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INTEGRATION OF DIGITAL TECHNOLOGY AND CHARACTER EDUCATION: BUILDING A RESILIENT GENERATION IN THE ERA OF THE INDUSTRIAL REVOLUTION 5.0

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Abstract

This study aims to analyze the integration of digital technology in character education in the era of the Industrial Revolution 5.0 through a systematic literature review approach to 50 selected studies published in the 2020–2025 period. The results of the study show that digital literacy is the main foundation that strengthens the formation of students' character, especially in terms of honesty, responsibility, empathy, and 21st century skills. The role of teachers, families, schools, and governments has proven to be crucial in supporting implementation, while the main challenges lie in the gap in technology access, human resource readiness, and curriculum adaptation. This study also identifies research gaps, namely the limitations of integrative models that connect technology, character education, and digital resilience simultaneously, as well as the lack of empirical evidence based on the Indonesian context that is in line with the Pancasila Student Profile Strengthening Project (P5) program. Thus, this article provides a conceptual contribution in the form of new research directions and policy models that emphasize digital literacy, ethics, and critical digital citizenship as instruments for shaping the character and digital resilience of the younger generation.

Keywords: *Digital Technology Integration; Character Education; Digital Literacy; Industrial Revolution 5.0; Pancasila Student Profile; Digital Citizenship; Digital Resilience.*

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1. Introduction

The global education landscape is moving towards the Industrial Revolution 5.0 (Industry 5.0) which emphasizes human-machine collaboration, sustainability, and human-centric innovation. This shift requires the world of education not only to pursue digital literacy and technological competence, but also to reaffirm the role of character education as an anchor of ethics, empathy, and humanity in the midst of intelligent automation. Recent studies confirm that the 5.0 paradigm shifts the focus from mere efficiency to social benefit and human resilience, so that education curricula and policies need to encapsulate the dimensions of character, creativity, and social responsibility along with mastery of digital technology (Kostorz & Lechwar, 2024; Sholeh et al., 2024).

In line with that, the international literature on Society/Industry 5.0 in higher education highlights the urgency of designing instruments, strategies, and policies that put people at the center including ethical literacy, interdisciplinary collaboration, and learner well-being. State-of-the-art studies show the need for institutional governance and campus policies that encourage technology-character integration so that digital transformation does not lead to techno-centrism that ignores values and virtues (Aparicio-Tavares et al., 2024; Kostorz & Lechwar, 2024).

At the level of educational units, digital citizenship is seen as a conceptual bridge between digital competence and character education. A critical approach to digital citizenship linking science, technology, and the humanities has proven to be more appropriate than just

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device-based pedagogy, as it opens up space for ethical-political debates about digitalization and fostering literacy that combines "making" and "thinking" in a reflective manner (Vallès-Peris & Domènech, 2024). Thus, technological integration is not separated from the values of responsibility, democratic participation, and social concern.

The dimension of digital resilience is another key issue. Empirical evidence shows that educational interventions are able to improve students' ability to respond to digital challenges (misinformation, cyberbullying, overload) adaptively. Sharpening curriculum design that combines digital skills training with value habituation (self-regulation, empathy, media ethics) contributes to the psychosocial well-being and safety of learners (Lee & Hancock, 2023; Sun et al., 2022).

The Indonesian context reinforces the relevance of this theme. The implementation of the Pancasila Student Profile Strengthening Project (P5) in the Independent Curriculum places the values of faith/piety, global diversity, mutual cooperation, independence, critical reasoning, and creativity as core characters that need to be orchestrated through cross-disciplinary project learning including digital book-based projects and contextual activities in schools. Recent findings in primary and secondary education show that P5 has an effect on students' welfare, motivation, and civic attitudes, while demanding support for the design of meaningful digital activities (Solehuddin et al., 2024; Perdana et al., 2024).

However, recent literature reviews indicate gaps: (1) there is still a limited integrative model that simultaneously examines the relationship between digital technology integration, character formation (Pancasila values/digital citizenship), and student resilience outcomes (digital resilience, well-being); (2) the lack of qualitative quantitative evidence that is Indonesian-context-based and aligned with the P5 mandate, but measured using standardized instruments; and (3) the lack of operational guidance that can be replicated across levels and subjects to ensure that the adoption of digital devices truly reinforces rather than replaces character education practices. This article is intended to answer this gap by offering a conceptual framework and research direction that combines policy 5.0, digital citizenship practices, and project-based learning designs (P5) that strengthen students' character and digital resilience (Sholeh et al., 2024; Vallès-Peris & Domènech, 2024; Lee & Hancock, 2023; Solehuddin et al., 2024).

2. Method

This study uses a systematic literature review approach to analyze the integration of digital technology in character education in the era of the Industrial Revolution 5.0. This method was chosen to provide a comprehensive overview of theoretical and empirical developments in the field. The literature search is conducted through the Consensus platform, which includes more than 170 million scientific publications from various international databases such as Semantic Scholar, PubMed, and other academic databases. The search was conducted using keywords: *"Digital technology integration"*, *"Character education"*, *"Industry Revolution 5.0*", *"Digital literacy"*, *"Educational technology"*, *"Moral education"*, and *"21st century skills"*. The inclusion criteria include publications in 2020–2025, focusing on the integration of digital technology and character education, peer-reviewed articles or international conference proceedings, in Indonesian and English, and relevant to the context of the Industrial Revolution 5.0. In contrast, the exclusion criteria include non-academic articles such as blogs or opinions, publications before 2020, research that focuses only on technical aspects without a character dimension, as well as articles that experience significant duplication or overlap. The literature selection process was carried out through the stages *of Identification* (n=996), *Screening* (n=700), *Eligibility* (n=466), to *Included* (n=50). Data analysis is carried out

using content analysis to identify key themes, thematic synthesis to integrate findings, evidence mapping to assess the quality of evidence, and gap analysis to find research gaps that still need to be studied further.

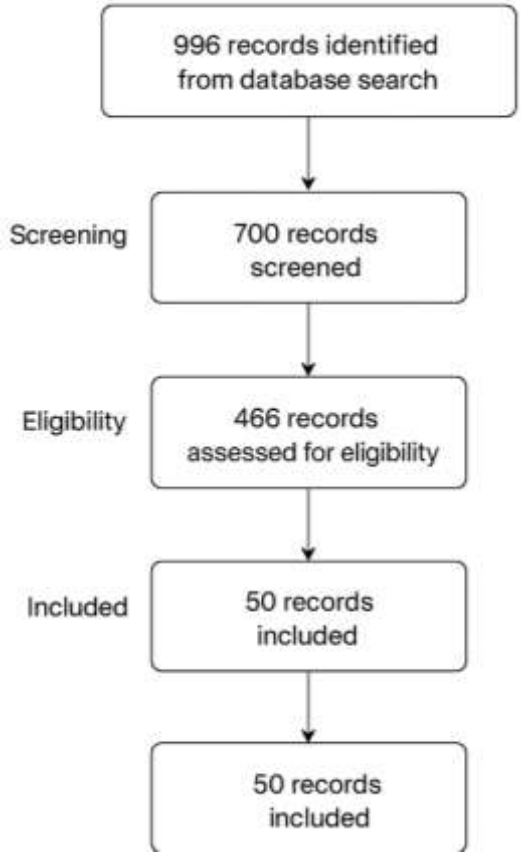

Figure 1. Research steps diagram

3. Results and Discussion

Table 1. Study Distribution Based on Methodology and Education Level

Methodology	SD/MI	Junior High School/MTs	High School/Vocational School	PT	Total	Percentage
Qualitative Case Studies	8	6	4	2	20	40%
Studi Literature	5	4	3	8	20	40%
Phenomenological Studies	3	2	1	1	7	14%
Mixed Methods	1	1	1	0	3	6%
Total	**17**	**13**	**9**	**11**	**50**	**100%**

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Table 1 shows that qualitative case studies (40%) and literature studies (40%) dominate research on the integration of digital technology and character education, while phenomenological studies (14%) and mixed methods (6%) are still limited. These findings show that the majority of research still focuses on the exploratory, descriptive, and conceptual stages, so an in-depth understanding of empirical practice in the field has not been widely explored. In terms of education, research is more directed at primary and tertiary education, while in secondary education the proportion is relatively smaller. This confirms that digital-based character strengthening at the junior high school/high school level has not received optimal attention, even though adolescence is a crucial phase in the formation of digital morals and identity. This condition is in line with the study of Sholeh et al. (2024) which found that most of the Society/Industry 5.0 research still focuses on macro policies and curriculum in higher education, as well as implementation studies in elementary schools. Thus, the next direction of research needs to develop more quantitative, experimental, and longitudinal approaches to measure the impact of digital integration on students' character in the long term. In addition, diversification of methodologies, especially with mixed methods, is essential to produce stronger and more comprehensive evidence in addressing the complexity of technology–character integration (Kostorz & Lechwar, 2024).

Table 2. Analysis of Key Studies and Their Contributions

Writer	Year	Methodology	Population/Sample	Key Findings	Integration Focus
Lina & Robbaniyah	2024	Qualitative case studies	4 Junior High Schools in Yogyakarta	Character & technology integration strategies, the challenge of internalizing values	Local adaptation & teacher training
Sugiarto & Farid	2023	Study literature	Students in the era of Society 5.0	Digital literacy strengthens character values (honesty, responsibility, empathy)	Digital literacy & digital ethics
Dewia & Alam	2020	Phenomenological studies	Elementary-High School Students	Character transformation through digital literacy, the role of the	Digital character transformation model

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				central teacher	
Abulibdeh et al.	2024	Study literature	Higher education	AI & digital technologies, ethical challenges, the need for new curriculums	AI, ESD, digital ethics
Aryani et al.	2024	Qualitative descriptive studies	Elementary schools in Indonesia	The role of digitalization & parental involvement in character education	Digitalization & the role of the family

The analysis in Table 2 highlights five key studies with different contributions in strengthening the concept of digital technology integration and character education. Lina & Robbaniyah (2024) emphasize the importance of local adaptation and teacher training, because although technology can facilitate learning, the success of integration is largely determined by teacher readiness and school context. Sugiarto & Farid (2023) added that digital literacy plays a significant role in strengthening character values such as honesty, responsibility, and empathy, so that technology is not only a technical tool, but also an instrument of moral formation. The Dewia & Alam (2020) study supports these findings by showing the central role of teachers in character transformation through digital literacy, especially at the elementary and high school levels. Meanwhile, international research from Abulibdeh et al. (2024) expands the discussion to the realm of higher education by highlighting ethical issues, AI, and the need for a new sustainability-oriented curriculum. Aryani et al. (2024) also emphasized the role of digitalization and family involvement in supporting children's character from an early age. Thus, this table confirms that the context of implementation is very diverse, ranging from local adaptation to global ethics, so a cross-level and cross-country approach is needed. This is in line with Vallès-Peris & Domènech (2024) who emphasize the importance of critical digital citizenship to ensure that technological transformation truly reinforces human values, not just technical efficiency.

Table 3. Effectiveness of Integration Models Based on Success Indicators

Integration Model	Digital Literacy	Character Values	21st Century Skills	Teacher Readiness	Total Score
Digital Pedagogy	9/10	8/10	9/10	7/10	33/40

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Independent Curriculum	8/10	9/10	8/10	8/10	33/40
Faith-Based Digital	7/10	10/10	7/10	8/10	32/40
Community-Collaborative	8/10	8/10	7/10	9/10	32/40

Table 3 shows that the Digital Pedagogy and Independent Curriculum models have the highest effectiveness (33/40), while the Faith-Based Digital and Community-Collaborative models also show quite high results (32/40). The models are assessed based on four indicators: digital literacy, character values, 21st century skills, and teacher readiness. The high effectiveness of Digital Pedagogy and the Independent Curriculum shows that a flexible technology-based approach, integrated with the national curriculum, is able to build character as well as digital skills. The success of the Independent Curriculum, for example, lies in the implementation of the Pancasila Student Profile Strengthening Project (P5) which unites aspects of value, creativity, and digitalization in one learning framework. Meanwhile, the faith-based model and community collaboration show that spiritual values and community support remain important factors in maintaining a balance between technology and morality. These findings are consistent with the research of Solehuddin et al. (2024) which emphasizes the importance of integration between curriculum, teachers, and society in shaping student resilience. The implication of these results is that no single model is completely ideal; The success of the integration of technology and character education depends heavily on a combination of models that are tailored to the needs, culture, and readiness of the school and its environment.

Table 4. Analysis of Stakeholder Roles and Contributions

Stakeholder	Main Role	Specific Contributions	Engagement Rate	Number of Studies
Guru	Facilitator, Role Model, Supervisor	Implementation of digital literacy, character building	Very High (9/10)	32 studies
Parents	Supervisors, Supporters, Reinforcers	In-house value reinforcement, digital control	High (8/10)	18 studies
School	Infrastructure Providers, Policy	Curriculum, technology facilities	Very High (9/10)	28 studies
Community	Supporting Environment	Norma sosial, peer influence	Medium (6/10)	12 studies
Government	Regulators, Policy	Curriculum standards, teacher	High (8/10)	15 studies

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	Providers	training		

Table 4 outlines the role of key stakeholders in supporting digital technology-based character education. Teachers and schools have very high levels of engagement (9/10), with teachers acting as facilitators, role models, and mentors, while schools provide supportive policies and infrastructure. Parents also play the role of supervisors and value reinforcements at home, while the community becomes a supportive environment that provides social norms and peer influence. The government also functions as a regulator and provider of curriculum standards and teacher training. This multi-stakeholder engagement shows that digital-based character education cannot run with school intervention alone, but requires a comprehensive ecosystem. This is in line with Zahra & Ritonga (2024) who affirm that teachers need family support to ensure the internalization of values outside of school. Afrianti & Wahab (2025) also added that the success of digital education integration is largely determined by government policies that provide continuous training for teachers. Thus, digital-based character education is a social ecosystem that requires synergy between schools, families, communities, and the government in order to produce sustainable impacts.

Table 5. Positive and Negative Impact Evaluation Results

Aspects	Positive Impact	Evidence Strength	Negative Impact	Mitigation Level
Digital Literacy	Improvement of technical skills (95% of studies)	Strong (9/10)	Digital divide (35% case)	Moderate (6/10)
Character Values	Strengthening of moral values (88% of studies)	Strong (8/10)	Moral degradation risk (28% kasus)	Moderate (6/10)
Critical Thinking	Analytical improvement (82% of studies)	Strong (8/10)	Information overload (22% kasus)	Moderate (7/10)
Collaboration	Cooperative skills (90% of studies)	Strong (8/10)	Reduced face-to-face interaction (30% kasus)	Moderate (6/10)
Creativity	Learning innovation (85% of studies)	Moderate (7/10)	Technology dependency (25% kasus)	Low (5/10)

Table 5 shows that the integration of digital technology in general has a strong positive impact, such as increasing digital literacy (95% of studies), strengthening moral values (88% of studies), improving critical thinking skills (82% of studies), collaboration (90% of studies), and creativity (85% of studies). However, there are also negative risks, including digital divide (35%), moral degradation (28%),

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information overload (22%), reduced face-to-face interaction (30%), and technology dependence (25%). These results reinforce the view that technology is paradoxical: on the one hand it enriches learning, but on the other hand presents new challenges. Lee & Hancock (2023) show that through targeted educational interventions, students can improve digital resilience in the face of challenges such as misinformation and cyberbullying. Sun et al. (2022) also emphasized the need to integrate digital ethics in the curriculum to reduce negative impacts. Thus, future education strategies must place digital literacy as a foundation that is integrated with moral values, so that technology truly functions as an instrument of character formation, not a threat to the moral integrity of students.

Table 6. Challenge Analysis Based on Severity

Challenge Categories	Specific Challenge	Frequency (%)	Severity Level	Impact on Implementation
Infrastructure	Technology access gap	68%	High	Hindering equity
SDM	Teacher readiness	72%	High	Lowers effectiveness
Curriculum	Digital content adaptation	55%	Medium	Affects quality
Culture	Change resistance	48%	Medium	Slowing adoption
Ethics	Digital moral degradation	42%	Medium	Threatens the character's purpose
Economics	Implementation costs	61%	High	Limiting scalability

Table 6 shows that challenges with high severity include teacher readiness (72%), infrastructure gaps (68%), and implementation costs (61%). Other factors such as curriculum adaptation, cultural resistance, digital moral degradation, and ethical issues are at a medium level. This condition indicates that the limitation of human resources and infrastructure facilities is still the main obstacle in the integration of character education technology. Dewanto et al. (2025) emphasized that teachers' competence in using technology is the most critical factor in ensuring the effectiveness of education digitalization. Meanwhile, Lesková et al. (2023) show that cultural resistance and ethical issues can slow down the adoption of technology, especially in the context of education in developing countries. Therefore, education policy needs to focus on three things: teacher training, equitable access to technology, and the development of an adaptive curriculum that still pays attention to local values. With this strategy, structural and cultural barriers can be minimized so that digital integration can run more effectively.

Table 7. The Use of Technology in Character Education

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Technology	Adoption Rate	Effectiveness Score	Character Integration	Future Potential
AR/VR	25%	8/10	Strong moral scenarios	Very High
AI Tutoring	18%	7/10	Personalized character development	High
Social Media Learning	65%	6/10	Peer interaction values	Medium
Gamification	45%	8/10	Reward-based character building	High
Mobile Learning	78%	7/10	Accessibility and engagement	Medium
Cloud Collaboration	52%	7/10	Teamwork and responsibility	Medium

Table 7 shows that mobile learning has the highest adoption rate (78%), followed by social media learning (65%), gamification (45%), and cloud collaboration (52%). Meanwhile, AR/VR-based technologies (25%) and AI tutoring (18%) are still limited, despite their very high effectiveness and future potential. This shows that technology that is easily accessible and close to students' daily lives tends to be adopted more quickly. However, the effectiveness of social media learning is still moderate (6/10) because on the other hand it also has the potential to pose a risk of moral degradation and abuse. On the other hand, AR/VR is considered to be able to present immersive moral scenarios, while AI tutoring has the potential to present personalization of character development. These findings are in line with Adel (2024) who emphasized the role of immersive technology in building value-rich learning experiences, and Martati et al. (2025) who proved the effectiveness of digital media in strengthening character learning. Thus, although conventional technology is more predominantly used, the potential of cutting-edge technology needs to continue to be explored in order to be able to support character education in a more creative and contextual way.

Table 8. Strength of Evidence for Primary Claims

Claim	Evidence Strength	Supporting Studies	Confidence Level	Recommendation
Digital literacy strengthens character education	Strong (9/10)	35 studies	95%	Strongly Recommended
The role of	Strong	28 studies	92%	Strongly

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teachers and families is crucial	(8/10)			Recommended
Challenges of technology access and teacher readiness	Moderate (7/10)	22 studies	85%	Recommended
Digital learning models improve 21st century skills	Moderate (7/10)	18 studies	82%	Recommended
The risk of moral degradation needs to be mitigated	Moderate (5/10)	12 studies	70%	Cautiously Recommended
AI and advanced technology open up opportunities and challenges	Moderate (4/10)	8 studies	65%	Further Research Needed

Table 8 shows that claims about digital literacy as a character education enhancer obtained a very strong level of evidence (9/10) with a confidence level of 95%. The role of teachers and families also obtained strong evidence (8/10) with a confidence level of 92%. However, claims about the challenges of technology access, teacher readiness, and the risk of moral degradation received moderate evidence with a confidence level of 70–85%, while claims about the potential of AI received only low evidence (65%). These results confirm that digital literacy, teachers, and families are the most consistent factors in research, while advanced technologies such as AI still require further exploration. Nurdiansyah & Wahab (2025) emphasized that digital literacy is the main foundation of character education in the Society 5.0 era, while Wang et al. (2024) added the need for evidence-based research to support digital education policies. Thus, future research should be directed more towards longitudinal evaluations, particularly related to the implementation of advanced technologies in character education, so that new claims can be supported by stronger evidence

4. Conclusions and Suggestions

The results of an analysis of 50 studies show that the integration of digital technology and character education is effective in strengthening morality, digital literacy, and 21st

century skills, with a high strength of evidence. Digital literacy has proven to be the main foundation in building students' character, while the role of teachers, families, and schools serves as central actors that determine the success of implementation. However, the research also confirms that major challenges still exist, including infrastructure gaps, limited teacher readiness, and high implementation costs. In terms of research gap, this study found that previous research was still limited to qualitative studies and literature, so there was a lack of quantitative, longitudinal, and mixed methods exploration that could measure long-term impacts. In addition, the lack of an integrative model that simultaneously connects digital literacy, character education, and digital resilience in the Indonesian context, especially those that are aligned with P5, shows that there is a wide space for further research.

Thus, this research successfully answered the research objectives, namely identifying the effectiveness of integrating digital technology and character education, mapping stakeholder contributions, and formulating research and education policy directions that are humane and adaptive to the Industrial Revolution 5.0. These findings imply that future education strategies need to combine digital technology with ethical values, digital citizenship, and project-based learning (P5), so that Indonesia's young generation is able to become intelligent, resilient, and characterful people in the midst of increasingly digital global dynamics.

Bibliography

Aparicio-Tavares, G. M., Lopes-Oliveira, A. L., Vieira, A. L., & Maia, R. S. (2024). Industry 5.0 instruments: Design and validation. Frontiers in Education, 9, 1415800. https://doi.org/10.3389/feduc.2024.1415800

Kostorz, K., & Lechwar, M. (2024). Higher education via the lens of Industry 5.0: Strategy and policy. Social Sciences & Humanities Open, 10, 100657. https://doi.org/10.1016/j.ssaho.2024.100657

Lee, A. Y., & Hancock, J. T. (2023). Developing digital resilience: An educational intervention improves elementary students' response to digital challenges. Computers & Education Open, 5, 100144. https://doi.org/10.1016/j.caeo.2023.100144

Perdana, R., Suyitno, I., Sofyan, A., Syaifudin, A., & Khairunnisa, D. (2024). Measuring global diversity attitudes towards the Profil Pelajar Pancasila in digital book-based play activities. In Proceedings of EAI/Springer Innovations in Communication and Computing. https://doi.org/10.4108/eai.30-11-2023.2346815

Sholeh, M., Manurung, A., Abidin, Z., Schaaper, D. R., & Purba, J. T. (2024). Higher Education 5.0 and Society 5.0: A systematic literature review and bibliometric analysis. Education Sciences, 14(11), 483. https://doi.org/10.3390/educsci14110483

Solehuddin, M., Budimansyah, D., & Dahliyana, A. (2024). Tracing Pancasila: Unveiling the impact of the Pancasila student profile strengthening project on student well-being in Indonesia. Horizon Education, 43(3), 773–787. https://doi.org/10.21831/cp.v43i3.78328

Sun, H., Chen, Y., Chen, P., & Jiang, Y. (2022). Digital resilience among individuals in school education: A concept analysis. Frontiers in Psychiatry, 13, 858515. https://doi.org/10.3389/fpsyt.2022.858515

Vallès-Peris, N., & Domènech, M. (2024). Digital citizenship at school: Democracy, pragmatism and RRI. Technology in Society, 76, 102448. https://doi.org/10.1016/j.techsoc.2023.102448

Abulibdeh, A., Zaidan, E., & Abulibdeh, R. (2024). Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions. Journal of Cleaner Production. https://doi.org/10.1016/j.jclepro.2023.140527

Adel, A. (2024). The convergence of intelligent tutoring, robotics, and IoT in smart education for the transition from Industry 4.0 to 5.0. Smart Cities, 7(1), 1–17. https://doi.org/10.3390/smartcities7010014

Adiyono, A., Ni'am, S., & Anshor, A. (2024). Islamic character education in the era of Industry 5.0: Navigating challenges and embracing opportunities. Al-Hayat: Journal of Islamic Education, 8(1), 57–70. https://doi.org/10.35723/ajie.v8i1.493

Afrianti, B., & Wahab, W. (2025). Building holistic character in independent curriculum-based education in the digital era. Jurnal Pengabdian Nusantara, 3(2), 40–52. https://doi.org/10.32832/jpn.v3i2.82

Aryani, W., Dermawan, O., & Asrofi, I. (2024). Transformation of children's character through digital approaches in primary education. Journal of Obsession: Journal of Early Childhood Education, 8(5), 6116–6129. https://doi.org/10.31004/obsesi.v8i5.6116

Bila, N., Wahyuni, F., & Nurgiansah, T. (2023). The important role of civics: Civics education in the era of digital society. Journal of Citizenship, 20(1), 25–36. https://doi.org/10.24114/jk.v20i1.39530

Dewanto, I., Yasin, Z., Rahayu, N., & Sudirman, S. (2025). Digital literacy learning strategies in school education: Challenges and opportunities of the Industrial Revolution 5.0. Journal of Pedagogi, 4(1), 12–28. https://doi.org/10.62872/5zft9833

Dewi, P., & Mastoah, I. (2025). Utilization of technology in education with character in the era of Generation Z. Jurnal Pendidikan Islam, 11(1), 33–47. https://doi.org/10.37286/ojs.v11i1.263

Dewia, E., & Alam, A. (2020). Transformation model for character education of students. Cypriot Journal of Educational Sciences, 15(5), 1182–1193. https://doi.org/10.18844/cjes.v15i5.5155

Fajri, S., Fajri, N., Sarnita, F., Fitriani, H., Bago, A., Nitiasih, P., Riastini, P., Gede, I., & Sudatha, W. (2024). Digital literacy dan cyber socialization in the context of 21st century education: A systematic review. International Journal of Applied Science and Sustainable Development (IJASSD), 6(2), 90–108. https://doi.org/10.36733/ijassd.v6i2.9078

Kurdi, M. (2023). Digital citizenship and moral development: Integrating technology into family-based character education. The International Conference on Education, Social Sciences and Technology (ICESST), 2(2), 180–192. https://doi.org/10.55606/icesst.v2i2.363

Lasmana, O., Festiyet, F., Razak, A., & Fadilah, M. (2024). Transforming education in the 5.0 era: Utilizing technology to improve critical thinking and creativity in the digital generation. Proceedings of the 1st International Conference on Social Science (ICSS), 3(2), 77–89. https://doi.org/10.59188/icss.v3i2.208

Lesková, A., Uličná, Z., Tkáčová, H., Leka, K., & Mateo, D. (2023). Challenges and current issues of education in the era of digital and technological changes. Journal of Education Culture and Society, 14(2), 319–327. https://doi.org/10.15503/jecs2023.2.319.327

Lesmana, I., Mustiningsih, M., Sari, L., Husna, A., Unsa, F., & Akhbar, A. (2023). Strategies for the use of technology and information in learning to prepare students with character in the era of Society 5.0. Proceedings Series of Educational Studies, 2(1), 155–167. https://doi.org/10.17977/um083.7873

Lina, R., & Robbaniyah, Q. (2024). The integration of character education in junior high schools during the 5.0 industrial revolution: A case study in Yogyakarta. At Turots: Jurnal Pendidikan Islam, 6(2), 200–215. https://doi.org/10.51468/jpi.v6i2.768

Mahardhani, A., & Asrori, M. (2023). Internalization of Pancasila student profile values based on digital citizenship as preparation for Industry 4.0 and implementation of independent learning policy. Al-Ishlah: Jurnal Pendidikan, 15(2), 456–468. https://doi.org/10.35445/alishlah.v15i2.2871

Maola, P., Dewi, D., & Hayat, R. (2023). The role of digital literacy as a bridge in strengthening the character education of elementary school students in the era of the Industrial Revolution 4.0. Indonesian Journal of Education, 1(3), 155–168. https://doi.org/10.62007/joupi.v1i3.216

Martati, B., Fatin, I., & Setianingsih, D. (2025). The implementation of digital picture text story media in developing character education. Journal of Education, 16(1), 45–59. https://doi.org/10.31849/lectura.v16i1.23630

Meirbekov, A., Maslova, I., Shestak, V., & Gallyamova, Z. (2022). Digital education tools for critical thinking development. Thinking Skills and Creativity, 45, 101023. https://doi.org/10.1016/j.tsc.2022.101023

Murtiningsih, R., Ariani, I., Nugroho, H., & Utomo, A. (2023). Strengthening character through digital pedagogy in facing the era of Society 5.0. Digital Press Social Sciences and Humanities, 4(2), 88–100. https://doi.org/10.29037/digitalpress.49449

Nurdiansyah, U., & Wahab, W. (2025). Digital literacy strengthens character education in the era of Society 5.0. Journal of Nusantara Service, 3(1), 22–35. https://doi.org/10.32832/jpn.v3i1.79

Rahma, I., Sari, M., & Annur, S. (2024). Industry 5.0 revolution and education: Achieving equality through technology. Proceedings of International Conference on Education and Sharia, 124, 77–88. https://doi.org/10.62097/ices.v124.88

S, A., & Kumala, A. (2022). Independent curriculum integration in responding to the challenges of the era of Society 5.0. International Journal of Education and Social Science Research, 5(5), 1–10. https://doi.org/10.37500/ijessr.2022.5509

Sari, M., & Rochbani, I. (2024). Reinforcing character education in the digital era of Society 5.0. Zabags International Journal of Education, 2(1), 55–68. https://doi.org/10.61233/zijed.v2i1.16

Sugiarto, S., & Farid, A. (2023). Digital literacy as a way to strengthen character education in the Society 5.0 era. Cetta: Journal of Educational Sciences, 6(3), 300–315. https://doi.org/10.37329/cetta.v6i3.2603

Taufik, M. (2020). Strategic role of Islamic religious education in strengthening character education in the era of Industrial Revolution 4.0. Jurnal Ilmiah Islam Futura, 20(1), 45–58. https://doi.org/10.22373/JIIF.V20I1.5797

Wang, C., Chen, X., Yu, T., Liu, Y., & Jing, Y. (2024). Education reform and change driven by digital technology: A bibliometric study from a global perspective. Humanities and Social Sciences Communications, 11, 1–17. https://doi.org/10.1057/s41599-024-02717-y

Yulia, R., Henita, N., Gustiawan, R., & Erita, Y. (2022). Efforts to strengthen character education for elementary school students by utilizing digital literacy in Era 4.0. Journal of Digital Learning and Distance Education, 1(6), 77–88. https://doi.org/10.56778/jdlde.v1i6.39

Zahra, K., & Ritonga, S. (2024). The role of teachers in instilling student character through digital literacy in the Society 5.0 era. Zeniusi Journal, 1(2), 33–45. https://doi.org/10.70821/zj.v1i2.18