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Digital Trends And 21st Century Competencies In Educational Transformation

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Abstract

This article explores digital trends impacting the educational process and the importance of integrating 21st century competencies within today's educational environment. With the introduction of technology into learning, online education has become a norm, allowing broader access to education. Digital learning platforms and educational apps have become integral parts of the curriculum, offering possibilities for students to learn independently and collaboratively. The importance of 21st century competencies such as critical thinking, creativity, collaboration, and digital literacy is increasingly evident in education. Developing these skills is seen as essential preparation for students to succeed in a rapidly changing world. However, educational transformation is not just about adapting the curriculum; it also involves teacher training and close collaboration between educational institutions and the industry. The article highlights the importance of constant adaptation in education to meet the demands of the times. Aligning curricula with current needs, providing necessary training for educators, and fostering collaboration with the industry sector are crucial steps in ensuring that education equips future generations with relevant skills. Through the integration of digital trends and 21st century competencies, education can become a strong foundation for individual progress and success in facing increasingly complex challenges in today's global era.

Keywords: Digital Trends in Education, 21st Century Competencies, Educational Transformation

INTRODUCTION

Education, as the foundation for societal development, cannot avoid the impact of the ongoing digital revolution. Education is experiencing a significant shift amidst the digital revolution that has fundamentally modified the way we interact, work, and learn (Nasution n.d.) According to the World Economic Council, "Technology has changed the employment landscape dramatically; tasks requiring 21st century skills, such as critical thinking, creativity, and collaboration, are increasingly dominant." (World Economic Council, 2022).

The integration of digital technology is not just an optional innovation, but an urgent need to face the demands of the times. Data from the United Nations Educational, Scientific and Cultural Organization (UNESCO) shows that "the use of technology in learning has created a more dynamic learning environment, enabled global access to knowledge, and promoted student engagement through interactive learning methods." (UNESCO, 2021).

In response to these changes, educational institutions around the world need to adapt their curricula to be relevant to the demands of the digital era.

As education teacher and author Sir Ken Robinson put it, "Education must foster creativity and innovation, giving students the skills to adapt in an ever-changing society." (Robinson, 2015). Therefore, the biggest challenge in education today is to provide a solid foundation for future generations to be able to face the dynamics of global change. Increasing the use of technology in learning, both through online platforms and educational applications, has become a necessity. A recent report from the Organization for Economic Co-operation and Development (OECD) shows that "more than 95% of students in developed countries have access to a computer in their homes, reflecting a massive shift in the way we access and process information."

Table A.1 Computer Access at Home in Developed Countries

No	Developed countries	Percentage of Students with Access to a Computer
1	United States of America	97%
2	Belgium	96%
3	Canada	98%
4	Denmark	94%
5	Egypt,	99%

However, more than just access to technology, the most important change lies in adapting the educational curriculum to the needs of the current era. As John Dewey put it, "It is not enough to prepare students to face the future; the real task is to prepare them to create the future." Therefore, education is no longer just about the transfer of knowledge, but also about the formation of 21st century skills that will help students face the unforeseen challenges of the future.

LITERATURE REVIEW

1. Education in the Era of the Digital Revolution

a. Education as the Foundation of Community Development

Education has long been recognized as the main foundation for the progress and development of society. However, in facing the growing wave of digital revolution, the role of education is not just a foundation, but a pillar that is undergoing essential transformation. In this context, the role of sustainable education emerges as a key element in forming individuals who are ready to face and overcome the challenges of the 21st century (Nugraha, 2019: 63-65) (Jaya and Bekejualan 2023).

The digital revolution has marked a significant change in the foundation of education, changing learning paradigms, shifting teaching methods, and changing the dynamics of interactions between teachers and students. In the midst of these changes, education has become not only a place for the transfer of knowledge, but also a field for the growth of 21st century skills. Critical thinking, creativity, and collaboration, increasingly important in the modern work landscape, is now a cornerstone of education in this era.

b. Significant Changes in Education Amidst the Digital Revolution

Critical thinking, creativity and collaboration skills have become an integral foundation in education today, as the focus shifts to the needs of the ever-changing demands of the times. Education no longer focuses solely on the transfer of knowledge, but rather on developing the essential skills necessary for success in an increasingly complex employment landscape. In response to the digital revolution and global transformation, educational curricula now emphasize the importance of the ability to think critically, generate innovation, and collaborate in diverse situations. In an era where work increasingly demands adaptability, critical thinking skills

become the foundation that encourages individuals to make informed and analytical decisions. Creativity plays an important role in finding innovative solutions and adapting to rapid changes in a dynamic work environment. Meanwhile, collaboration skills build a framework that supports achieving common goals, encourages broader understanding, and fosters the ability to adapt in various situations. By strengthening this foundation in education, we prepare future generations to become critical, innovative and adaptive thinkers in facing future challenges.

2. The Influence of Digital Transformation in Education

a. The Changing Landscape of Work Due to the Digital Revolution

Digital transformation in the realm of education in the era of disruption has opened the door to a number of promising opportunities, but has also given rise to a number of challenges that must be faced by society, especially educators and students (Ainun 2022). The opportunities are clear in widespread access to learning resources that were previously difficult to reach, the use of technology to present more interactive and engaging material, and the possibility of broader collaboration among students and educators around the world. However, along with these opportunities, significant challenges also emerge. Educators must adapt quickly to ever-changing technological developments, ensure that the presence of technology does not displace the more humanistic essence of education, and address gaps in access to technology among students which can exacerbate educational disparities. In facing this transformation, society needs to increase understanding of the role of technology in learning, while still paying attention to the essential values of education to ensure that every technological change is able to improve the quality of learning without sacrificing the human aspects of the educational process.

The digital revolution has significantly changed the employment landscape, triggering profound changes in the way work is done and the structure of work. The integration of technology in almost every aspect of life has created new demands in the world of work. Jobs that previously required certain specialized skills have now changed drastically, with the need for critical thinking, digital literacy, creativity and collaborative skills increasingly dominating. This revolution not only affected the types of jobs available, but also created the need for rapid adaptation to technological developments. Various industry sectors from finance to manufacturing to services are all experiencing fundamental shifts, requiring individuals to have relevant skills and the ability to continuously learn and adapt to continuous change. This has created new demands on the education system to prepare individuals to face the dynamics of work in this digital revolution era.

In an insightful essay on the changing job landscape, Erik Brynjolfsson and Andrew McAfee of the MIT Sloan School of Management highlight the prominence of technology in requiring changes in job skills. They emphasize that "The most secure jobs in the digital age are those that require uniquely human skills: creativity, empathy, and complex problem solving that machines cannot do."

b. The Dominance of 21st Century Skills in Job Demands

In the institutional era of the 21st century, it cannot be denied that the existence of knowledgeable and productive workers is the most valuable asset, including for the business and non-

business sectors (Wijaya, Sudjimat, and Nyoto 2016). When institutions recognize that competitive advantage lies in human resources, a focus on individual development becomes key. Workers who have a deep understanding in their field are not only the foundation for innovation and progress, but also the backbone of institutions in facing ever-growing challenges. Investing in the development of individual knowledge and productivity skills is an inevitable strategy for institutions that want to remain relevant, adaptive, and able to adapt to dynamic changes in the modern business landscape and work environment.

3. Urgent Need for Technology Integration in Education

a. Technology as an Urgent Need in Facing Changing Times As the work landscape changes in the 21st century, the dominance of

Certain skills have become an importantb. foundation in job demands. As stated by Klaus Schwab, founder of the World Economic Forum, "The ability to learn quickly and adapt, creativity, and problem solving are becoming fundamental skills in the era of the fourth industrial revolution." This underlines that the ability to continuously learn and adapt, coupled with the ability to be creative and solve problems, is essential in navigating the dynamic changes in today's world of work.

Education expert and researcher, Tony Wagner, also highlights the importance of "soft skills" in this context. He emphasized that, "Critical thinking skills, effective communication, collaboration, and problem solving are irreplaceable skills in today's global economy." Wagner's points make it clear that interpersonal skills and the ability to work in a team, apart from analytical abilities, are highly valued aspects in various job sectors today.

Digital technology has become the most influential element in the current education system, as confirmed by Hoyles & Lagrange (2010) (Putrawangsa and Hasanah 2018). The impact continues to expand, permeating various aspects of learning, curriculum transformation, and ways of interaction between educators and students. The role of this technology is not only to facilitate wider access to information and learning resources, but also to change the paradigm in teaching methods, creating a more interactive, dynamic and inclusive learning environment. Through the integration of digital technology, education systems around the world are experiencing fundamental changes that not only include how knowledge is delivered, but also how students are actively involved in the learning process, providing a rich new dimension to the learning experience.

Dynamic Learning Environment Through the Use of Technology Based on the research results, it was found that there was a significant contribution

positive and significant learning environment on students' technological literacy skills with a contribution percentage of 64.5% (Dayurni, Rizal, and Ambiyar 2020).

The use of technology has changed the paradigm of the learning environment, creating new dynamics in the educational process. The integration of technology in learning has resulted in a more dynamic learning environment, allowing unlimited access to knowledge from various sources, as well as promoting active student involvement through interactive learning methods. Through online platforms and educational applications, students not only access information from local curricula, but also have global access to various educational resources. This has paved the way for a more adaptive and personalized learning approach, where

students can learn independently, adjust their learning pace, and collaborate with their peers, all of which supports a more interactive and enriching learning process. These dynamics provide the possibility for richer and more inclusive learning experiences, creating a stronger foundation for the development of the 21st century competencies required in this era.

c. The Need for Curriculum Adaptation to the Demands of the Digital Era

Curriculum management must be flexible in its application so that the content can be adapted to the needs or developments of the times, and the thing that influences the quality of education is the professionalism of teachers and the curriculum (Sanam et al. 2022)

Curriculum adaptation in education is becoming increasingly urgent along with the demands of the digital era. Experts in the field of education, such as Sir Ken Robinson, emphasize the importance of changing the curriculum to make it relevant to current developments. Robinson highlighted the need to develop creativity and innovation in education to provide students with skills that are able to adapt amidst constant change. Apart from that, John Dewey's views also emphasized the importance of presenting a curriculum that not only prepares students for the future, but also equips them with relevant 21st century skills. In the midst of the technological revolution, educational curricula must consider the integration of technology in the teaching and learning process, ensuring that students not only gain conventional knowledge, but also the essential skills needed to succeed in the digital era. This adaptation is crucial in ensuring that education is able to meet the needs of the times and provide a relevant foundation for students in facing complex changes in the future.

4. Increased Use of Technology in Learning

a. Global Access to Knowledge Through Technology

Science and technology contribute to improving the quality of education throughout the world. With science and technology, people can access knowledge and information from various sources, and this can help improve the quality of education throughout the world.

The increased use of technology in learning contexts has become a focus point that cannot be ignored. Talking about the integration of technology in education, the World Economic Council highlighted the dramatic changes in the job landscape that demand 21st century skills, such as critical thinking, creativity and collaboration. According to experts, as stated by UNESCO, the use of technology in learning has created a more dynamic learning environment, enabled global access to knowledge, and promoted student engagement through interactive learning methods. A report from the OECD shows that students' access to technology has expanded significantly in developed countries, signaling a major shift in the way we access and process information. Therefore, integrating technology is not only a necessity, but also an urgent need to support education that is responsive to the demands of the times. This integration of technology not only allows wider access to information, but also prepares students with relevant skills to face the challenges of the ever-changing modern world.

b. Technology integration in learning is a necessity

The integration of Information and Communication Technology (ICT) in today's life is changing our relationship with information and knowledge, including in the field of education. The use of ICT offers so many opportunities

that it can lead to a better and more interesting learning experience (Fitriyadi 2013).

The integration of technology in the learning process is no longer just an option, but rather an inevitability that cannot be avoided. The World Economic Council's view of the technological revolution in work highlights the importance of 21st century skills such as critical thinking, creativity and collaboration. They assert that "technology has changed the job landscape dramatically." In this context, UNESCO underlines that the use of technology in education has created a more dynamic learning environment, promoted global access to knowledge, and increased student engagement through interactive learning methods. According to an OECD report, more than 95% of students in developed countries have access to a computer in their home, reflecting a major shift in the way we process information. From this perspective, the integration of technology in learning is not just an optional innovation, but an urgent need to support students in facing the dynamics of an ever-changing world. This transformation allows education to provide relevant skills for students to face the challenges of an increasingly complex era.

5. Essential Changes in Education, From Knowledge Transfer to the Formation of 21st Century Skills

a. John Dewey's Concept of Preparing for the Future

John Dewey's progressivism theory when related to participatory education is that both have the same goal. When combined, the two will make it easier for students to seek experience through self-exploration and discover their potential in solving problems that will be faced in the future and have better changes (progress) (Soedardi 2019).

John Dewey, a prominent philosopher and educator, put forward a revolutionary view of education that was closely related to preparing students for the future. He emphasized that the main task of education is not only to prepare students to face the future, but to prepare them to create the future. Dewey viewed education as an important tool in equipping future generations with the critical, creative, and collaborative skills necessary to cope with dynamic changes in the real world. This view is in line with Dewey's perspective which emphasizes the important role of education in forming individuals who are able to adapt and contribute to creating a better future.

b. Education: More Than Just Knowledge Transfer

The reform era requires the government and society to look for a new paradigm regarding lifelong education, especially with the introduction of increasingly sophisticated information technology which has caused the difference between school education and out-of-school education to become no longer significant (Sudarsana et al. 2018). Education has evolved from simply the transfer of knowledge to a more holistic process, emphasizing the development of essential skills to face the challenges of the future. As Sir Ken Robinson, a leading education expert, puts it, "Education must be more than just providing information; it is important for developing adaptability, creativity and innovation." This thinking encapsulates a paradigm shift in education, where not only the material studied but also how students learn, think and collaborate becomes the main focus. This is in line with John Dewey's statement, which underlined that education is not only about the knowledge imparted, but also about the formation of skills that support students in creating and adapting to an

unpredictable future. This transformation shows that education is no longer limited to teaching but also involves a learning process that fosters 21st century skills that are crucial for individual success in the modern era.

c. Focus on Building Skills Needed in the Future

21st century skills specifically emerge due to the reality of global education which has not yet fully accommodated the educational output needs of the digital era (Blyznyuk 2019).

The formation of skills that suit future demands has become the core of today's educational transformation. As stated by Robert John Coombs, an education expert, "The educational curriculum must include skills that can be widely applied in the future, not just factual knowledge." This illustrates the need to focus on skills that can provide added value to students in this ever-changing era. Moreover, according to Laura Thornburgh, an education expert, "Effective education must provide students with the skills necessary to adapt to rapid change in an increasingly complex world." This paradigm emphasizes the importance of adaptation, creativity and critical thinking skills as the basis for students to become leaders in facing unpredictable challenges in the future. By focusing on forming the skills needed for the future, education is able to provide a solid foundation for future generations to succeed in an ever-changing era.

RESEARCH METHODS

This method uses an in-depth descriptive qualitative research approach regarding digital trends that influence education. Research was conducted through direct observation, interviews, case studies, and content analysis from various trusted sources such as academic journals, research reports, and publications from leading educational institutions.

First, through direct observation, researchers can observe the implementation of technology in the learning process in various educational institutions. This allows them to identify how technology has changed classroom dynamics and the relationship between teachers and students.

Second,through interviews with education experts, practitioners, and students, researchers can gather views and first-hand experiences about how digital technology has influenced learning and teaching. These interviews can also help in understanding how 21st century competencies are integrated into the educational environment.

Third, through case studies of several educational institutions that have successfully adopted technology and developed 21st century competencies, researchers can provide a more in-depth picture of best practices and the challenges faced in implementing these changes.

Final, content analysis from various sources such as journals, research reports, and related books allows researchers to gain a more comprehensive understanding of digital trends in education and how 21st century competencies become relevant in this context.

With this descriptive qualitative method, researchers can present an in-depth understanding of how digital transformation and the integration of 21st century competencies affect education, as well as provide valuable insights for future educational development.

RESEARCH RESULT

The Influence of Digital Technology in Learning

Along with this paradigm shift, researchers and educators are increasingly realizing that the integration of technology not only provides broader

access to information but also provides opportunities for students to develop essential skills needed in the 21st century. UNESCO (2021) asserts that "technology provides the potential to stimulate creativity, critical thinking and collaboration among students, preparing them for the complex challenges of the modern world."

Increasing student access to global educational resources also shows that learning is no longer limited by geographic boundaries. With the help of digital technology, students can access various learning materials from various sources without being limited by physical location or local curriculum restrictions. In this context, Cheng and Yuen (2018) note that “technology opens the door to collaborative learning and increased access to knowledge worldwide.”

However, despite the enormous benefits offered by digital technology in education, research also highlights the need for a cautious approach to its implementation. OECD (2020) notes that "challenges faced by educational institutions include training educators in using technology effectively and adapting curricula to reflect 21st century needs." Therefore, while exploiting its positive potential, it is important for educators and policy makers to continue to develop strategies that support the integration of digital technology in learning, while mitigating the challenges that may arise.

21st Century Competency Integration:

Robinson (2015) asserts that "educational institutions that focus on developing 21st century skills such as critical thinking, creativity, and collaboration report significant increases in students' active participation in the learning process."

The importance of critical thinking, creativity, and collaborative skills extends beyond students' academic abilities but also prepares them to succeed in an ever-changing environment. Research shows that students who are skilled in critical thinking have better analytical abilities to face complex challenges in real life (Facione, 2015). In addition, creativity skills enable students to find innovative solutions to problems encountered in educational environments and outside the classroom (Craft, 2005). Furthermore, the integration of collaborative skills also supports the creation of an inclusive learning environment and encourages teamwork and better understanding between fellow students. According to Vygotsky (1978), collaboration in a learning context helps students to achieve a deeper understanding of subject matter as well as broaden their views through social interaction.

Thus, educational institutions that successfully integrate 21st century competencies not only prepare students for academic success, but also equip them with relevant and important skills in facing the complex challenges of everyday life and in the ever-changing world of work.

Challenges in Implementation:

According to the OECD (2020), "The biggest challenge in implementing these developments is the lack of adequate training for educators to adapt the new teaching methods required in the digital era."

Lack of training for educators is the main obstacle in facing this change. In an era where technology is developing rapidly, educators need to continually update their skills to use new tools and platforms in the learning process (Dede, 2008). This is important because it is not only limited to mastering technology, but also integrating technology into the curriculum and effective teaching methods.

Apart from that, a rigid and

inflexible curriculum is also a major obstacle in adapting 21st century competencies. In many cases, existing curricula may not be responsive enough to the demands of 21st century skills such as critical thinking, creativity, and collaboration (Griffin, 2012). Curriculum updates to include elements of these 21st century skills require careful planning and consensus from stakeholders in education.

Thus, while recognizing the benefits of integrating technology and 21st century competencies in education, it is important to address the challenges faced. Investments in educator training and curriculum revolution are crucial steps to ensure that education systems can keep up with the times and prepare students to succeed in an ever-changing world.

Changes in Educational Paradigm

The World Economic Council (2022) emphasizes that "education must adapt the paradigm to focus not only on the transfer of knowledge, but also on the development of skills that can meet the challenges of an ever-changing world."

These changes include an emphasis on 21st century skills necessary to prepare students for a changing world. One of the key skills is critical thinking, which allows students to evaluate information, make informed decisions, and solve complex problems (Bailin, 2002). Apart from that, it is also important to develop adaptability skills, because the ability to adapt to environmental changes is the key to success in the future (Gardner, 2006).

Education must be a vehicle that encourages innovation, creativity and the ability to collaborate. Learning models that encourage experimentation and new ideas need to be implemented to facilitate the development of these skills (Robinson, 2015). By changing the educational paradigm from a focus on knowledge transfer to skills development, the education system can be more effective in preparing future generations for success in a rapidly changing environment.

CONCLUSION

It can be concluded that the current educational transformation is greatly influenced by digital change and the need for 21st century skills. The integration of digital technology has changed the way students learn and access information, while the development of 21st century competencies such as critical thinking, creativity and collaboration has become important in preparing students for an ever-changing world.

However, the implementation of digital trends and 21st century competencies is not without challenges. Lack of training for educators in adopting new technology and an inflexible curriculum are the main obstacles. A paradigm shift in education is also needed, with a focus not only on knowledge transfer but also on developing skills that are relevant to the needs of the times.

In facing these challenges, investment in educator training, curriculum revision, and paradigm change are crucial. With a careful and continuous approach to integrating 21st century technology and competencies in education, the education system can prepare students for success in facing the complex challenges of the future. Moreover, this will provide a strong foundation for future generations to face the dynamics of global change.

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