

## **IT-Based Learning System for TKJ Subjects in Vocational Schools**

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***Abstract.** This research aims to determine the application of IT-based learning at SMK Muhammadiyah 1 Taman in improving the quality of learning in the field of Computer and Network Engineering (TKJ). This research uses descriptive qualitative methods with data obtained through observation, interviews and document study. The results of the research show that Muhammadiyah 1 Taman Vocational School implements IT-based learning with various strategies, namely: Implementation of the Independent Curriculum which gives students freedom in choosing learning materials. TKJ, Utilization of digital learning media such as video, animation, and simulation, Use of online platforms to provide learning materials, assignments, and assessment of student learning outcomes, Application of group learning, Development of educator competency through training and workshops, Implementation of these strategies shows SMK's commitment Muhammadiyah 1 Taman in improving the quality of learning in the TKJ field in the digital era. The efforts made by SMK Muhammadiyah 1 Taman should be appreciated and can be an inspiration for other schools in improving the quality of learning in the TKJ field in the digital era.*

***Keywords** - IT-based learning, Digital Learning Media, Educator Competency Development*

### **I. INTRODUCTION**

In this digital era in the 21st century, information from all corners of the world can be accessed easily without borders. Almost all human activities are switching to machine implementation (computing), automating routine work, and enabling communication from anywhere. This also applies to rapidly developing learning systems. Teachers in the 21st century are required to be more creative in processing learning media so as not to be outdated (Hamzah et al., 2021).

Modern technology is the main key in encouraging renewal efforts. Its role is so vital, especially for people in developing countries. Awareness of the important role and function of technology encourages the government and society to pay full attention to its development. The impact of modern technology, especially in the field of communication, has affected all sectors, including the education sector.

Various forms of learning media are created to assist teachers in delivering subject matter. Now, learning media has entered the era of information technology, where various learning applications have begun to be developed to facilitate the delivery of material. Making this learning application is expected to help students understand and learn a material more easily (Samhudi, 2021).

In Indonesia, teachers have always been respected and seen as noble, even in the midst of socio-cultural shifts in modern times. This profession is still considered honorable because teachers are the frontline in achieving national goals, namely educating the nation's life. It is the teacher who gives birth to an intelligent generation who will become the successor of the nation. Having a strategic position and role in national development, especially in the field of education and efforts to educate the nation's life, teachers are required to have high qualifications, competencies, and professionalism (Sulistiani & Setiawansyah, 2020) (Putria et al., 2020).

One type of learning that is considered difficult for students to understand and learn is at the Vocational High School (SMK) level. Because Vocational High School (SMK) is a school that produces graduates who are competent in their professional fields and ready to enter the world of work. The world of work soon. Vocational high schools also play an important role in developing

students who have good knowledge, attitudes, and skills (Febrianto, et al., 2021). Unlike Senior High Schools (SMA), Vocational High Schools (SMK) have a learning system that focuses on productive subjects that are equivalent to lecture material. Each department in SMK has different productive subjects, according to the area of expertise that students want to master. The level of difficulty of productive subject matter in SMK is generally higher than the subject matter in SMA. This is because SMK aims to prepare students to be able to work directly in their fields after graduation. This difference in learning systems aims to produce SMK graduates who are competent and ready to work in the industrial world. SMK graduates are expected to have qualified practical skills and in-depth knowledge in their fields of expertise (Mulyono et al., 2021). For example, computer systems. This subject is one of the basic subjects of the competency program of the Computer and Network Technology Competency Program (TKJ) of Vocational High Schools (SMK). Based on the curriculum structure, the Computer Systems subject is taught in class X. This subject is considered difficult for students who have just graduated from junior high school (SMP) (Kumbara, 2021).

Based on an interview with one of the TKJ teachers of SMK Muhammadiyah 1 Taman on May 2, 2024, there are many difficulties in communicating understanding and explanation directly between teachers and students during the teaching and learning process. This is due to many relevant aspects such as: For example, the teacher's explanation is difficult for students to understand, or tired or bored when learning media only uses Power Point or LKS, So that students find it difficult to concentrate on the material, students have difficulty understanding and explaining the teacher's explanation is difficult. The school has internet access and students can search for learning content through the website. However, there is no Video-based learning media that can be accessed through computer system learning (Harta et al., 2021).

The use of media in learning materials makes it more concrete and can make the learning atmosphere that was previously boring become interesting. Today many learning media are developed for independent learning, but finding a really good selection of tools and solutions to make the learning process effective, engaging, interactive and fun is difficult. Independent learning tools or media in the era of technological progress are needed in the learning process. This is necessary to create human qualities that do not only rely on oral transmission of knowledge, both in schools and non-formal educational institutions.

## **II. METHOD**

The method we use is a descriptive qualitative method. According to Sugiyono (Nasser, 2021), qualitative research methods are research methods to study the state of natural objects, where researchers are an important tool. Qualitative research has the characteristics of text analysis, and in Cresswell's view quoted (Arifudin, 2018), qualitative research is interpretive research in which researchers engage in continuous and continuous experience with participants. This research method is descriptive analysis. Researchers used a descriptive qualitative research approach to investigate how principals' strategies support the use of IT-based learning and teachers' motivation to use IT-based learning.

Researchers carried out several data collection activities using several tools such as the researchers themselves, information from several educators at SMK Muhammadiyah 1 Taman, notebooks, and recording devices. To obtain data from primary and secondary data sources, researchers conduct observations, interviews, and documentation. After collecting data, researchers interpret, discuss, and interpret the results obtained in the field. Therefore, researchers seek information from whatever information they actually find to support the data. All data obtained will

be checked and recorded by the researcher. This research was conducted from April 29, 2024 to May 4, 2024, at SMK Muhammadiyah 1 Taman, Sidoarjo, East Java.

### **III. RESULTS AND DISCUSSION**

SMK Muhammadiyah 1 Taman, as one of the schools that focuses on developing student competencies in the field of Computer and Network Engineering (TKJ), has made the application of IT-based learning the main focus in this subject. This shows the school's commitment in preparing students to face challenges in the digital era and improving the quality of learning in the TKJ field. The implementation of the Independent Curriculum at SMK Muhammadiyah 1 Taman provides freedom to students in choosing TKJ learning materials. This has a significant impact, where students can choose material that suits their interests and needs. IT-based learning can support this approach by providing easy access to a variety of learning resources and online information *related to* TKJ. Students can choose the learning materials they are interested in from various online educational platforms, learning videos, and other digital materials. This allows students to learn independently and according to their own learning rhythm. Although SMK Muhammadiyah 1 Taman has given freedom to students in choosing TKJ learning materials, there are still some obstacles in the implementation of the Independent Curriculum. The main obstacle lies in the readiness of Human Resources (Teachers) and the difficulty of focusing experienced by students. Teachers may not be ready for curriculum changes and need training to improve their competence in applying the Independent Curriculum to TKJ subjects. Students may have difficulty focusing due to a variety of factors, such as lack of interest in the material, fatigue, or external distractions. IT-based learning can help overcome some of these obstacles. Teachers can take advantage of online learning platforms to improve their competencies and attend online training related to the Merdeka Curriculum and TKJ learning. Students can use educational applications to improve their focus and concentration while learning TKJ material. According to , teachers are the most important factor influencing student learning success. The Merdeka Curriculum transforms teachers from mere knowledge conveyors to learning facilitators. As facilitators of learning, teachers need to provide various learning resources so that students can easily access information. (Dadi et al., 2019)

Learning is carried out with the use of digital learning media such as videos, animations, and simulations being one of the key strategies in IT-based learning at SMK Muhammadiyah 1 Taman. This digital learning media helps teachers deliver TKJ material more interestingly and easily understood by students. The advantages of digital learning media, such as interactivity and informativeness, increase student participation in the learning process. Students learn in a more fun and less boring way, thus increasing their focus and engagement in understanding complex TKJ material. Teachers at SMK Muhammadiyah 1 Taman utilize online learning platforms to provide learning materials, assignments, and assessments of student learning outcomes online. This platform allows teachers to deliver TKJ learning materials more structured and systematic, provide tasks that vary and are in accordance with the TKJ subject matter being studied, assess student learning outcomes more effectively and efficiently. In addition, the online learning platform allows students to access TKJ learning materials anywhere and anytime, without being bound by space and time, work on assignments and complete assessments online, and learn at their own pace and according to their learning style. In the classroom also apply IT learning in groups. Where this is done in order to encourage students to work together and help each other in completing tasks related to TKJ material, develop communication skills, cooperation, and responsibility in completing TKJ projects, and learn with friends who have the same interests and skills in the TKJ field. Group learning by utilizing information technology increases the motivation and enthusiasm for learning of TKJ students. This

helps them achieve optimal learning outcomes and develop soft skills that are important in the world of work in the field of TKJ. As revealed, the integration of technology into educational media has a significant impact on the learning process. explained that technological advances are very important in the Independent Curriculum, which gives freedom to students in choosing their learning materials. Therefore, it is very important to develop learning media in order to support and support the learning process. Research conducted at SMK Muhammadiyah 1 Tamang majoring in TKJ found that the learning process was only focused on using powerpoints, making the learning atmosphere boring. IT-based learning is very helpful in the learning process because the material presented can be accessed offline or online. (Priwanto, 2018) (Vianis et al., 2022)

Educators at SMK Muhammadiyah 1 Taman are encouraged to optimize the use of technology in learning. This is done through various means, such as the use of digital platforms, interactive learning media, and simulations. Digital platforms such as *Google Classroom* and *Moodle* allow teachers to deliver learning materials, assignments, and assessments online. This makes it easier for teachers to manage learning and provides easy access for students to learn anytime and anywhere.

Interactive learning media such as animated videos and 3D simulations can help students understand complex concepts more easily and interestingly. Simulations allow students to practice the material they have learned firsthand, so they can improve their skills and understanding. Although some educators at SMK Muhammadiyah 1 Taman still feel unaccustomed to utilizing technology in the learning process, efforts have been made to improve their abilities in this field. Schools conduct training and workshops to assist educators in using various technologies in learning. In addition, the school also provides access to a variety of online learning resources and an online educator community, so educators can continue to learn and develop their skills. Mastery of IT competencies for educators is the main key in realizing quality learning in the digital era. By mastering IT, educators can increase student engagement, increase learning effectiveness, facilitate access to information and learning materials, and prepare students for the future.

There are several advantages of IT-based learning at SMK Muhammadiyah 1 Taman, including: Increased student interest and participation: Digital learning media and online learning platforms make the learning process more interesting and interactive so as to increase student interest and participation, Improved learning outcomes: IT-based learning allows teachers to teach material in a more structured and systematic manner, assigning varied tasks, and assess student learning outcomes more effectively, Increased access to information and learning materials: Students can access TKJ learning materials anytime, anywhere, without being limited by time and location, Preparing students for the future: IT-based learning equips students with essential IT skills to face the challenges of the digital age.

Although IT-based learning at SMK Muhammadiyah 1 Taman has many advantages, there are also some disadvantages: Infrastructure limitations: IT infrastructure, such as school computers and internet networks, is still limited and may hinder the facilitation of the learning process. Student IT Skills: Not all students have sufficient IT skills to keep up with IT-based learning. Dependence on Technology: Excessive dependence on technology can make students less focused and easily distracted.

#### **IV. CONCLUSION**

The process of designing and creating systematic and structured IT-based learning media will produce effective and useful media for students, as explained in the Research and Development (R&D) procedure. SMK Muhammadiyah 1 Taman shows its commitment in improving the quality of learning in the field of Computer and Network Engineering (TKJ) through the application of IT-

based learning. The implementation of the Independent Curriculum that provides freedom to students in choosing TKJ learning materials, the use of digital learning media, online platforms, group learning, and educator competency development through training and workshops are some of the main strategies applied in this school. The efforts made by SMK Muhammadiyah 1 Taman should be appreciated and can be an inspiration for other schools in improving the quality of learning in the field of TKJ in the digital era. SMK Muhammadiyah 1 Taman is committed to improving the quality of IT-based learning in the field of Computer and Network Engineering (TKJ). Some important points to improve IT-based learning at SMK Muhammadiyah 1 Taman are: Schools need to improve computer access and stable internet networks for all students, Schools need to organize IT training regularly to improve students' ability to use various software and online learning platforms, Schools need to compile comprehensive and easy-to-understand guidelines to help students and teachers in utilizing technology Schools need to collaborate with online education platforms and encourage students to utilize these learning resources. Schools need to build and facilitate active and positive online learning communities to increase student collaboration and motivation. (Suggestion, 2015)

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