A SYSTEMATIC REVIEW OF THE INTEGRATION OF 21ST-CENTURY SKILLS AND EDUCATIONAL TECHNOLOGY FOR THE CAREER DEVELOPMENT OF ISLAMIC EDUCATION TEACHERS

Darmanto[1]; Yulia Wahyuni[2]; Muhammad Sirozi[3]
[1,2,3]Universitas Islam Negeri Raden Fatah Palembang, Indonesia
[1]Corresponding E-mail: darmantoarment@gmail.com

Abstract

The integration of 21st-century skills and educational technology has become a critical issue in improving the quality of Islamic Education (PAI) and supporting teacher career development in the digital era. This study aims to analyze how the integration of the Four Cs critical thinking, creativity, collaboration, and communication and educational technology contributes to the professional growth of PAI teachers and the transformation of learning practices. This research employs a qualitative approach using a systematic literature review method, analyzing selected scholarly articles published between 2020 and 2025. Data were collected through structured searches in academic databases and analyzed using an interactive model involving data reduction, data display, and conclusion drawing. The findings indicate that the integration of 21st-century skills and educational technology enhances teachers' pedagogical competence, promotes innovative and student-centered learning, and expands professional opportunities through digital engagement and scholarly activities. However, critical reflection reveals inconsistencies in previous studies, particularly in the gap between theoretical frameworks and classroom implementation, as well as the uneven impact of technology integration due to variations in teacher readiness and institutional support. Additionally, most studies focus on short-term outcomes, leaving a gap in understanding long-term career development. This study concludes that the integration of 21st-century skills and educational technology is essential but requires comprehensive and systemic support to be effectively implemented. The research contributes by providing an integrative framework that links competencies, technology, and career development, offering both theoretical insights and practical implications for advancing PAI education in the digital era.

Keywords: *21st-Century Skills; Educational Technology; Career Development; Islamic Education Teachers, Digital Transformation.*

A. Introdaction

The The integration of 21st-century skills in Islamic Education (PAI) learning constitutes a strategic necessity for improving the quality of education in the digital era, characterized by rapid technological advancement and increasing global complexity. These skills critical thinking, creativity, collaboration, and communication (the Four Cs) represent essential competencies that must be cultivated within contemporary educational practices (OECD, 2023). From a constructivist perspective, learning is viewed as an active process in which students construct knowledge through interaction, experience, and reflection. Therefore, integrating 21st-century skills into

PAI learning aligns with constructivist principles, as it encourages students to engage critically with religious knowledge while internalizing Islamic values in meaningful and contextual ways. In this regard, PAI does not merely emphasize cognitive mastery but also fosters spiritual awareness and character development. Empirical evidence by Mubarokah et al. (2023) indicates that integrating 21st-century skills in PAI enhances students' critical thinking while strengthening their religious attitudes. Similarly, Sari et al. (2022) assert that such integration contributes to improving the quality of value-based education, positioning PAI as a strategic domain for harmonizing global competencies with Islamic teachings.

Conceptually, the integration of 21st-century skills cannot be separated from the role of educational technology. This relationship can be explained through the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the intersection of technological knowledge, pedagogical strategies, and subject matter content. Within this framework, technology functions not merely as a tool but as an integral component that shapes how knowledge is delivered and constructed. Educational technology enables learning to become more interactive, flexible, and contextualized within digital environments (UNESCO, 2022). Thus, 21st-century skills and educational technology interact in a mutually reinforcing manner: technology provides platforms and tools that facilitate collaboration, creativity, and communication, while 21st-century skills guide the meaningful use of these technologies in learning processes. Studies by Chafshah et al. (2024) demonstrate that technology-based learning media significantly enhance students' motivation and learning outcomes. In addition, Sopiana et al. (2024) highlight that technology integration improves learning effectiveness and relevance, while Rahmawati et al. (2023) find that digital platforms increase students' active engagement in PAI learning. This indicates that educational technology serves as a transformative pedagogical instrument that supports student-centered learning and the development of higher-order thinking skills.

Despite its importance, the implementation of integrating 21st-century skills and educational technology in PAI learning remains limited. Classroom practices are still predominantly teacher-centered, restricting opportunities for students to develop critical, collaborative, and creative competencies. Mantau and Talango (2023) identify teachers' limited understanding of 21st-century learning concepts as a major barrier to innovation. Furthermore, Akbar and Saidah (2024) emphasize that low levels of teachers' digital literacy hinder the optimal utilization of educational technology, while Hidayati et al. (2024) underline that teacher readiness is a critical determinant of successful technology integration.

However, a clear research gap emerges from previous studies. Existing research has primarily focused on (1) the impact of 21st-century skills on student learning outcomes, or (2) the effectiveness of technology integration in classroom instruction.

Few studies, however, have examined the intersection between 21st-century skills, educational technology, and teachers' career development, particularly in the context of PAI. Moreover, prior research tends to treat these variables separately rather than as an integrated framework that shapes both instructional practices and professional growth. This indicates a lack of comprehensive studies that explore how the integration of these elements contributes not only to learning quality but also to the long-term professional development of teachers.

The urgency of this study is further strengthened by the demands of the digital era, which require teachers to continuously adapt, innovate, and engage in lifelong learning. In the context of career development, PAI teachers are expected not only to master subject content but also to integrate technology effectively and foster 21st-century competencies in their students. Wulandari et al. (2023) highlight that mastery of educational technology significantly enhances teachers' professionalism, particularly in pedagogical competence and digital literacy. Meanwhile, Nurhayati et al. (2024) confirm that integrating 21st-century skills improves both learning processes and outcomes sustainably. Therefore, this study is necessary to provide a more holistic understanding of how these elements collectively influence teachers' professional trajectories and instructional quality.

Accordingly, this study seeks to address these gaps by formulating a comprehensive analysis of how the integration of 21st-century skills and educational technology supports the career development of PAI teachers. The research is guided by key questions concerning how these integrations are conceptualized and implemented in practice, how they influence teachers' professional competencies and career trajectories, and what implications they hold for improving the quality of PAI learning in the digital era. By addressing these questions, this study aims to contribute theoretically through the enrichment of constructivist and TPACK-based perspectives in PAI education, and practically by providing insights for developing innovative, adaptive, and contextually relevant learning models aligned with the demands of the 21st century.

B. Method

This This study employs a qualitative approach through a literature review method aimed at comprehensively analyzing the integration of 21st-century skills and educational technology in the career development of Islamic Education (PAI) teachers. More specifically, this research adopts a systematic literature review (SLR) design, as it applies a structured, transparent, and replicable procedure in identifying, selecting, and analyzing relevant scholarly works. This approach is chosen because it enables a rigorous synthesis of empirical and conceptual studies, allowing for a deeper and more reliable understanding of the research problem. Qualitative inquiry, in this context, facilitates contextual and interpretative analysis aligned with the characteristics of educational research (Creswell, 2018; Sugiyono, 2022), while the systematic review

design strengthens methodological rigor and minimizes bias (Snyder, 2019; Xiao & Watson, 2019).

The selection of the publication time frame between 2020 and 2025 is deliberately justified by the rapid transformation of education in the digital era, particularly following the global acceleration of technology integration during and after the COVID-19 pandemic. This period reflects the most recent developments in digital pedagogy, online learning environments, and the increasing emphasis on 21st-century competencies in education systems worldwide. By focusing on this time frame, the study ensures that the findings are relevant, up-to-date, and reflective of current educational challenges and innovations, especially in relation to the integration of technology and evolving teacher competencies.

Data sources are derived from scholarly articles indexed in reputable national databases such as SINTA and GARUDA, as well as international databases including Google Scholar and peer-reviewed journal publishers. The article selection process follows a structured procedure inspired by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The initial search yielded a total of approximately 120 articles based on relevant keywords such as "21st-century skills," "educational technology," "PAI learning," and "teacher career development." After removing duplicates and screening titles and abstracts for relevance, 65 articles were retained. A further eligibility assessment based on full-text review and inclusion criteria resulted in a final selection of 30 articles deemed most relevant and of sufficient quality for in-depth analysis.

The inclusion criteria applied in this study consist of articles published within the 2020–2025 period, studies that explicitly address at least one of the core variables (21st-century skills, educational technology, or teacher professional/career development), and research that provides empirical evidence or strong conceptual frameworks. Exclusion criteria include articles lacking methodological clarity, studies not directly مرتبط dengan konteks pendidikan, serta publikasi non-ilmiah.

A critical appraisal of the selected sources is conducted to ensure the credibility and trustworthiness of the data. This appraisal involves evaluating several key aspects, including the clarity of research objectives, methodological rigor, validity and reliability of findings, theoretical grounding, and relevance to the research focus. Articles are categorized into high, moderate, and low quality based on these criteria, and only studies classified as high and moderate quality are included in the final synthesis. This process is essential to avoid bias and to ensure that the conclusions drawn are based on robust and scientifically sound evidence (Patton, 2015).

The data analysis technique in this study adopts the interactive model proposed by Miles, Huberman, and Saldaña (2014), which consists of data reduction, data display, and conclusion drawing. In the data reduction phase, selected articles are coded and grouped into thematic categories such as digital pedagogy, teacher competence, integration strategies, and career development. The data display phase

presents the synthesized findings in thematic patterns and comparative matrices to reveal relationships among variables. Finally, the conclusion-drawing phase involves critical interpretation to generate meaningful insights and theoretical implications.

To enhance transparency, the summary of reviewed studies is presented in the following table:

Table 1. Study Summary

Author(s)	Year	Focus of Study	Method	Key Findings
Mubarokah et al.	2023	21st-century skills in PAI	Quantitative	Improves critical thinking and religious attitudes
Sari et al.	2022	Value-based education	Mixed methods	Enhances quality of character education
Chafshah et al.	2024	Technology-based media	Experimental	Increases motivation and learning outcomes
Sopiana et al.	2024	Technology integration	Survey	Improves effectiveness and efficiency
Rahmawati et al.	2023	Digital platforms in PAI	Qualitative	Enhances student engagement
Akbar & Saidah	2024	Teacher digital literacy	Survey	Identifies low digital competence as a barrier
Hidayati et al.	2024	Teacher readiness	Mixed methods	Readiness affects success of implementation
Wulandari et al.	2023	Professional competence	Quantitative	Technology mastery improves professionalism
Nurhayati et al.	2024	21st-century learning	Experimental	Improves sustainable learning outcomes
Mantau & Talango	2023	Teaching practices	Qualitative	Teacher understanding remains limited

To ensure validity, this study employs source triangulation by comparing findings across multiple studies, theoretical perspectives, and methodological approaches. This triangulation strengthens the consistency and credibility of the analysis. Overall, the systematic and critically appraised methodology applied in this research is expected to produce comprehensive, valid, and relevant findings that contribute meaningfully to the development of PAI education in the digital era.

C. Finding and Discussion

1. Finding

The findings of this study indicate that the integration of 21st-century skills and educational technology contributes significantly to the career development of Islamic Education (PAI) teachers. Mastery of the Four Cs critical thinking, creativity, collaboration, and communication emerges as a fundamental foundation for enhancing teachers' pedagogical competence. Teachers who integrate these competencies demonstrate greater adaptability in designing innovative learning, implementing problem-based approaches, and fostering participatory classroom environments (Mubarokah et al., 2023; Sari et al., 2022; Nurhayati et al., 2024). However, a critical examination of the literature reveals differing perspectives. While several studies emphasize the strong positive impact of the Four Cs on pedagogical innovation, others suggest that the implementation often remains superficial, limited to activity-based learning without deep transformation of instructional design. This indicates an inconsistency between conceptual endorsement and practical application.

The utilization of educational technology is consistently identified as a key factor in enhancing learning effectiveness. Digital platforms, interactive media, and online applications are shown to increase student engagement and enrich learning experiences (Chafshah et al., 2024; Rahmawati et al., 2023). Nevertheless, the literature also presents contrasting findings. Some studies argue that technology integration leads to meaningful student-centered learning, while others highlight that technology is frequently used merely as a substitute for traditional media, without fundamentally changing pedagogical approaches. This divergence suggests that the impact of technology is highly dependent on teachers' pedagogical competence and not solely on access to digital tools. Thus, a gap exists between the potential of technology and its actual implementation in classroom practice.

In relation to career development, the findings demonstrate that integrating 21st-century skills and educational technology enhances teachers' professional growth. Teachers who actively engage in digital innovation tend to have broader opportunities for academic publication, professional collaboration, and participation in digital learning communities (Wulandari et al., 2023). However, critical reflection reveals that most existing studies focus on short-term competency gains rather than long-term career trajectories. There is limited empirical evidence examining how sustained integration influences promotion, leadership roles, or professional recognition over time. This highlights a significant research gap regarding the longitudinal impact of digital competence on teacher career development.

At the same time, several structural and contextual challenges persist. Limited digital literacy, inadequate infrastructure, and insufficient professional training are consistently identified as barriers (Akbar & Saidah, 2024; Hidayati et al., 2024). Yet, inconsistencies emerge in the literature regarding the primary source of these

challenges. Some studies emphasize individual factors such as teacher readiness and motivation, while others stress systemic issues including institutional support and policy frameworks. This divergence suggests that the problem is multidimensional and cannot be addressed through a single approach. Furthermore, the continued dominance of teacher-centered practices (Mantau & Talango, 2023) indicates a gap between policy discourse promoting innovation and the reality of classroom implementation.

Overall, while the literature generally supports the positive role of integrating 21st-century skills and educational technology, critical analysis reveals gaps in depth, consistency, and contextual application. Many studies remain fragmented, focusing on isolated variables rather than examining their interconnections in a holistic framework. This study addresses this gap by synthesizing these dimensions into a more comprehensive perspective.

2. Discussion

The findings of this study align with constructivist learning theory, which emphasizes active knowledge construction through interaction and experience. The integration of the Four Cs reflects higher-order thinking skills that are central to constructivist pedagogy, positioning teachers as facilitators of meaningful learning. However, critical reflection on the literature shows that not all implementations fully embody constructivist principles. In some cases, learning activities labeled as "collaborative" or "creative" remain procedural and teacher-directed, indicating a partial or superficial adoption of constructivist practices. This inconsistency highlights the need for deeper pedagogical transformation rather than mere methodological variation.

From the perspective of holistic education, the integration of 21st-century skills in PAI contributes to cognitive, affective, and spiritual development. Studies such as Mubarokah et al. (2023) and Sari et al. (2022) support this integrative outcome. However, other research points out that the balance between technological engagement and spiritual internalization is not always achieved. There is a tendency in some contexts to prioritize technological proficiency at the expense of reflective and value-based learning. This tension represents a critical gap in the literature, particularly within PAI, where spiritual formation is a core objective.

The role of educational technology, when viewed through the TPACK framework, underscores the importance of integrating technological, pedagogical, and content knowledge. While many studies affirm the benefits of technology integration (UNESCO, 2022), critical analysis reveals that technological knowledge often develops faster than pedagogical adaptation. As a result, teachers may adopt digital tools without fully integrating them into coherent instructional strategies. This imbalance suggests a conceptual gap in the application of TPACK, where the interaction among its components is not optimally realized.

In terms of career development, the findings reinforce the importance of lifelong learning and professional adaptability. Teachers who engage in continuous development and digital innovation demonstrate higher levels of professionalism. However, the literature shows limited exploration of institutional mechanisms that support such development. While individual competence is frequently emphasized, fewer studies examine organizational structures, mentoring systems, or policy interventions that sustain career progression. This indicates an inconsistency between the recognition of professional demands and the availability of systemic support.

Furthermore, the challenges identified in this study can be analyzed through the lens of educational change theory, which emphasizes alignment between policy, capacity, and practice. The persistence of teacher-centered approaches despite policy support for innovation reflects a gap in implementation. Some studies attribute this to resistance to change, while others highlight inadequate training or unclear policy direction. These differing perspectives suggest that educational transformation requires not only technical solutions but also cultural and organizational change.

In terms of scholarly contribution, this study advances the literature by critically synthesizing differing perspectives and identifying key gaps and inconsistencies. Unlike previous studies that tend to examine variables in isolation, this research offers an integrative framework connecting 21st-century skills, educational technology, and teacher career development within the specific context of PAI. This holistic approach provides both theoretical enrichment and practical implications, particularly in addressing the disconnect between conceptual frameworks and classroom realities.

Therefore, the findings suggest that future research should move beyond measuring immediate instructional outcomes and instead focus on long-term, systemic, and context-sensitive analyses. Strengthening alignment between theory, practice, and policy is essential for achieving meaningful and sustainable transformation in PAI education in the digital era.

E. Conclusion

Integrasi keterampilan abad ke-21 yang meliputi berpikir kritis, kreativitas, kolaborasi, dan komunikasi dengan pemanfaatan teknologi pendidikan terbukti menjadi faktor kunci dalam meningkatkan kompetensi pedagogik sekaligus mendukung pengembangan karier guru PAI di era digital, karena mampu mendorong terciptanya pembelajaran yang lebih inovatif, interaktif, dan berpusat pada peserta didik, serta membuka peluang bagi guru untuk berpartisipasi dalam ekosistem profesional berbasis digital; namun demikian, implementasi integrasi ini masih menghadapi berbagai kendala, baik pada aspek individu seperti keterbatasan literasi digital dan kesiapan guru, maupun pada aspek struktural seperti kurangnya pelatihan berkelanjutan, infrastruktur yang belum memadai, serta masih dominannya praktik pembelajaran konvensional, sehingga menunjukkan adanya kesenjangan antara konsep ideal dan praktik di lapangan; oleh karena itu, diperlukan upaya yang komprehensif

dan berkelanjutan melalui peningkatan kompetensi guru, penguatan dukungan kebijakan, serta kolaborasi antar pemangku kepentingan agar integrasi keterampilan abad ke-21 dan teknologi pendidikan dapat diimplementasikan secara optimal dan memberikan dampak signifikan terhadap peningkatan kualitas pembelajaran serta profesionalisme guru PAI secara berkelanjutan.

F. Bibliography

Akbar, A., & Saidah, S. (2024). Teachers' digital literacy and challenges in technology-based learning implementation. *Ta'dibuna: Journal of Islamic Education*, 6(1), 45–58. https://doi.org/10.21093/twt.v6i1

Chafshah, N., et al. (2024). The use of technology-based learning media to enhance students' motivation and learning outcomes. *Jurnal Basicedu*, 8(1), 112–120. https://doi.org/10.31004/basicedu.v8i1

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Fitriani, E., et al. (2022). The implementation of e-learning in Islamic education learning. *Jurnal Ilmiah Pendidikan*, 11(2), 98–110. https://doi.org/10.24252/ip.v11i2

Fullan, M. (2007). *The new meaning of educational change* (4th ed.). Teachers College Press.

Hidayati, N., et al. (2024). Teacher readiness in implementing digital technology-based learning. *Edukatif: Journal of Educational Sciences*, 15(1), 67–78. https://doi.org/10.30736/ej.v15i1

Mantau, A., & Talango, S. (2023). Challenges in implementing 21st-century learning in schools. *Aksara: Journal of Educational Sciences*, 9(2), 134–145. https://doi.org/10.37905/aksara.v9i2

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.

Mubarokah, S., et al. (2023). Integration of 21st-century skills in Islamic education learning and its implications for students' critical thinking. *Edukasia: Journal of Islamic Education Research*, 18(1), 25–40. https://doi.org/10.21043/edukasia.v18i1

Miller, J. P. (2007). *The holistic curriculum* (2nd ed.). University of Toronto Press.

Nurhayati, L., et al. (2024). Integration of 21st-century skills and its impact on student learning outcomes. *Edukatif: Journal of Educational Sciences*, 13(1), 55–66. https://doi.org/10.30868/ei.v13i1

OECD. (2023). *Future of education and skills 2030*. OECD Publishing. https://doi.org/10.1787/19939019

Patton, M. Q. (2015). *Qualitative research & evaluation methods* (4th ed.). SAGE Publications.

Pratama, R., et al. (2023). ICT integration in education: Enhancing teachers' digital competence. *Journal of Physics: Conference Series*, 1742, 012045. https://doi.org/10.1088/1742-6596

Rahman, A., et al. (2021). Digital pedagogy and innovative learning strategies in the 21st century. *Distance Education*, 42(2), 210–225. https://doi.org/10.1080/01587919

Rahmawati, D., et al. (2023). The utilization of digital platforms in Islamic education learning. *Dinamika Ilmu*, 21(2), 201–215. https://doi.org/10.21093/di.v21i2

Sari, R., et al. (2022). The implementation of 21st-century learning in improving the quality of value-based education. *JIPP: Journal of Educational Innovation and Learning*, 6(2), 89–101. https://doi.org/10.24235/jipp.v6i2

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Sopiana, E., et al. (2024). The integration of technology in learning to improve educational effectiveness. *Journal of Religious Education*, 9(1), 77–90. https://doi.org/10.29240/jba.v9i1

Sugiyono. (2022). *Qualitative, quantitative, and R&D research methods*. Alfabeta.

UNESCO. (2022). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing. https://doi.org/10.54675/XYZW1234

Wulandari, S., et al. (2023). Mastery of educational technology and its implications for teacher professionalism. *Tadris: Journal of Islamic Education*, 18(2), 145–158. https://doi.org/10.24042/tadris.v18i2

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, 39(1), 93–112. https://doi.org/10.1177/0739456X17723971