

## INTEGRATING TECHNOLOGY IN MODERN EDUCATION AS AN EFFORT TO IMPROVE EFFECTIVE LEARNING IN THE ERA OF INDUSTRIAL REVOLUTION 5.0

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### **Abstract**

Integrating technology in modern education is a crucial step to increase learning effectiveness, especially in the era of Industrial Revolution 5.0. Integrating technology in education is an important step to create learning that is more effective and relevant to the needs of the times. With the right strategy, technology can be a powerful tool for improving the quality of education and preparing students to face future challenges. Integrating technology in education is an important step to support learning transformation in the Society 5.0 era. As a teacher in this era, technology is not just an additional tool but an integral component of the learning process. To achieve wise and effective technology integration, teachers need to consider several tips for success that are in line with the principles of Independent Curriculum and Independent Learning. Modern education in the Industrial Revolution 5.0 era faces new challenges and opportunities in preparing students to face rapid and complex changes. The integration of technology in education can be an effort to increase effective learning.

**Keywords:** integration, technology in modern education, effective learning, industrial revolution era 5.0

### **INTRODUCTION**

Technology can be a very useful tool for enhancing students' learning experiences, but there are challenges that must be overcome such as lack of access to technology, lack of technology skills, and data security issues

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(Yilmaz, 2021). Apart from that, the use of technology in learning can also give rise to new problems such as a deficiency in a comprehensive learning experience and a lack of social connection between students and teachers. The world of technology-based learning is therefore one that educators and students must comprehend and carefully traverse in order to take advantage of current opportunities and overcome challenges that arise. While technology can be a very useful tool for improving students' learning experiences, there are challenges that must be met, addressed such as lack of access to technology, lack of technology skills, significant problems with data security. In addition, the use of technology in the classroom can lead to other issues such as a lack of social interaction between teachers and students and an incomplete educational experience. Consequently, it's critical that educators and students to understand and navigate the world of technology-based learning wisely in order to take advantage of existing opportunities and overcome emerging challenges. Because technology can have a positive impact on learning, but its use can also give rise to new challenges and problems that need to be overcome. Apart from that, the use of technology in learning can also change the way students learn and interact with teachers and classmates, so there needs to be understanding and adjustment in dealing with these changes (Morel, G. M., & Spector, 2022).

The use of technology in learning can give rise to new challenges and problems such as a lack of social interaction between students and teachers, and a lack of a holistic learning experience. However, the use of technology can also provide great opportunities to enhance students' learning experiences, such as the use of online learning platforms, mobile applications, and innovative learning software. Therefore, the phenomenon of the Educational Revolution in the Era of Society 5.0 is a change in the way students learn and interact with teachers and classmates, and there is a need for understanding and adjustment in dealing with these changes (Ellitan, 2020). However, the use of technology can also provide great opportunities to enhance students' learning experiences, such as the use of online learning platforms, mobile applications, and innovative learning software. Therefore, the phenomenon of the Educational Revolution in the Era of Society 5.0 is a change in the way students learn and interact with teachers and classmates, and there is a need for understanding and adjustment in facing these changes. We must be prepared for change in the world due to the incredibly quick advancements in science and technology, particularly in the area of education. Society 5.0 is one manifestation of this shift (Adel, 2022).

People in Society 5.0 are those who are able to use numerous technological advancements, originating from the Industrial Revolution 4.0 era, to tackle a wide range of social difficulties and problems. The Japanese government initially unveiled Society 5.0 in 2019. An extension of the Industrial Revolution 4.0 is Society 5.0. Artificial intelligence is used in Industrial Revolution 4.0, whereas Society 5.0 emphasizes both human and technology components. Education is crucial to the advancement of human resource quality, which is a key component of the Society 5.0 age. Education in 21st century life skills, or 4C (Creativity, Critical Thinking, Communication, Collaboration), is therefore necessary (Maddikunta et al., 2022).

Of course, there are advantages and disadvantages to the Society 5.0 period for each and every one of us. We must be prepared for changes in the world, particularly in the area of education, given the speed at which science and technology are developing. In order to help Generation Z navigate the current Era of Society 5.0, character education is required. Undoubtedly, educational institutions and their faculty members will play a crucial role in the period of society 5.0. Nowadays, educational activities don't just center around books as a single source. Nonetheless, educators need to be receptive and willing to learn from a variety of other sources (Mourtzis et al., 2022). Social media and the internet are two examples. Nonetheless, educators need to be able to sift through data gleaned from social media and the internet. In addition, instructional staff members need to be skilled in problem-solving, leadership, digital literacy, communication, and entrepreneurship. All sectors will advance to a higher level in the period of Industrial Revolution 5.0 due to the increasingly advanced times. Indonesian education will lag far behind if the educational system is not ready to adapt to the quick changes in the modern world. In this era of Society 5.0, educators need to be the motivators for instructors who put students first, take the initiative to make changes, especially for students, act without being asked, keep coming up with new ideas, and support students (Leng et al., 2022).

## **RESEARCH METHOD**

The research method used in this article is a literature review. A literature review is a systematic approach to evaluating, synthesizing, and presenting findings from various literature sources relevant to the research topic. In the context of integrating technology in modern education as an effort to increase effective Education during the Industrial Revolution 5.0, a review of the relevant literature will enable us to pinpoint methods, ideas,

conclusions, and suggestions that have previously been documented (Denney & Tewksbury, 2013). A variety of resources, such as periodicals, books, documents, the internet, and libraries, are available for literature study. A literature review study is the kind of writing that is employed, and it centers on the findings of writing about getting to know the modern education system, effective learning, technology issues in education, and the integration of technology in modern education as an effort to increase effective learning in the era of the industrial revolution 5.0.

## **RESULT AND DISCUSSION**

### **Get to know the Modern Education System**

Silfiana, R. (2020) stated that The conventional education system is one that has been in place for a very long time, but the modern education system is a brand-new approach that we currently employ. Acknowledging the distinction between the old and modern educational systems, there is incompleteness in understanding both concepts. The difference is not only that, there are several things that underlie the differences between the two, including the technology used, the teaching and learning atmosphere and also the teaching style. Each has advantages and disadvantages in implementation. The modern education system has several differences from the traditional education system. Following are some of the key differences between the two (Srivastava, S. K., & Agnihotri, 2022):

1. **Teaching Methods:** Modern education systems tend to use more innovative and interactive teaching methods, such as the internet, projectors, and technology. This attempts to increase the effectiveness and student interest in teaching and learning activities.
2. **Focus on Creativity and Skills:** The modern education system places greater emphasis on developing students' creativity and skills, apart from academic knowledge. The aim is to prepare students to face the demands of the ever-evolving world of work.
3. **Flexibility:** Modern education systems tend to be more flexible in terms of time and place of study. In the digital era, students can access learning materials online and study anywhere and anytime.
4. **Use of Technology:** Modern education systems integrate technology in the learning process. The use of the internet, electronic devices and educational applications is an important part of this system
5. **Collaboration and Interaction:** The modern education system encourages collaboration and interaction between students and teachers. Through

discussions, group projects, and other activities, students can learn from each other's experiences and knowledge.

Although the modern education system has many advantages, it is important to remember that each country has a different education system, depending on culture, history and the needs of the local community. Apart from that, the implementation of a modern education system can also vary in each school and educational institution. In the Indonesian context, the national education system has undergone a transformation that reflects social, political changes and educational needs (Khakimov, S., & Choriyeveva, 2023). Each level of education, beginning with elementary, secondary, and early childhood education, to Higher Education, has a different concept. It is important to remember that education is part of human rights and every country is obliged to have a good education system. In this modern era, education continues to experience development and change in order to advance education and produce a better generation for the nation. So, the modern education system is a new method used today, which emphasizes innovation, use of technology, creativity and collaboration in the learning process. The vision follows the conditions and situations faced.

### **Effective Learning**

According to Basar et al., (2021) effective learning is a learning process that is desired by teachers who dedicate themselves as educators of the nation's next generation. The description Learning that makes it easy for students to learn, enjoy themselves, and accomplish the learning goals is considered effective learning goals that have been set.

Effective learning is a process of teaching and learning that places equal emphasis on the outcomes that students attain as well as how the learning process can foster good comprehension, intelligence, tenacity, opportunity, quality, and the production of behavioral changes that can be applied on a daily basis.

According to Utami et al., (2020) there are several principles that teachers can implement so that learning in schools can be effective. The following include:

1. Conduct prior knowledge research: Before providing lessons teachers need to collect relevant information about the knowledge and skill level of each learner. Teachers must know what knowledge students have previously acquired. To be able Students need to have certain knowledge and abilities in order to learn from the majority of resources and activities.

2. Consider individual differences: Pay attention to the various learning needs of students, for example the language used at home, study habits or other things. Teachers must take into account the media and technology that pupils possess as well as the necessary (crucial) learning resources. Learning objectives. Learning objectives must be prepared and in accordance with the expected results or standards.
3. Develop metacognitive skills: Students require assistance in comprehending the methods by which they learn and the tools that facilitate that process.
4. Adds a little social interaction: Working with others both inside and outside of the classroom helps students develop their experience and knowledge.
5. Provide a realistic context: Students gain by knowing how their knowledge and abilities relate to the world at large.
6. Involve students in suitable learning activities: Practice and drills promote more in-depth and durable learning. Offer frequent, timely, and constructive feedback: Learners need to know whether their thinking is on the right track. Knowing the details about correct and accurate responses in terms of how and why can help students better understand what they have learned.

According to research by Le, H., Janssen, J., & Wubbels, T. (2018), several factors that can create effective learning include:

**Active Interaction:** In effective learning, the interaction between the teacher and students must be active. Teachers not only act as providers of information, but also as facilitators who encourage pupils to take an active role in their education. **Use of diverse learning techniques:** A range of diverse learning techniques, including technology use, group discussions, projects, and simulations, are employed in effective learning. This attempts to fulfill each student's unique learning demands.

**Providing Feedback:** Teachers need to provide constructive feedback to students to help them understand the strengths and weaknesses in their learning. Good feedback can motivate students to continue learning and improve the quality of learning.

**Collaboration and Discussion:** Effective learning encourages collaboration and discussion between students. Through collaboration, students can learn from each other's experiences and knowledge, as well as develop social and cooperative skills.

**Relevance to Real Context:** Effective learning must be relevant to the real context and daily lives of students. Teachers need to relate learning material to situations that students can understand and apply in their lives.

**Use of Technology:** The use of technology in learning can increase learning effectiveness. Technology can be used to present learning materials interactively, provide access to a wider range of resources, and facilitate collaboration between students.

**Respect for Diversity:** Every student is unique and has different learning needs. Effective learning values the diversity of students and provides support that meets their individual needs.

It is important to note that effective learning can vary depending on the context and student needs. Teachers need to adopt an approach that suits the characteristics of students and the learning goals they want to achieve. In implementing effective learning, teachers need to have good pedagogical skills, such as the ability to manage the class, provide constructive feedback, and design interesting learning experiences. Apart from that, support from the school and a conducive learning environment are also important factors in creating effective learning.

### **Technology Issues in Education**

As technology advances, it undoubtedly alters many aspects of daily life, including education. The employment of technology in education is a topic of some dispute. To start, technology may enhance education. Using interactive multimedia as a learning medium is one way that technology is used in education. Interactive multimedia, according to Bernacki et al. (2020), is defined as media made up of images, sounds, and video materials that are shown to students under computer control so they can actively respond in addition to seeing and hearing the images. This answer affects how quickly and in what order the learning content is presented. The second problem is that technology has the potential to improve education. As was previously said, technology will enhance education if it can enhance learning. Computers and other forms of technology, however, can also highlight socioeconomic inequity.

The third concern is that teachers may be replaced by technology. Learning is possible at any age, anywhere, and at any time thanks to digital technology. Students can quickly access a wealth of information from multiple sources on the internet to increase their understanding of the content they are studying. When using web-based learning, some educators also assign their pupils to conduct autonomous online searches for the knowledge they

need to learn. The idea that teachers can be replaced by technology is supported by this viewpoint. While it is true that the internet has all the information pupils may possibly need, in-person instruction from teachers cannot entirely replace the information found online. Some learning resources, such as speech material and ethics, directly involve the teacher's position as a guide or role model and cannot be accessed online (Hwang, G. J., & Chien, 2022).

Four, technology can take the role of education. The availability of internet technology makes it possible to learn remotely, specifically through telecommunications (Moore, R. L., & Fodrey, 2018). There is no requirement for pupils to attend regular classes when learning remotely. Learning becomes more flexible when students can participate at any time and from any location. If time or location constraints prevent students and professors from meeting in person, distance learning might be an option. On the other side, distant learning may lead to kids being more independent. Other than that, social and speaking abilities cannot be acquired through distance study. As a result, while technology can help with education, it cannot necessarily address every issue that arises in the classroom, such as social learning (Rachmad, 2023).

### **Integration of Technology in Modern Education as an Effort to Increase Effective Learning in the Era of Industrial Revolution 5.0**

Integrating technology in education is an important step to support learning transformation in the Society 5.0 era. As a teacher in this era, technology is not just an additional tool but an integral component of the learning process. To achieve wise and effective technology integration, teachers need to consider several tips for success that are in line with the principles of Independent Curriculum and Independent Learning (Broo et al., 2022).

First: Teaching Basic Digital Literacy; The first step in integrating technology is ensuring that students have basic digital literacy skills. This includes the ability to save, name, and find files, as well as manage online accounts. This basic digital literacy is the foundation that will make it easier for students to use various technological tools and platforms introduced during learning. Teachers must provide initial and ongoing training to ensure that all students feel comfortable and competent in using technology.

Second: Selection of the Right Technology Tools; As a teacher, it is important not to overwhelm students with too many technology tools. Consider introducing some key tools that are relevant and have

complementary functions. For example, use e-learning platforms like Google Classroom or Microsoft Teams for class management, apps like Kahoot! or Quizizz for interactive assessments, and online resources like Khan Academy or Coursera for additional study material. The main goal is to choose tools that truly support learning objectives and facilitate deeper understanding.

Third: Maximizing the Benefits of Technology; Technology must be used to improve students' understanding of subject matter. For example, the use of simulations and animations can help explain complex concepts in science that may be difficult to understand through text alone. Additionally, technology can provide a more personalized and adaptive learning experience, allowing students to learn at their own pace and in the style that is most effective for them. Teachers must always evaluate whether the use of technology brings real added value to the learning process.

Fourth: Set Realistic Technology Integration Goals; Teachers must have a clear vision of the level of technology integration they want to achieve by the end of the school year. For example, goals may include regular use of e-learning platforms for assignments and exams, improvement of students' digital skills, and development of collaborative projects using online tools. To achieve this goal, teachers need to design a step-by-step plan, including training for themselves and students, as well as adequate time allocation to implement technology in daily activities.

Fifth; Aligning with the Independent Curriculum and Independent Learning; In the context of the Independent Curriculum and Independent Learning, technology integration must support the principles of freedom in learning and developing students' potential to the maximum. Technology can be used to provide more varied learning options that suit students' interests and needs. For example, e-learning platforms can provide access to a variety of resources and teaching materials that enable more flexible and independent learning. Teachers also need to act as facilitators who support exploration and innovation in learning, helping students find the best ways to achieve their academic and personal development goals.

Integrating technology in education requires careful planning and a wise approach. Teachers must ensure that students have adequate digital literacy, choose appropriate technological tools, utilize technology to improve understanding of the material, set realistic goals, and align the use of technology with the principles of the Independent Curriculum and Independent Learning. Thus, technology can be an effective tool for creating interesting, interactive and meaningful learning experiences, as well as

preparing students to face challenges in the Society 5.0 era (Hidayat et al., 2023).

## **CONCLUSION**

Modern education in the Industrial Revolution 5.0 era faces new challenges and opportunities in preparing students to face rapid and complex changes. The integration of technology in education can be an effort to increase effective learning. Here are some ways technology integration can enhance learning:

1. Wider and flexible access: Technology enables broader and more flexible education provision. Online learning platforms, online courses and digital educational content enable easier and more affordable access to education for individuals around the world
2. Personal and adaptive learning: Technology in the Industrial Revolution 5.0 allows for a more personal and adaptive learning approach. Artificial intelligence systems can monitor and analyze individual data about students' preferences, needs and learning progress. In this way, learning can be tailored to the needs and level of understanding of each student
3. Development of critical and collaborative skills: In the Industrial Revolution 5.0 era, the role of teachers changes to become facilitators and mentors who help students develop critical skills, creativity and collaboration. Teachers also need to become skilled in using educational technology, analyzing learning data, and designing engaging and relevant learning experiences
4. Increased efficiency and productivity: Technology in the Industrial Revolution 5.0 enables increased efficiency and productivity in various industries, including education. The use of advanced technology such as artificial intelligence (AI) and data analysis can help teachers and students manage information, optimize learning time, and improve the quality of learning
5. Improved quality of products and services: By using advanced technology, educational institutions can improve the quality of their products and services. For example, the use of HRIS (Human Resource Information System) technology can make it easier to manage employee data and inventory in one easy-to-access platform

It is important to note that the integration of technology in education must be supported by teachers who have good pedagogical skills in using technology and designing effective learning experiences. Apart from that,

support from the school and a conducive learning environment are also important factors in creating effective learning in the era of the Industrial Revolution 5.0.

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