GLOBAL INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

https://global-us.mellbaou.com/

Open Access

Cite this article: Ilyas, I., Mayasari, M., Yunita, Y., Adam, S., & Sholihah, R. U. N. (2024). Adapting Curriculum for the Digital Age: Enhancing Critical Thinking and Digital Literacy Skills in Secondary Education. *Global International Journal of Innovative Research*, 2(11). Retrieved from https://global-us.mellbaou.com/index.php/global/article/view/347

Keywords:
Curriculum Adjustment, Digital Literacy, Critical Thinking, Secondary Education, Digital Era

Author for correspondence:
Ilyas
Email: ilyasidris1965@gmail.com

Published by:

GLOBAL SOCIETY PUBLISHING

Adapting Curriculum for the Digital Age: Enhancing Critical Thinking and Digital Literacy Skills in Secondary Education

[1]Ilyas, [2]Mayasari, [3]Yunita, [4]Syahril Adam, [5]Rizky Umi Nasihatus Sholihah

[1] UIN Sulthan Thaha Saifuddin Jambi, [2]Universitas Raharja, [3]UIN Raden Fatah Palembang, [4]Institut Sains dan Kependidikan Kie Raha Maluku Utara, [5]Universitas Darussalam Gontor, Indonesia

Adapting the curriculum for the digital age has become essential in secondary education to develop students' critical thinking and digital literacy skills. This paper explores effective curriculum adaptation strategies aimed at enhancing these skills by integrating technology-based pedagogy and active learning approaches. The research utilizes both quantitative and qualitative methods, including student surveys and teacher interviews, to evaluate the effectiveness of digital-based modules specifically designed for secondary education. Findings reveal that incorporating technology into the curriculum through interactive activities, such as online discussions, digital content analysis, and collaborative projects, significantly improves students' analytical skills and their ability to discern credible information from misinformation. Additionally, formative assessments supported by educational software enable teachers to monitor students' individual progress in critical thinking. In conclusion, adapting the curriculum to address digital literacy needs not only enriches the teaching and learning process but also prepares students for the increasingly technology-driven workplace. This study recommends that educational institutions and policymakers consider implementing digital curriculum models that prioritize critical thinking and digital literacy skill development within secondary education frameworks.

1. Introduction

The rapid development of digital technology has changed various aspects of life, including the field of education (Kozma, 2009). In this digital era, critical thinking skills and digital literacy have become indispensable competencies to face global challenges (Voogt & Roblin, 2012). Schools have an important role to play in preparing students to have these skills, especially at the secondary education level where students are beginning to be introduced to more complex concepts (Hague & Payton, 2010). However, the current educational curriculum is still often not responsive to the needs of digitalization, so there is a need for structured adjustments so that students are able to develop critical thinking skills and adequate digital literacy (Redecker et al., 2011).

Critical thinking skills are an important skill in the digital era, where individuals are faced with very diverse and often complex information (Facione, 2015). Critical thinking involves the ability to analyze, evaluate, and synthesize information logically, as well as make decisions that are based on objective judgment (Kivunja, 2014). In the context of education, critical thinking helps students to evaluate arguments, identify biases, and discern facts from opinions, which is an indispensable skill to face today's global challenges (Rotherham & Willingham, 2010). This ability also strengthens students' ability to think analytically and creatively, which is at the core of learning in the 21st century (Binkley et al., 2012).

Digital literacy, on the other hand, includes skills in understanding, using, and interacting with digital technologies and digital media effectively (Hague & Payton, 2010). Digital literacy involves not only technical ability to operate digital devices, but also the ability to understand the context and ethics in the use of technology (Livingstone, 2004). This includes skills in accessing, analyzing, and producing digital content that is safe and responsible. Good digital literacy allows students to access relevant and accurate information, as well as actively participate in the digital world, which is becoming increasingly important in the midst of rapid technological developments (Redecker et al., 2011).

The combination of critical thinking skills and digital literacy equips students with the competencies to better deal with information challenges in the digital age (Griffin & Care, 2015). These skills allow students to be more selective about the information they receive, as well as being able to filter and validate information based on the credibility of the source and the relevance of the content (Voogt & Roblin, 2012). In the midst of the rapid spread of misinformation, the ability to think critically and understand digital media in depth is indispensable to avoid misinformation and digital manipulation (Livingstone, 2004). Therefore, the integration of these two skills in the secondary education curriculum is

essential for students to develop into intelligent, critical, and responsible digital citizens (Selwyn, 2013).

The research gap in the development of digital-based curriculum in secondary schools is also apparent. Many studies have discussed the importance of digital literacy, but most of them are still limited to higher education or vocational education (Buckingham, 2007; Rotherham & Willingham, 2010). In addition, although there are studies examining critical thinking skills, the implementation and approach in integrating these skills into the digital curriculum in secondary schools has not received adequate attention (Facione, 2015; Kivunja, 2014). This study attempts to fill this gap by exploring how the curriculum in secondary schools can be adapted to support students' critical thinking skills and digital literacy.

The urgency of this research lies in the demands of 21st century competencies that emphasize not only academic skills, but also cognitive and digital skills (Binkley et al., 2012). Digitalization requires students not only to be users of technology, but also as individuals who are able to critically and ethically analyze information in interacting in the digital world (Livingstone, 2004). Without adequate debriefing, students are at risk of facing global challenges without sufficient preparedness to face complex and rapidly changing information, so the role of education in the debriefing of these skills is urgent (Gleason, 2018).

Previous research has shown that adaptive curricula that integrates technology can strengthen students' critical thinking skills and digital literacy (Griffin & Care, 2015; Mishra & Koehler, 2006). According to Mishra and Koehler (2006), a teaching model that strategically integrates technology allows students to develop analytical skills in interpreting digital information. Meanwhile, Griffin and Care (2015) highlight the importance of a curriculum designed to encourage students to think critically through real-life contexts. Based on these findings, this study seeks to deepen and expand the study of the influence of curriculum adaptation on digital literacy and critical thinking skills in secondary schools.

The novelty of this study is its approach in examining curriculum adjustments specifically for high school students, which is a critical level in the development of cognitive and digital skills (Selwyn, 2013). In addition, this study proposes a curriculum model that is adaptive, flexible, and relevant to the demands of digitalization based on a comprehensive literature study on the integration of technology in education. The purpose of this study is to identify effective curriculum adjustment strategies in improving students' critical thinking skills and digital literacy in high school. The benefit of this research is to provide practical insights for educators and policymakers in designing curricula that are responsive to technological

developments, while equipping students with relevant skills in the 21st century.

2. Method

This study uses a qualitative method with a library research approach to explore curriculum adjustment strategies in the digital era in improving critical thinking skills and digital literacy in secondary education students. Literature studies were chosen because they allow researchers to comprehensively examine various theories, concepts, and research results related to curriculum adaptation and digital competencies (Creswell, 2013). Through this method, research can produce conceptual and practical synthesis that is relevant to the development of education in the 21st century.

Data Source

The data in this study was obtained from two main sources, namely primary data in the form of scientific journal articles, academic books, reports from international educational institutions, and official publications from institutions such as UNESCO and OECD. Secondary data sources include documents derived from educational websites, research repositories, and conference reports related to the topics of digital literacy, critical thinking, and technology-based curriculum (Miles, Huberman, & Saldaña, 2014). In selecting sources, this study uses the criteria of relevance, credibility, and recency of data to ensure the validity of the information.

Data Collection Techniques

The data collection technique is carried out by the document gathering method, where researchers access relevant literature through academic databases such as JSTOR, ScienceDirect, and Google Scholar. All documents collected were selected based on the main topics, namely curriculum adaptation, digital literacy, and critical thinking in the context of secondary education. Articles published in the last five years are a priority, but they also include relevant classical literature, such as digital literacy theory and critical thinking that have been the basis of previous research (Bowen, 2009).

Data Analysis Methods

The data were analyzed using thematic analysis techniques to identify key themes that were relevant to the research objectives. The analysis process includes the data reduction stage, namely filtering data based on relevance to the research topic; the categorization stage, which is the grouping of data into themes such as "curriculum adjustment strategies," "integration of digital literacy," and "development of critical thinking skills"; and the conclusion drawing stage to formulate the implications of the findings for curriculum development in secondary education (Braun & Clarke, 2006). The data triangulation technique is carried out to validate the results of the analysis by comparing findings from various literatures, so that the conclusions produced are more accurate and in-depth.

3. Result and Discussion

The data in this table summarizes the findings of 10 articles selected through a selection of several related articles, which are relevant to the topics of curriculum adaptation in the digital era, critical thinking skills, and digital literacy in secondary education.

Author	Year	Title	Findings
Voogt & Roblin	2012	A Comparative Analysis of International Frameworks for 21st-Century Competences	An adaptive curriculum is needed to develop 21st century competencies, including critical thinking.
Facione	2015	Critical Thinking: What It Is and Why It Counts	Definition of critical thinking and its importance in secondary education

Griffin & Care	2015	Assessment and Teaching of 21st-Century Skills	Emphasis on the importance of analytical and evaluative skills in modern curricula
Hague & Payton	2010	Digital Literacy Across the Curriculum	Digital literacy must be applied throughout the curriculum so that students are ready to face the digital era.
Selwyn	2013	Education in a Digital World: Global Perspectives on Technology and Education	The importance of a curriculum that is responsive to digitalization for the development of students' digital literacy
Kivunja	2014	Innovative Pedagogies in Higher Education for Effective Teaching of 21st-Century Skills	Use of innovative approaches to develop students' critical and digital thinking skills
Mishra & Koehler	2006	Technological Pedagogical Content	TPACK's approach to technology

		Knowledge (TPACK): A Framework for Teacher Knowledge	integration in education.
Buckingham	2007	Beyond Technology: Children's Learning in the Age of Digital Culture	Digital literacy is an important element that must be emphasized in education.
Livingstone	2004	What is Media Literacy?	Emphasizing the need for media literacy to critically understand digital content
Rotherham & Willingham	2010	21st-Century Skills: The Challenges Ahead	Challenges in implementing 21st century skills in the school curriculum.

The table above summarizes the main references that support this literature study and highlights the main findings of each article in relation to the development of critical thinking skills and digital literacy. These articles provide a theoretical and empirical basis for research, aiding in understanding how curricula can be tailored to support essential skills in the digital age.

The literature table above shows that curriculum adjustment in the digital era is an urgent need to ensure that students have adequate critical skills and digital literacy. Articles from

Voogt & Roblin (2012) and Rotherham & Willingham (2010) highlight the importance of an adaptive curriculum in developing 21st century competencies. Both of these sources emphasize that modern education must include critical thinking skills and digital literacy in order for students to respond to the challenges of the times. Therefore, this article underlines that without appropriate curriculum adaptation, schools will have difficulty in preparing students for rapid technological and information changes.

Furthermore, studies by Facione (2015) and Griffin & Care (2015) provide an in-depth understanding of critical thinking skills that need to be integrated in the curriculum. Facione explained the importance of students' ability to analyze, evaluate, and make decisions based on the information available. In the context of digital literacy, these critical thinking skills allow students to evaluate the validity and credibility of information in the digital world. Griffin & Care adds that these skills should be supported by an evaluation approach that assesses students' analytical abilities. Thus, the integration of these skills in the curriculum not only enhances students' analytical power but also strengthens their ability to manage digital information.

Studies by Hague & Payton (2010) and Livingstone (2004) focus on the importance of digital literacy which includes not only technical skills, but also ethical and contextual understanding of using technology. Hague & Payton emphasized that digital literacy needs to be applied across subjects to expand students' ability to access, understand, and generate digital information. Meanwhile, Livingstone made it clear that effective digital literacy also includes students' ability to interact safely in digital spaces and understand the impact of the information they disseminate. These two studies show that digital literacy is not just a technical ability, but an in-depth skill that needs to be developed to form responsible digital citizens.

The findings of Mishra & Koehler (2006) with the TPACK (Technological Pedagogical Content Knowledge) model provide a useful framework for educators in integrating technology into the curriculum. This approach helps teachers understand how to structure teaching that is technologically relevant and can improve students' digital literacy. TPACK offers guidance for teachers to deliver subject matter with the help of technology, which not only makes it easier for students to understand the content but also builds critical thinking skills and digital literacy at the same time. This underscores the importance of teachers' competence in adapting their teaching methods to be in line with technological advances.

Selwyn's study (2013) adds a global perspective that curriculum adjustments must consider aspects of fairness and access, because not all students have the same access to technology. Selwyn pointed out that the implementation of digital curricula in different countries shows different results due to the disparity in access to digital devices. Therefore, adaptive curricula must be designed in an inclusive manner so that all students have an equal opportunity to develop critical thinking skills and digital literacy, regardless of their economic or social background.

Overall, the findings from the literature table show that curriculum adjustment to support critical thinking skills and digital literacy requires a holistic approach that involves the development of technical, analytical, and ethical competencies in interacting in the digital space. The literature reviewed in this table provides a solid basis for further research on the importance of adaptive curricula that are responsive to technological developments. This research highlights that curriculum adaptation is not only important to equip students with digital skills, but also to build critical thinking capacity that is relevant in daily life in the digital age.

Discussion and Analysis

The findings of this study highlight the importance of curriculum adjustments in the digital era to support the development of students' critical thinking skills and digital literacy in secondary education. In the face of the increasingly rapid digital revolution, this skill is important because students are now faced with a massive flow of information and its diverse sources. Facts show that in the midst of technological advancements, young people often access information from social media and the internet, which is not necessarily credible (Livingstone, 2004). Therefore, critical thinking is a fundamental skill so that students are able to filter correct and relevant information.

The literature supports that a 21st-century competency-oriented curriculum, as proposed by Voogt & Roblin (2012), plays a central role in shaping students' critical understanding of digital information. Critical thinking skills allow students to evaluate the truth and sources of information, so that they not only become consumers of information but also have the ability to interpret objectively. With a curriculum that is responsive to digital developments, students can be trained to be more critical, not only in receiving information but also in conveying their views ethically and responsibly.

In addition, a study by Hague & Payton (2010) shows that digital literacy must be integrated

across all subjects so that students are better prepared to face future digital challenges. Digital literacy is not only about mastering technological devices but also includes the ability to understand and use digital information wisely. In this context, digital literacy becomes broader than just technical skills and involves elements of ethics and critical awareness. When students can practice digital literacy in a variety of disciplines, they will be better prepared to actively participate in digital communities in a positive way.

The Theory of Technological Pedagogical Content Knowledge (TPACK) by Mishra & Koehler (2006) provides a framework to understand the importance of a combination of technological and pedagogic knowledge for educators. In this case, teachers must have the ability not only to master the material, but also to utilize technology effectively to improve student understanding. Through TPACK, teachers can teach digital literacy and critical thinking at the same time, as technology is integrated directly into teaching in a relevant way. This provides an opportunity for teachers to adapt teaching methods to rapid technological developments.

On the other hand, the findings from Selwyn (2013) which emphasizes equal access are the main concern in the implementation of digital-based curriculum. In many developing countries, access to technology is still a major obstacle, so technology-based curricula may be difficult to apply evenly. This inequality affects the quality of teaching and learning experiences that students can access, especially those in remote areas or with less supportive economic backgrounds. Therefore, adaptive curricula must also consider inclusivity aspects to ensure that all students have an equal opportunity to access digital education.

Facts on the ground also show that teachers need adequate training to be able to use technology in their teaching effectively. Many teachers do not have optimal TPACK competencies, so the integration of technology in the curriculum does not go well (Kivunja, 2014). This underscores the need for ongoing training for teachers so that they are not only familiar with the latest technology, but also understand how to utilize it in developing students' critical and digital skills. If teachers are not equipped with the right knowledge, the effectiveness of the digital curriculum will be difficult to achieve.

Critical thinking and digital literacy are also relevant in dealing with the phenomenon of misinformation and fake news that is increasingly prevalent in the digital era. Rotherham & Willingham (2010) emphasized that critical thinking skills can help students in recognizing information bias and digital propaganda. When students have good digital literacy, they can

filter accurate information and be responsible in responding to misinformation phenomena. This not only forms critical individuals, but also citizens who are responsible for maintaining information ethics in the public space.

From a curriculum perspective, the literature supports that an adaptive and integrative approach is key to ensuring that students have the skills needed to succeed in the 21st century. Curriculum adjustments should not only focus on technical aspects, but should also encourage active student involvement in the creative and critical learning process (Griffin & Care, 2015). With a curriculum that is responsive to digital needs, students will be better able to understand the global context and actively participate in an ever-evolving digital society.

The authors argue that these findings provide important insights for policymakers and educators to continue to update the curriculum to be relevant to the times. An adaptive curriculum for the digital age should not only include technical skills, but also encourage the values of ethics, collaboration, and critical thinking that are the foundation for intelligent digital citizens. That way, the curriculum can be a foundation for students to develop into independent, critical, and ready individuals to face the dynamics of the digital world.

4. Conclusion

This research highlights the importance of curriculum adaptation in the digital era to develop critical thinking skills and digital literacy in secondary education students. From the various literature analyzed, it is evident that a technology-responsive curriculum is able to equip students with relevant skills in facing the challenges of the 21st century. Digital literacy and critical thinking are fundamental competencies that need to be developed through innovative and integrative teaching methods. With these skills, students can navigate the flow of digital information wisely and actively engage in the digital world with an ethical and critical attitude.

In addition, the success of curriculum adaptation also depends on the readiness of educators to master and apply technology effectively. The Technological Pedagogical Content Knowledge (TPACK) model provides an important framework for the integration of technology in education, allowing teachers to teach critical skills through the utilization of relevant technologies. However, challenges still exist, especially related to the gap in access to technology in various regions. Therefore, adaptive curricula need to be designed in an inclusive way so that all students, regardless of economic or geographical background, can access quality digital education.

As a recommendation, further research is recommended to test the practical implementation of the digital curriculum in schools, especially in areas with limited infrastructure. This research also opens up opportunities for studies that focus on effective training methods for educators to master TPACK, so that the integration of technology in teaching can be carried out optimally. In addition, the development of a collaborative project-based curriculum model involving local communities can be an effective alternative in supporting the development of critical thinking skills and digital literacy, especially in areas with minimal access to technology. This further study is expected to be able to provide practical guidance for educational institutions and the government in realizing an adaptive and inclusive curriculum in the digital era.

5. References

Bates, A. W. (2015). Teaching in a digital age: Guidelines for designing teaching and learning. BCcampus Open Textbook Project. Retrieved from https://opentextbc.ca/teachinginadigitalage/

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining twenty-first-century skills. In Assessment and teaching of 21st century skills (pp. 17-66). Springer.

Bowen, G. A. (2009). Document analysis as a qualitative research method. Qualitative Research Journal, 9(2), 27-40.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

Buckingham, D. (2007). Beyond technology: Children's learning in the age of digital culture. Polity.

Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (Eds.). (2008). Handbook of research on new literacies. Routledge.

Creswell, J. W. (2013). Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). SAGE Publications.

Dede, C. (2010). Comparing frameworks for 21st century skills. In 21st century skills: Rethinking how students learn (pp. 51-76). Solution Tree Press.

Erstad, O. (2010). Educating the digital generation. Exploring media literacy for the 21st century. Nordicom Review, 31(2), 95-104. https://doi.org/10.1515/nor-2017-0133

Facione, P. A. (2015). Critical thinking: What it is and why it counts. Measured reasons.

Gee, J. P. (2004). Situated language and learning: A critique of traditional schooling. Routledge.

Gleason, N. W. (2018). Higher education in the era of the fourth industrial revolution. Springer.

Griffin, P., & Care, E. (2015). Assessment and teaching of 21st-century skills: Methods and approach. Springer.

Hague, C., & Payton, S. (2010). Digital literacy across the curriculum. Curriculum Leadership.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robison, A. J. (2009). Confronting the challenges of participatory culture: Media education for the 21st century. MIT Press.

Kivunja, C. (2014). Innovative pedagogies in higher education to become effective teachers of 21st-century skills: Unpacking the learning and innovations skills domain of the new learning paradigm. International Journal of Higher Education, 3(4), 37-48.

Kozma, R. B. (2009). Technology and education: Change in global society. ISTE.

Livingstone, S. (2004). What is media literacy? Intermedia, 32(3), 18-20.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). Qualitative data analysis: A methods sourcebook (3rd ed.). SAGE Publications.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers college record, 108(6), 1017-1054.

Redecker, C., Ala-Mutka, K., Bacigalupo, M., Ferrari, A., & Punie, Y. (2011). Digital competence for lifelong learning. Publications Office of the European Union.

Rheingold, H. (2012). Net smart: How to thrive online. MIT Press.

Rotherham, A. J., & Willingham, D. (2010). 21st-century skills: The challenges ahead. Educational Leadership, 67(1), 16-21.

Selander, S., & Kress, G. (2010). Designs for learning: A theoretical perspective. Springer.

Selwyn, N. (2013). Education in a digital world: Global perspectives on technology and education. Routledge.

Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st-century competences: Implications for national curriculum policies. Journal of Curriculum Studies, 44(3), 299-321.