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## The Role Of Technology In Education

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### Abstract

*Here modern technology is defined as knowledge that is transformed into products, processes, services and organizational structures. Technology is always juxtaposed with the term science. Science is a human effort to understand the phenomena and facts of nature, and to preserve that knowledge conceptually and systematically. While technology is a human effort to use science for the benefit and welfare. Because of this relationship, the development of science is always related to technological developments, and vice versa. The development of science and technology has an exponential characteristic, which is getting faster and faster, because the results of one stage become the basis and reason for the next stage. It is not surprising that not only is its development accelerating but the role of science and technology in modern society is increasing in importance. The development of science is active in all fields, namely health, agriculture, economics, social sciences, natural sciences and so on.*

*Keyword : Technology, Education, The development of science*

### 1. Introduction

Technology is currently considered as something in the form of machines or things related to machines, but actually technology in education has a broad meaning, because in education the technology used is a combination of management, machines, humans, and ideas [1]. Real technology is insight into performing tasks efficiently and implementing knowledge management systematically [2]. The existence of technology means that it is a way to increase the usefulness and efficiency of knowledge. Technology exists and develops to solve problems faced by humans efficiently. On the other hand, educational technology is seen as an implementation and a knowledge procedure [3]. Examples of the implementation of this educational technology are more tangible and easy to understand, such as the presence of radios, projectors, televisions, and smartphones [4].

The methods and technologies created are partially usable and meaningful for education, especially for subsequent learning methods and effects. The manufacture of technologies such as microtechnology, biotechnology, and materials are finally used as teaching media. Technologies directly relevant to learning have been aligned with the learning objectives themselves, such as the use of gamification in learning [5]. Communication of reciprocal negotiations between students and other students or students and teachers and the learning environment to obtain learning directions is a form of learning [6]. From this understanding of learning, there is a basic understanding of learning that must contain information and communication elements. At present, the manufacturing and technology methods used must be unique so that they motivate student learning [7]. The communication and information technology used will be directly related to learning and students in several semesters [8].

Information Technology emphasizes the implementation and processing of data such as capturing, transmitting, storing, retrieving, manipulating or displaying data using electronic technology devices, especially computers [9]. The meaning of information technology does not describe directly its relation to communication systems, but rather on data and information processing.

Meanwhile, communication technology emphasizes the use of electronic technology devices, which emphasizes the aspect of achieving goals in the communication process, so that data and information processed with information technology must meet the criteria for effective communication [10]. For example, one application of Information and Communication Technology is videoconferencing, which uses information technology to connect (networking) between clients with internet facilities, messages conveyed by both parties are received, processed, analyzed and transmitted, by information technology so that they arrive at each party via the internet with satellite or cable networks [11]. The role of communication technology is to regulate the communication mechanism between the two parties by means of appropriate communication designs, clear visualizations, text messages, voice, video meet communication standards, and feed back settings so that communication takes place in two directions [12].

## **2. Research Method**

Other research says that there is a close relationship between Information and Communication Technology, information technology processes information while communication technology functions to convey information. information to process, analyze and transmit data by paying attention to and utilizing existing technology to facilitate learning.

### **2.1 Technology and its Relationship with Learning Methodology**

Technology in education is abstract because science will develop continuously. Educational technology can be understood as a complex and integrated process involving various people, ideas, procedures, tools, and problem analyzers such as an organization to solve problems, implement, assess, and manage issues that cover all aspects of education and learning [13].

In line with this, educational technology was born from various problems that arise in education. Academic problems that exist at this time include improving the quality, relevance, and efficiency of education and equal distribution of opportunities to obtain instruction in various countries. A severe problem in education, from primary education to higher education, is a quality problem; these problems can be solved if you take an educational technology approach to overcome existing problems.

These three basic principles in educational technology can be used as a reference in its development and utilization, namely: a student-oriented system approach and the use of learning resources such as the media used [5]. The systems approach means that the implementation of education and learning needs to be well designed by analyzing problems from various subjects and objects. Learning design requires procedural steps: identifying

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problems, analyzing circumstances, identifying goals, managing learning, determining methods, determining learning evaluation media [14].

The principle of student-oriented education means that learning must focus on student output and pay attention to students' characteristics, interests, and potential. The use of learning resources must also be considered and implies that students must be able to utilize various learning resources to access the knowledge and skills they need [15]. The success of learning needs to be carried out in an educational activity about how students can learn by identifying, developing, organizing, and using all kinds of existing learning resources. Thus problem-solving using an educational technology approach can be done by utilizing learning resources. Marked by the change in the term from educational technology to learning technology. The definition of learning technology has the meaning that "Educational technology is theory and practice in terms of design, development, utilization, management, and evaluation of resources and learning processes." [16]

## 2.2 Functions of Information and Communication Technology in learning

Information and Communication Technology (ICT) has three main functions used in learning activities, namely (1) technology functions as a tool, in this case ICT is used as a tool for users or students to assist learning [17], for example in processing words, processing numbers, making graphic elements, creating databases, making administrative programs for students, teachers and staff, personnel data, finance and so on [18].

Technology functions as science. In this case technology as part of the discipline that must be mastered by students. For example, computer technology is studied by several majors in universities such as informatics, information management, computer science [19]. In learning in schools according to the 2006 curriculum, there are ICT subjects as science that students must master all competencies [7].

Technology in education today has a function as a material and tool for learning. Technology is also interpreted as learning materials as a tool to master competencies with the help of machines or computers. The computer has been programmed to guide students step by step by using various learning principles designed thoroughly for students' master competencies. In this case, the position of technology is like a teacher who helps facilitators, motivators, transmitters, and evaluators [9].

## 3. Use of Learning Media

In simple terms the term media can be defined as an intermediary or introduction. While the term learning is a condition to make someone do learning activities. By referring to this definition, learning media is a vehicle for distributing messages or learning information so as to condition a person to learn or various types of resources that can be used in the learning process, based on the scope of the learning resources above, the learning media is part of learning resources that emphasize software or software and hardware or hardware [20]. The value of the media is determined by its very strong function to increase the level of learning outcomes, some of the media's functions include:

- Capturing a certain object or event. Important events or rare objects can be captured with a photo film or recorded via radio then the event can be conveyed and can be used when needed. The teacher / lecturer can explain the process of the occurrence of a rare solar eclipse through video recording. Or how the process of the development of a caterpillar into a butterfly is the process of a baby's development in the womb from the start of a fertilized egg to an embryo and developing into a baby. Likewise, explaining how a tool or organ of the human body such as the heart works, so that through a film loop that moves continuously, the way it works can be better understood by students.
- More equitable learning opportunities. By using various media such as audio, video, sound slides, and so on, it is possible for everyone to learn anywhere and anytime.
- Display objects that are too large to be carried into the classroom.
- Enlarge and clarify objects that are too small to be seen by the eye, such as blood cells/bacterial molecules and so on.

### 3.1 Utilization of Learning Resources

Teaching and learning as a process is a system that cannot be separated from other systems that interact with each other. One component in learning is learning resources. Learning resources were born in an effort to increase the level of learning outcomes. In simple terms, learning resources are resources that can be used for learning purposes to facilitate students in learning to understand and acquire a skill in learning.

This learning resource is also called learning resources by utilization [1]. The term people or man as the party that distributes learning messages for example lecturers, teachers / lecturers, lecturers, etc. Media instrumentation includes material and devices as materials and equipment c. Technice or Method as a way or method in conveying information [19]. Environment or setting as an environment where teaching and learning interactions occur.

### 3.2 Utilization of the Internet as a Learning Resource

The characteristics of the internet why it is needed for learning is that the internet has used text, graphics, video and audio simultaneously [21]. The internet can also reach students anywhere regardless of place and time. Internet can provide video services, although not as good as videotape, TV or CD-ROM. The Internet can interact in real time, but not as well as telephone or video conferencing. Internet can provide information textually, but not as complete as books or magazines [22].

In terms of learning environment design [23]. Forming a learning environment means an environment which is the process of delivering a source of material and how communication strategies are used between teachers / lecturers and students or between students themselves in a learning process [18]. Communication can be done in several ways, including through video conferencing, email, chat, or by telephone [9].

## 4. Conclusion

Improving the quality of learning can be done using the Educational Technology approach, namely by finding and identifying the problems encountered in learning and then finding solutions through the application of educational technology. Efforts to solve educational problems, especially the problem of learning quality, can be pursued by using various learning resources and using learning media that function as tools and increase the level of student learning outcomes.

## References

- [1] F. Agustin, Q. Aini, A. Khoirunisa, and E. A. Nabila, "Utilization of Blockchain Technology for Management E-Certificate Open Journal System," *Aptisi Trans. Manag.*, vol. 4, no. 2, pp. 133–138, 2020.
- [2] Q. Aini, M. Budiarto, P. O. H. Putra, and N. P. L. Santoso, "Gamification-based The Kampus Merdeka Learning in 4.0 era," *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 15, no. 1, pp. 31–42, 2021.
- [3] Q. Aini, U. Rahardja, and A. Khoirunisa, "Blockchain Technology into Gamification on Education," *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 14, no. 2, pp. 147–158, 2020.
- [4] M. Tohir, "Merdeka Belajar: Kampus Merdeka," 2020.
- [5] P. A. Sunarya, U. Rahardja, Q. Aini, and A. Khoirunisa, "Implementasi Gamifikasi Sebagai Manajemen Pendidikan Untuk Motivasi Pembelajaran," *Edutech*, vol. 18, no. 1, pp. 67–79, 2019.
- [6] M. Zhu, S. C. Herring, and C. J. Bonk, "Exploring presence in online learning through three forms of computer-mediated discourse analysis," *Distance Educ.*, vol. 40, no. 2, pp. 205–225, 2019.
- [7] C. Lukita, S. Suwandi, E. P. Harahap, U. Rahardja, and C. Nas, "Curriculum 4.0:

- Adoption of Industry Era 4.0 as Assessment of Higher Education Quality,” *IJCCS (Indonesian J. Comput. Cybern. Syst.*, vol. 14, no. 3, pp. 297–308, 2020.
- [8] U. Rahardja, Q. Aini, F. Budiarty, M. Yusup, and A. Alwiyah, “Socio-economic impact of Blockchain utilization on Digital certificates,” *Aptisi Trans. Manag.*, vol. 5, no. 2, pp. 106–111, 2021.
- [9] R. Van Roy and B. Zaman, “Need-supporting gamification in education: An assessment of motivational effects over time,” *Comput. Educ.*, vol. 127, pp. 283–297, 2018.
- [10] V. Z. Vanduhe, M. Nat, and H. F. Hasan, “Continuance intentions to use gamification for training in higher education: Integrating the technology acceptance model (TAM), Social motivation, and task technology fit (TTF),” *IEEE Access*, vol. 8, pp. 21473–21484, 2020.
- [11] Z. Fauziah, H. Latifah, X. Omar, A. Khoirunisa, and S. Millah, “Application of Blockchain Technology in Smart Contracts: A Systematic Literature Review,” *Aptisi Trans. Technopreneursh.*, vol. 2, no. 2, pp. 160–166, 2020.
- [12] P. A. Sunarya, U. Rahardja, L. Sunarya, and M. Hardini, “The Role Of Blockchain As A Security Support For Student Profiles In Technology Education Systems,” *InfoTekJar J. Nas. Inform. dan Teknol. Jar.*, vol. 4, no. 2, pp. 203–207, 2020.
- [13] A. Dudhat, N. P. L. Santoso, S. Santoso, and R. Setiawati, “Blockchain in Indonesia University: A Design Viewboard of Digital Technology Education,” *Aptisi Trans. Technopreneursh.*, vol. 3, no. 1, pp. 68–80, 2021.
- [14] M. Hardini, Q. Aini, U. Rahardja, R. D. Izzaty, and A. Faturahman, “Ontology of Education Using Blockchain: Time Based Protocol,” in *2020 2nd International Conference on Cybernetics and Intelligent System (ICORIS)*, 2020, pp. 1–5.
- [15] P. A. Sunarya, A. Khoirunisa, and P. Nursaputri, “Blockchain Family Deed Certificate for Privacy and Data Security,” in *2020 Fifth International Conference on Informatics and Computing (ICIC)*, 2020, pp. 1–4.
- [16] A. Manzano-León *et al.*, “Between level up and game over: A systematic literature review of gamification in education,” *Sustainability*, vol. 13, no. 4, p. 2247, 2021.
- [17] F. Agustin, S. Syafnidawati, N. P. L. Santoso, and O. G. Amrikhasanah, “Blockchain-based Decentralized Distribution Management in E-Journals,” *Aptisi Trans. Manag.*, vol. 4, no. 2, pp. 107–113, 2020.
- [18] M. Milosz and E. Milosz, “Gamification in Engineering Education—a Preliminary Literature Review,” in *2020 IEEE Global Engineering Education Conference (EDUCON)*, 2020, pp. 1975–1979.
- [19] S. Sharma and R. S. Batth, “Blockchain technology for higher education sytem: A mirror review,” in *2020 International Conference on Intelligent Engineering and Management (ICIEM)*, 2020, pp. 348–353.
- [20] W. Chen *et al.*, “Cooperative and distributed computation offloading for blockchain-empowered industrial Internet of Things,” *IEEE Internet Things J.*, vol. 6, no. 5, pp. 8433–8446, 2019.
- [21] M. A. Rahman, M. S. Hossain, M. S. Islam, N. A. Alrajeh, and G. Muhammad, “Secure and provenance enhanced Internet of health things framework: A blockchain managed federated learning approach,” *IEEE Access*, vol. 8, pp. 205071–205087, 2020.
- [22] G. P. Hartawan and I. G. T. Isa, “APLIKASI ABSENSI PERKULIAHAN DENGAN MENGGUNAKAN MIKROKONTROLER ARDUINO BERBASIS RFId,” *SANTIKA (Jurnal Ilm. Sains dan Teknol.*, vol. 6, no. 2, pp. 507–512, 2016.
- [23] M. Kamil, A. S. Bist, U. Rahardja, N. P. L. Santoso, and M. Iqbal, “COVID-19: Implementation e-voting blockchain concept,” *Int. J. Artif. Intell. Res.*, vol. 5, no. 1, pp. 25–34, 2021.