unable to access the link due to password or email account forgetfulness, network disruptions, power outages, and issues for students who do not own an Android cellphone. To get around the challenges of delivering information in the field of assessment that cannot be completed with ICT, the delivery of information is done manually/physically by scheduling student attendance so that hard copies of the questions can be brought to class.

Other challenges with informing learning include issues with students' access to Google Classroom, which forces the teaching staff to provide information about the content via Telegram or a WhatsApp group. As a result of unsupportive internet signals, some teaching staff members are unable to continue using virtual learning

platforms like Zoom or Google Meet for discussing and communicating material. Instead, students can communicate via voice notes and WhatsApp chats. Additionally, the school's teaching staff respects health guidelines and delivers information about assignments, learning materials, and daily assessments for offline study with consent from the student's parents. In addition, teachers continue to use manual/physical-based learning in the form of worksheets, library books, and hardcopy power points for offline instruction. This allows students to retain textbook notes, expand their knowledge, and receive assistance from teachers when needed. on an Android cellphone.

3. Benefits/importance of implementing an ICT-based management information system (SIM) in increasing the effectiveness of student learning at SMK Negeri 1 Gelumbang

The curriculum sector benefits from the use of an ICT-based management information system in learning activities at SMK Negeri 1 Gelumbang. These benefits include the creation of curriculum tools related to learning activities that require less time and energy, the ease of creating, storing, transferring, and printing data and information, as well as the ability to communicate it to relevant parties. Additionally, because the data and information are created digitally, it is more accurate.

The advantages of learning activities include the availability of a wider variety of learning resources – not just worksheets or package books – the ease of carrying and storing learning resources, the materials' increased interest due to the availability of digital learning resources – which are not only in the form of reading but also allow for visualization of the content to enhance comprehension and increase students' enthusiasm for learning – and the fact that students get experience with learning activities by using laptops or Android cellphones that are connected to the internet to access the necessary learning resources. Learning activities are also more enjoyable and successful because the content is more inventive and creative.

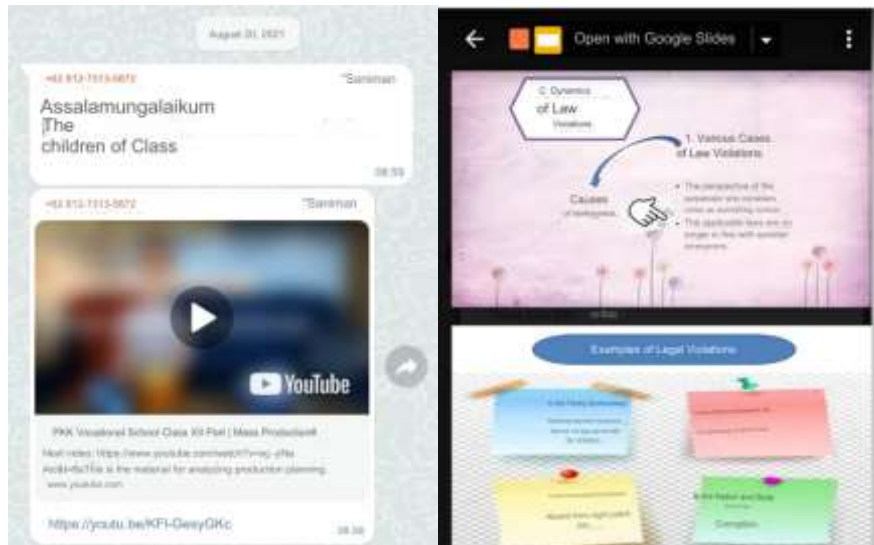


Figure 5. Delivery of ICT-based information that is creative, innovative, varied

The use of ICT-based SIM in learning evaluation activities offers advantages such as reduced correction time, as teaching staff is relieved of the task of manually correcting the results of daily tests, PTS, and PAS, reduced time it takes to notify students of their grades, and reduced waiting time for announcements. Teachers are now reviewing the exam results and making necessary corrections, but students can view their grades right away once the online assessment is finished.

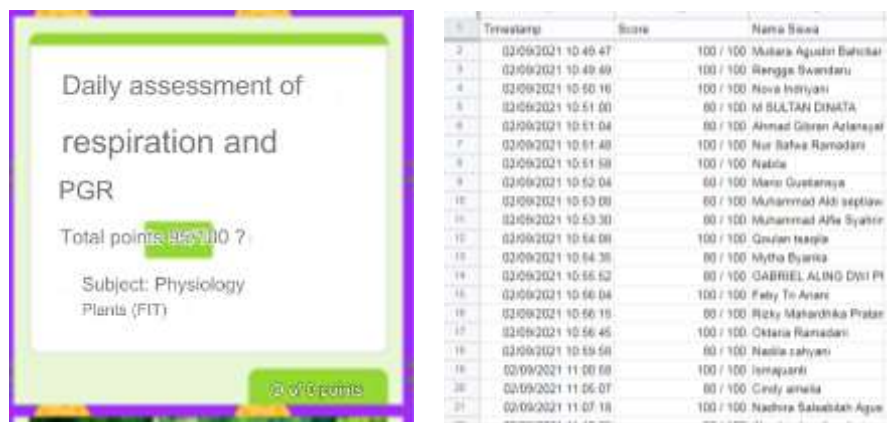


Figure 6. Delivery of ICT-based learning evaluation information

The advantages and significance of using ICT-based SIM to improve student's learning outcomes align with Muhammad Yaumi's theory, which is cited in (Asmani, 2010), according to which the world has undergone significant changes as a result of the development of information and communication technology, or ICT. instruction. There are at least five shifts in the world of education, namely the shift from training to performance, the shift from the classroom to the virtual space, the shift from paper to online, the shift from physical facilities to network facilities, and the shift from cycle time to real-time.

ICT-based learning activities can shift the paradigm of learning from traditional learning to information technology-based learning and improve student learning through the implementation of an ICT-based management information system (MIS), which consists of information technology covering everything related to processes, use as a tool, manipulation, and management of information, and communication technology, namely all things related to the use of tools to process and transfer data from one device to another.

D. Conclusion

Based on the results of research and discussions conducted by researchers regarding the application of an ICT-based management information system (SIM) in increasing the effectiveness of student learning at SMK Negeri 1 Gelumbang, conclusions can be drawn as follows:

At SMK Negeri 1 Gelumbang, the use of management information systems in instructional activities is mostly ICT-based. The deployment of a physical-based, manual management information system is limited to resolving issues that arise during information transfer or communication of educational activities. The application of this management information system can be seen in four areas/aspects, namely: (1) curriculum area; (2) learning material areas; (3) the field of learning strategies; and (4) assessment area.

The fact that all data has been computerized and that Google Classroom, WhatsApp groups, and Telegram are commonly used to organize and distribute information about learning activities demonstrate the application of ICT-based SIM in domains associated with learning activities. The use of ICT for learning strategies, planning, data management, information delivery, and communication is combined with a variety of creative, entertaining learning tools, such as power points, YouTube videos, Quizizz, Wordwall, web learning, and blogs, to increase learning effectiveness.

The information is delivered manually and physically by attaching printouts to the notice board in the teaching staff's room. This solves the issue that ICT-based learning cannot be implemented because some teaching staff members find it difficult to open files saved on laptops or Android cellphones. Delivery of learning resources in hardcopy, including library books, assignments, and assessment (evaluation) in the form of hardcopy questions, to students without Android cellphones.

E. Acknowledgement

We would like to express our acknowledgment to our respondents, colleagues in SMK Negeri 1 Gelumbang who helped us in this article.

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