| RESEARCH ARTICLE

Optimization of ICT-Based Instructional Media as an Educational Transformation

Riskasari[1] ✉ Roemintoyo[2] and Mochamad Kamil Budiarto[3]

[1]STIT NU Oku Timur, Indonesia
[2]Sebelas Maret University, Indonesia
[3]Stiper Institute of Agriculture, Indonesia
Corresponding Author: Riskasari, **E-mail**: riskasari1222051@gmail.com

| ABSTRACT

Information and communication technology is an important part of the implementation of learning activities. It can be seen through ICT that the implementation of learning can take place dynamically and can be carried out at any time, regardless of space and time. Therefore, ICT is considered necessary to be optimized as an integral part of the learning process in an effort to implement the transformation of ICT-based education to meet the needs of students. This study aims to describe the form of educational transformation by optimizing the use of ICT-based learning media. This study uses a literature study technique with data sources, namely various relevant literature on educational transformation, ICT-based learning media, and 21st-century competencies sourced from books and scientific articles. The results of the study indicate that one of the efforts to support and succeed in the transformation of education can be made through the use of various ICT tools in learning, be it primary, secondary, or even tertiary education. This optimization is considered necessary considering that the impact tends to lead to supporting facilities in order to achieve 21st-century learning goals and competencies. Through the results of this research, it is hoped that it will serve as a basis for educators and policymakers to not hesitate in optimizing ICT for teaching and learning activities.

1. Introduction

Society 5.0 is an era that represents the current state of society because it is present in Industry 4.0, meaning that technology has become part of people's lives. Industrial revolution 4.0 is also known as the era of digital disruption and the digital revolution. The term is motivated by the distribution and dissemination of various ICT-based equipment in all aspects of life, a very prominent feature of this era is the presence of artificial intelligence technology. The idea raised by the Indonesian Ministry of Education and Culture, namely freedom to learn, is considered to be an answer to the needs of the education system in Indonesia to face the industrial revolution 4.0 and prepare for society 5.0. The era of society 5.0 in the field of education allows students in the learning process to use distance learning because it is back again for students to learn flexibly, regardless of space and time and with or without a teacher. Freedom to learn with another meaning as independence in thinking determined by educators. Because educators are at the center of this new education system, the concept of independent learning that was initiated is intended so that the learning process can create a happy learning environment without burdening students.

The new era where technological developments are so rapid requires educators to be able to adjust the skills needed so as not to be left behind. Technological developments have also contributed to changes in the work system in the fields of economy, transportation, health, and even education. Education in the global era requires graduates to have skills according to the times, which are known as 21st-century skills (Muhali, 2019). In the context of 21st-century education, technology and teachers are the main focus for the success of a learning paradigm shift from teacher-centered to student-centered (Zubaedah, 2016; Wijaya et al.,

2016). The learning process as a form of implementing education has an important role in efforts to improve the quality of education so that the learning held can bring meaning and benefit to learning (Suhairi & Santi, 2021). This is expected to create a learning atmosphere that can stimulate the ability of students to explore and explore their potential optimally in a creative, innovative, and fun way.

The use of technology in learning has enormous potential. Technology-based learning allows educators and students to then interact and communicate both directly and indirectly in a study room (Bagde et al., 2021; Baharuldin et al., 2019). Technology that has developed today allows the creation of flexible learning conditions and environments. Therefore, teachers have challenges that must be answered immediately, namely managing and optimizing ICT in learning activities (Baharuldin et al., 2019). As an educator, you will certainly be required to adapt and be responsive to the needs of students and technological advances (Chisango et al., 2020). The ability of teachers to manage digital-based learning processes is important. Teachers can take advantage of various ICT-based tools to develop learning media; thus, cognitive, affectively, and psychomotor learning goals can be achieved (Zyad, 2016).

In addition, in the current era of globalization, it is also hoped that education graduates can acquire soft skills (speech, mental attitude, behavior) as a measure of educational success (Sulaiman & Ismail, 2020; Gündüzalp, 2021). In general, the skills needed in the 21st century include critical thinking, creativity, communication, and collaboration or abbreviated as 4C, which are also part of the soft skills that must be possessed by students, as well as various other competencies needed in line with the era of globalization (Bhattacharjee & Deb, 2016; Halah & Patrick, 2015; Muhali, 2019).

2. Methodology
This research paper adopts the literature study method (literature study). A literature study is an activity of collecting data through the analysis of various data sources such as books, research articles, research reports, and information related to the topic of discussion (Salim, 2019). Sources of data used as literature in this research are scientific articles published in national and international research journals and articles published in national and international proceedings. The data that has been collected is then analyzed based on supporting theories so that it can be concluded as an analysis result written descriptively (Samsu, 2017).

3. Results and Discussion
3.1 Paradigm, Educational Transformation, and 21st Century Competence
There are three main factors that cause the structure and life of society to change, such as the need for democracy, scientific progress, and globalization. Globalization is an important point to be understood together by us educators and prospective educators besides ignoring other points. Globalization itself looks very real today, as people between countries are now communicating with each other, and technology has become an integral part of people's lives (Bose, 2011). In short, globalization can be described as the process of individual life connected with various individuals and groups whose locations can be between cities, regions, and countries, where the life process covers all aspects of life, such as politics, ideology, socio-culture, economics that can be felt by all human beings in the world without any particular limitations (Nur'aini et al., 2021). The implementation of education in Indonesia must be prepared for the rapid flow of globalization, so another keyword is the implementation of a change or transformation of the direction and policy of education (Wihartanti & Wibawa, 2017). In order for educational transformation to be implemented, there are several things that need to be considered, namely (Nithyanantham et al., 2019; Syauqi et al., 2020); assessment of the implementation of the curriculum that is being implemented, assessing educational goals for each level of education, and prepare learning resource center facilities. These three things can be the first step for policymakers at various levels or levels of education to be able to realize the transformation of education so that they are ready to face the negative impacts of globalization.

In order to prepare human resources to be able to compete in the era of globalization, the competencies that need to be mastered by students are also increasingly varied). This is because technology has become part of human life, communication that can be carried out without any limitations of space and time (Cvetković & Stanojević, 2017). Through the implementation of transformative education, it is hoped that it will be able to accommodate the various demands of the times and the need for competencies needed in the 21st century. The 21st century skills can actually be grouped into three, namely (1) life and career skills, (2) learning and innovation skills, and (3) Information media and technology skills (Dewi et al., 2019; Awang et al., 2016; Nesri & Kristanto, 2020); 1) life and career skills include (a) flexibility and adaptability/Flexibility and Adaptability, (b) initiative and self-regulation/Initiative and Self Direction, (c) social and cultural interaction/Social and Cross-Cultural Interaction, (d) productivity and accountability/Productivity and Accountability and (e) leadership and responsibility/Leadership and Responsibility, 2) learning and innovation skills include (a) critical thinking and problem solving/Critical Thinking and Problem Solving, (b) communication and collaboration/Communication and Collaboration, (c) creativity and innovation/Creativity and Innovation, 3) information media and technology skills include (a) information literacy, (b) media literacy and (c) ICT literacy / Information and Communication Technology literacy. With the reference and skill framework of the 21st century, it is hoped that it can become the basis for

educational transformation that is in line with the needs and challenges of graduates so that graduates can later become superior human resources who are ready to face various challenges in the era of globalization.

3.2 ICT-based Instructional Media

It is known that learning is a process of acquiring knowledge that consists of communication and interaction between educators and students (Nurdyansyah & Fahyuni, 2016). The success of learning activities is influenced by several factors, not only communication factors but also psychological, environmental, facilities, methods, media, and learning strategies used (Wijaya et al., 2016; Nasrulloh & Ismail, 2018). As one aspect that has an influence on the success of learning activities, learning media plays a role in focusing students' attention during learning activities (Amelia et al., 2021). Basically, the use of learning media is not new, but along with the development of technology, learning media are increasingly varied and innovative. The presence of ICT-based learning media can be a solution and teacher innovation to support the success of the learning process, considering the various benefits of the presence of ICT-based learning media are very large if implemented according to needs (N. R. Dewi et al., 2019; Roemintoyo et al., 2022). In addition, students who are already familiar with ICT tools also tend to be supportive and will be easy to adapt if the learning process utilizes ICT tools.

According to various studies, there are many types of ICT-based learning media, including 1) interactive multimedia, 2) audio-visual media, 3) animation, 4) mobile-based learning media, 5) video, animation, 6) interactive quizzes, and 8) educational games (Nurjanah et al., 2014; Ishaq et al., 2020; Ojo & Adu, 2018). In general, the benefits of this learning media will be useful if it is implemented into the learning process. Some of the benefits that can be provided by the media are; 1) clarify the presentation of material or information, 2) improve and focus students' attention, 3) can overcome the limitations of human senses, 3) can be combined with various learning methods, 4) student-centered learning, 5) improve learning outcomes, 6) study time becomes more efficient, 7) improve students' positive attitude. Instructional media gives students the experience needed to build student knowledge. This is because students have quite unique traits and characteristics, so the various benefits offered by this learning media are expected to accommodate and guide students to construct their respective knowledge.

3.3 Principles of Using ICT-Based Media

In order to maintain the quality of learning when integrating ICT into the learning process, this ICT utilization activity is expected to make a significant contribution to (1) the development of students to become human beings with character and intellectual intelligence and (2) the empowerment of educators and related education personnel. that need to be implanted in the use of ICT-based learning media (Ghavifekr & Rosdy, 2015); 1) The use of ICT in education should consider the characteristics of students, educators, and education staff in the overall ICT decision-making, 2) the use of ICT should be designed to strengthen the interest and motivation of users to use it solely to improve themselves, both in terms of intellectual, spiritual (spiritual), social, and physical, 3) the use of ICT should foster awareness and belief in the importance of interacting directly with humans (face to face), with the socio-cultural environment (meetings, museums, historical places), and the natural environment (exploration) in order to be able to maintain values social and humanities (arts and culture), and love of nature as a gift from God Almighty, 4) the use of ICT should maintain that the target group can still appreciate simple communication technology and learning activities without ICT because of the demands for mastery of related competencies in order to develop all student potential in a balanced way, 5) the use of ICT should encourage users to be more creative and innovative so that they are not only satisfied with being consumers of ICT-based information, 6) the use of various media in one learning activity is not just a distraction/filler of time or entertainment, but has a purpose that is integrated with ongoing learning, 7) the selection of media should be objective that is, based on learning objectives, not based on the personal pleasure of the teaching staff.

3.4 Optimization of ICT-based Learning Media as a Form of Educational Transformation

The integration of ICT into the learning process can be realized through the use of ICT-based learning media, as in several successful studies showing that ICT-based learning media with electronic module formats, interactive multimedia, learning videos, animations, and smartphone-based applications almost all contribute positively to improving student academic achievement (Haldorai et al., 2021; Prestridge, 2012). And some media formats can also be adapted to the needs of students to achieve 21st-century competencies such as digital literacy, critical thinking, communication, and innovative thinking; that character building can also be optimized through the use of ICT in learning activities (Agyei & Agyei, 2021; Acun & Karabulut, 2012). The use of ICT-based learning media can provide convenience for students to participate in learning activities. This is because the characteristics of ICT-based media tend to be flexible and can be used by students both in independent learning and classroom learning (Ratheeswari, 2018). In the digital era, learning has become an active and constructive process rather than a passive and reproductive process.

The focus of current learning objectives is certainly on 'knowledge creation' rather than 'knowledge acquisition,' and learning is more than just 'data transfer'. This is in line with the concepts and positions of cognitive and constructivist learning theories. The cognitive theory theoretically focuses on how people receive processes and manipulate information and pays attention to how people think (Curum & Khedo, 2021), solve problems, and make decisions which then implies that any media developed will be

able to have an impact on understanding a theory contained in the subject matter and discover new knowledge in accordance with the relationship between the material and the experience that students gain. The next theoretical view is constructivist theory. This theory considers the involvement of learners in meaningful experiences as the core of the learning experience (IGNATOVA et al., 2015). In the learning process, this theory encourages students to conduct group discussions, seek problem-solving, and integrate some new information. Thus, optimizing the use of ICT-based media will also contribute to students' ability to solve problems and be active in communicating.

4. Conclusion

In line with the purpose of this study, which is to provide a description and analysis of the potential use of applications to manage ICT-based learning, this paper successfully shows that there are many applications that can be applied by teachers as an initial step in planning learning that is integrated with ICT. Education in the global era requires teachers to be able to adapt to the presence of ICT in various learning activities. The utilization of ICT in the learning process can be realized through the development of innovative learning media in various formats, such as interactive multimedia, smartphone-based learning applications, e-modules, animations, videos, and interactive quizzes. The ICT-based learning media can now be accessed on educational sites, and teachers can develop their own learning media development independently. Soft skills and hard skills continue to develop, and abilities such as critical thinking, communication, innovative thinking, literacy, computing, tolerance, problem-solving, discipline, etc., become important to be instilled and trained in students.

These skills can be trained in students during the learning process and can be optimized through the integration of ICT into the learning process, which can then be combined with learning models such as project-based learning, problem-based learning, inquiry learning, and discovery learning. However, this research is still limited to descriptions and narrations, not yet reaching a form of needs analysis to find out what types of applications are often used and are in demand by teachers in developing ICT-based learning. Suggestions for further research are to be able to make the paper a basis for developing an ICT-based learning media by taking into account the characteristics of the material and students.

Conflicts of Interest: The authors declare no conflict of interest.
Author Biography: **Riskasari, M.Pd**, a lecturer at STIT NU Oku Timur, Indonesia, and an elementary school educator, has experience publishing scientific papers in international journals with his research focus on educational technology, learning media, and learning management.
Dr. Roemintoyo, a senior lecturer at Sebelas Maret University, Indonesia, has experience in publishing scientific papers in reputable international journals with his research focus on educational technology, learning management, and vocational education.
Mochamad Kamil Budiarto, M.Pd, a lecturer at the Invada Language and Education Institute, Cirebon, Indonesia, has experience publishing scientific papers in international journals with his research focus on educational technology, interactive multimedia, ICT-based learning, and learning media.
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