

## Deep Learning in Christian Religious Education: A Systematic Review of Pedagogical Models and Digital Challenges

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<p><b>Article history:</b> Received 12-10-2025 Revised 26-10-2025 Accepted 02-10-2025 Published 16-11-2025</p> <p><b>How to cite:</b> Pulung, R., Degeng, I. N. S., &amp; Aulia, F. (2025). Deep Learning in Christian Religious Education: A Systematic Review of Pedagogical Models and Digital Challenges. <i>Edcomtech: Jurnal Kajian Teknologi Pendidikan</i>, 10(2), 120–132. <a href="https://doi.org/10.17977/um039v10i22025p120-132">https://doi.org/10.17977/um039v10i22025p120-132</a></p> <p>© The Author(s)  This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License</p>	<p>Penelitian ini bertujuan untuk mengkaji pengembangan model deep learning dalam Pendidikan Agama Kristen (PAK), menilai efektivitas integrasinya dalam meningkatkan motivasi dan pemahaman peserta didik, serta mengidentifikasi tantangan implementasinya di era digital. Metode yang digunakan adalah Systematic Literature Review (SLR) dengan menganalisis sepuluh artikel ilmiah yang diterbitkan antara tahun 2020 hingga 2025. Artikel diperoleh dari database Google Scholar, Publish or Perish (PoP), dan Research Rabbit, kemudian dipilih berdasarkan kriteria inklusi: relevansi dengan topik deep learning dan PAK, kebaruan publikasi, serta kualitas jurnal. Hasil penelitian menunjukkan bahwa model deep learning dalam PAK berkembang melalui pendekatan berbasis proyek, media interaktif digital, dan personalisasi spiritual berbantuan kecerdasan buatan. Model terintegrasi ini terbukti efektif dalam meningkatkan motivasi intrinsik siswa, memperdalam pemahaman mereka terhadap teks-teks iman, serta menumbuhkan keterampilan abad ke-21. Namun, implementasi deep learning masih menghadapi berbagai tantangan seperti keterbatasan infrastruktur digital, rendahnya literasi teknologi guru, akses siswa yang terbatas, serta persoalan etika dan spiritual. Oleh karena itu, penelitian ini menekankan perlunya strategi kolaboratif antara guru, sekolah, orang tua, dan gereja agar penerapan deep learning benar-benar mendukung pertumbuhan iman dan meningkatkan kualitas pembelajaran Pendidikan Agama Kristen.</p> <p><b>Kata Kunci:</b> <i>Model Pembelajaran; Deep Learning; Pendidikan Agama Kristen; Motivasi Belajar; Era Digital.</i></p> <p><b>Abstract</b> <i>This study aims to examine the development of a deep learning model in Christian Religious Education (PAK), assess the effectiveness of its integration in improving student motivation and understanding, and identify implementation challenges facing the digital era. The method used is a Systematic Literature Review (SLR) by examining ten scientific articles published between 2020 and 2025. Articles were obtained from Google Scholar, Publish or Perish (PoP), and Research Rabbit databases, then selected based on inclusion criteria: relevance to the topic of deep learning and PAK, publication recency, and journal quality. The results</i></p>

	<p><i>of the study indicate that the deep learning model in PAK develops through a project-based approach, digital interactive media, and spiritual personalization assisted by artificial intelligence. This integrated model has proven effective in increasing students' intrinsic motivation, deepening their understanding of faith texts, and fostering 21st-century skills. However, the implementation of deep learning still faces challenges such as limited digital infrastructure, low teacher technology literacy, reduced student access, and ethical and spiritual issues. Therefore, this study emphasizes the need for collaborative strategies between teachers, schools, parents, and churches so that the implementation of deep learning truly supports the growth of faith and the quality of Christian Education learning.</i></p>
	<p>Keywords: <i>Learning Models; Deep Learning; Christian Religious Education; Learning Motivation; Digital Age.</i></p>

## INTRODUCTION

The development of information technology and education in the 21st century has brought about a significant transformation in teaching and learning methods. One innovation that is gaining attention is deep learning in the context of education, which is an approach that emphasises deep understanding, reflection, and active student involvement in the learning process (Fitriani & Santiani, 2025). Cognitive theories, such as constructivism, according to Azzahra (2025) the idea that students construct meaning through active interaction with material and context, rather than just passively receiving information. Christian religious education in particular, which aims not only to convey doctrine but also to shape faith, character, and spiritual life, requires an approach that goes beyond mere memorisation or lectures. In Christian Religious Education (CRE), this challenge is even more apparent. CRE not only focuses on the transfer of theological knowledge, but also aims to shape the character, faith, and spirituality of students (Tonapa et al., 2025). However, many studies show that conventional teaching methods such as lectures and memorisation often fail to build contextual and reflective understanding of faith. Students may know the doctrines, but find it challenging to apply the values of faith in their daily lives. This indicates the need for a more in-depth and relevant approach to Christian religious education (Oktavianus Rangka, 2024).

One approach that can address these needs is deep learning. In a pedagogical context, deep learning refers to learning that encourages conceptual understanding, analytical skills, and critical reflection in students. According to (Akmal et al., 2025), Deep learning focuses on the search for meaning, the interconnection of ideas, and the application of knowledge in authentic contexts. This differs from surface learning, which is only oriented towards short-term memorisation. Thus, deep learning is believed to be able to bridge the gap between knowledge and practice, including in the realm of faith learning. From the perspective of Christian Religious Education, deep learning is highly relevant (Tapilaha & Mauboy, 2025), emphasising that deep learning can strengthen the integration of faith and knowledge, so that students not only understand Christian teachings theoretically, but also internalise them in real actions. Furthermore, this approach supports holistic spiritual development, in line with the primary mission of Christian Religious Education to shape individuals with Christian character. Thus, integrating deep learning into Christian Religious Education has the potential to produce a generation that is not only intellectually intelligent but also mature in faith and morality.

However, the application of deep learning in PAK is not without challenges. The main obstacles include limited teacher competence, a lack of digital resources, and a curriculum that does not fully support reflective and participatory learning. According to Irsan Habsyi, (2020), the adoption of new approaches in religious education is often hampered by teacher resistance and concerns about the loss of long-established learning traditions. These challenges highlight the need for comprehensive strategies to integrate deep learning into PAK practices. In addition, the literature on integrating deep learning into Christian Religious Education remains very limited. Several studies focus more on general education or other religions, while studies in the Christian context are still rare. Furthermore, the opinion of (Tupahamhu, 2025) Highlights the use of artificial intelligence (AI) for personalising spiritual learning, but specific research on the effectiveness of deep learning in developing an understanding of the Christian faith remains limited. This condition creates an immediate research gap that needs to be bridged.

On the other hand, developments in learning technologies such as artificial intelligence and adaptive learning systems open up great opportunities for implementing deep learning in PAK. Technology enables more personalized, interactive, and reflective learning, so that students can relate religious teachings to their life experiences in a more relevant way (Gerbin Tamba, 2025). This is in line with the new educational paradigm that emphasizes personalization and context-based learning. The urgency to examine the integration of deep learning in PAK is even greater, given the challenges of globalization, secularization, and the rapid flow of digital information. Without a deep learning approach, PAK risks becoming merely a cognitive subject with minimal transformative impact (Legi et al., 2025). Therefore, a systematic review of existing literature is needed to understand the practices, challenges, and potential of deep learning integration in Christian Religious Education. A systematic review will provide a comprehensive overview of the current state of research.

The systematic literature review (SLR) approach is an appropriate method for critically analysing previous studies. Through SLR, researchers can identify trends, patterns, and research gaps using structured and transparent procedures (Arissona Dia Indah Sari et al., 2023). With this method, the integration of deep learning into PAK is not only understood through individual studies but also through a broader, deeper synthesis of knowledge. In addition, systematic reviews provide practical benefits for teachers and policymakers. Teachers can gain inspiration for effective learning methods, while educational institutions can design curricula that suit the needs of students in the digital age (Hasmiza, 2025). The results of this study can also help stakeholders prepare more context-specific teacher training programs. Thus, this study has not only academic but also practical contributions.

The study of deep learning integration in PAK is also essential for building the faith and character of the younger generation. Religious education that focuses only on knowledge tends to fail to shape a well-rounded personality. Conversely, deep learning can help students understand the meaning of faith personally, connect it with life experiences, and internalise it in everyday moral decisions (Heluka & Mbelanggedo, 2024). In this way, PAK can function as a space for transformation, not just a transfer of knowledge. Based on the above explanation, this study aims to conduct a systematic literature review on the integration of deep learning in Christian Religious Education. Thus, this study is expected to contribute to efforts to enrich the quality of Christian religious education in the digital age, so that students' faith and character are not only understood theoretically, but are alive and real in their lives.

## METHOD

The method used for this article was a Systematic Literature Review (SLR). SLR is a research design that systematically synthesises evidence from previous studies to answer research questions (Harahap & Hasibuan, 2025). This method enables researchers to obtain accurate, relevant academic literature aligned with the research problem. The analysis focused on articles containing the keywords "deep learning" and "Christian Religious Education."

This study aims to answer three main questions, namely:

1. How does the deep learning model work in Christian Religious Education?
2. How does the integration of the deep learning model improve student motivation and understanding?
3. What are the challenges faced in implementing the deep learning model in Christian Religious Education in the digital age?

This research was conducted through four main stages. The first stage was an article search conducted through databases such as Google Scholar, Publish or Perish (PoP), and Research Rabbit. The second stage was criteria selection, which focused on filtering articles relevant to deep learning and Christian Religious Education in accordance with the research questions. The third stage was quality assessment, in which only articles from reputable journals published through online platforms such as Open Journal Systems (OJS), DOAJ, or other credible platforms were included, based on title and abstract reviews to ensure quality and relevance. The fourth stage was data extraction, which involved selecting 10 articles that were relevant to the research focus on deep learning in Christian Religious Education.

The selected articles were limited to publications from the last 6 years, namely 2020-2025, to ensure the study's results remained up to date and relevant. Of the ten articles analysed, six used descriptive qualitative methods, two used literature study methods, and the other two used classroom action research (CAR). This variety of methods enriches the synthesis of results regarding the development, effectiveness, and challenges of implementing deep learning in Christian Religious Education in the digital era.

## RESULT

A literature search using the keywords "deep learning" and "Christian Religious Education" found ten articles considered relevant to the focus of this study. These articles highlight various aspects of deep learning integration in the context of Christian Religious Education, including model development, the effectiveness of implementation, and challenges faced in its implementation in the digital age. More specifically, the selected articles are described in the table below:

Table 1. Review Results

No	Author and Year	Research Title and Journal	Objective
1	EviTobeli et al., 2025)	Developing Excellent and Independent Student Character Through a Deep	This study aims to examine various digital approaches and technologies for Christian Religious Education and to evaluate their impact on students'

		Learning Approach in PAK Learning. Journal of Theology (JUTEOLOG)	understanding, learning motivation, and active engagement with Christian material. This study is expected to provide a comprehensive overview of the extent to which technological innovations, including deep learning and digital media, can enrich the faith learning experience.
2	(Kadarismanto & Sari, 2025)	The Concept of Deep Learning as a Pillar in Quality Education Strategy. Journal of Teaching and Education	This study aims to explore how the concept of deep learning can serve as a key pillar of quality education strategies in the digital age. The focus of the study is on understanding how deep learning can improve students' conceptual understanding, critical thinking skills, creativity, and problem-solving abilities.
3	(Y. Waruwu, 2024)	Christian Religious Education in the Age of AI: Using Artificial Intelligence to Personalize Spiritual Learning. Abdiel Journal: Treasury of Theological Thought, Christian Religious Education, and Church Music	This study aims to explore the potential and challenges of using artificial intelligence (AI) in Christian Religious Education (CRE), with a specific focus on personalising spiritual learning. This study aims to understand how AI can improve learning quality through a more in-depth analysis of religious texts, wider access to educational resources, and the development of adaptive learning strategies tailored to students' needs. In addition, this study examines ethical issues that arise, including data privacy, the digital divide, and the risk of reduced relational interaction in the educational process.
4	(Riomalen et al., 2025)	AI and Deep Learning: Improving the Quality of Education in the Digital Age. Journal of Education	This study aims to examine how artificial intelligence (AI) can be integrated with deep learning within the Merdeka Curriculum to improve the quality of education in the digital age. The primary focus is on exploring the potential of AI to personalise learning experiences tailored to individual student needs, while identifying implementation challenges, such as infrastructure limitations, teacher competencies,

			and ethical, cultural, and data privacy issues.
5	(Karina Onmilka et al., 2025)	Integration of Digital Media in Improving Discipline in Christian Religious Education (PAK) at Home and School	This study aims to explore how the integration of digital media can improve student learning discipline in the context of Christian Religious Education (CRE), both at home and at school. The focus of the study is on understanding the role of digital media in creating an interactive, flexible, and engaging learning environment, as well as its impact on student motivation and engagement, which ultimately strengthens their learning discipline. In addition, this study also examines the main challenges faced, such as limited access to technology, low digital literacy, and the risk of distraction that may arise from the use of digital media.
6	(Oktaviani, 2024)	Integration of Deep Learning Technology in Islamic Education in the Digital Age. Journal of Education Science	This research focuses on exploring the use of deep learning as an artificial intelligence-based learning innovation that can improve the effectiveness and quality of learning. The objectives include studying the application of deep learning in various forms, such as smart learning applications, religious material recommendation systems, and AI-based chatbots for religious consultation. Furthermore, this research aims to formulate a conceptual model for the integration of technology that is relevant and in line with Islamic values, thereby creating a more personalized, interactive, and contextual learning experience.
7	(D. E. R. Waruwu & Setiawati, 2025)	Integration of Deep Learning Curriculum in Education: Strategies and Challenges. Journal of Education and Social Sciences	The research focuses on understanding how deep learning can improve conceptual understanding, critical thinking skills, and students' readiness to face global challenges. Through descriptive literature review, this study also examines various implementation strategies, such as

			the Project-Based Learning approach, the Active Deep Learner experience (ADLX) model, and the use of artificial intelligence technology to create adaptive and personalised learning experiences.
8	(Halim, 2025)	Deep Learning Curriculum as a Means of Improving Work Readiness in the Industry 4.0 Era. Multi-Disciplinary Scientific Journal	This study aims to examine in depth how a deep learning-based curriculum can serve as a strategic tool for improving students' work-readiness in Indonesia, particularly in addressing the challenges of the Industrial Revolution 4.0. The focus of the study is directed at understanding the contribution of deep learning in developing higher-order cognitive skills such as critical thinking, problem solving, creativity, and adaptive abilities that are relevant to the needs of the modern workplace.
9	(Saputri et al., 2024)	Development of Interactive Learning Media in Christian Education. Murid Kristus Journal	The research focuses on efforts to update traditional learning methods, which tend to be monotonous, to make learning more interesting, relevant, and tailored to students' needs in the digital age. The interactive media referred to include the use of applications, videos, and online learning platforms that allow students to interact directly with the material in a more personalised manner according to their individual learning styles and speeds.
10	(Febri, 2025)	Building Academic Independence for Christian Students in the Age of AI: Christian Education Strategies to Overcome the Challenges of Technology Addiction. Journal of Christian Theology and Education	This research focuses on understanding how Christian education can help students develop self-discipline, ethical use of technology, and balanced independent learning skills in both academic and spiritual aspects. In addition, this research examines the roles of lecturers, educational institutions, and faith communities in creating a healthy learning ecosystem that not only encourages the wise use of technology but also strengthens students' Christian character.

## DISCUSSION

### **RQ1 How does the deep learning model work in Christian Religious Education?**

The deep learning model in Christian Religious Education (CRE) emphasises a deep, reflective, and practical understanding of Christian values. This model not only focuses on students' cognitive mastery but also guides them to internalise the meaning of faith in their daily lives. As Bloom emphasised in his taxonomy, deep learning requires students to analyse, evaluate, and create something new, not just remember information (Magdalena et al., 2020). In the context of CAR, this means that students are invited to connect biblical teachings with the social, ethical, and cultural challenges they face. The development of a deep learning model in PAK can be done through a Project-Based Learning (PJBL) approach. With this model, students are directly involved in faith-based projects, such as creating digital content about Christ's love, managing social service activities, or writing reflections on faith that address social issues. According to (Bessie et al., 2025), the project-based learning model allows students to integrate 21st-century skills with Christian values, so that they are ready to face global challenges.

In addition to being project-based, deep learning in PAK can also be realised through the Active Deep Learner eXperience (ADLX) approach. According to D. E. R. Waruwu & Setiawati (2025), ADLX emphasises active student involvement in solving real-world problems. For example, students are invited to discuss ethical issues in the use of technology from a Christian perspective, so that they not only understand the material conceptually, but also develop critical and ethical attitudes. The deep learning model also utilises digital technology as a learning tool. In addition, according to (Saputri et al., 2024) Digital-based interactive media can increase student participation because it provides a more engaging and personalised learning experience. The integration of technology is not just about the use of tools, but also a way to connect faith values with the digital reality that students face every day. Furthermore, (Rosiyati et al., 2025) emphasize that the deep learning model in PAK must pay attention to the dimension of spirituality. This means that learning should not only be oriented towards digital innovation but also maintain authentic faith relationships. A good learning model is one that balances cognitive, affective, and spiritual aspects so that students can grow holistically.

In the context of higher education, Halim (2025) highlights that a deep learning-based curriculum can be a strategic means of improving the work readiness of Christian students. This learning model requires students to master critical thinking, problem-solving, and creativity skills that are relevant to the world of work, without abandoning their faith identity. Thus, PAK not only shapes spirituality but also professional readiness. Conceptually, the deep learning model in PAK is also influenced by the theory of holistic education, which emphasizes the integration of intellectual, emotional, and spiritual aspects. Deep religious education must shape students to become individuals who are faithful, have good character, and are able to live relevant lives in the modern world. This is what makes the deep learning model unique compared to other learning models. Thus, the deep learning model in PAK can be understood as an integrative approach that connects theology, pedagogy, and technology. Through project-based learning, active experiences, and digital media, students not only acquire cognitive knowledge but also live out their faith in a tangible way.

### **RQ2 How does the integration of deep learning models improve student motivation and understanding?**

The integration of deep learning models in Christian Religious Education has been proven to increase student motivation by providing learning that is relevant to real life.

According to Karina Onmilka et al. (2025), digital media in Christian Religious Education can build learning discipline while motivating students to be more actively involved. When students see that learning is relevant to their daily lives, their intrinsic motivation grows naturally. In line with the research by (Oktaviani, 2024), the integration of deep learning technology enables more personalized learning, as students can learn according to their individual needs and pace. This personalization provides a unique learning experience, making students feel valued and motivated to continue exploring the material. In this way, learning motivation no longer depends on external encouragement but arises from the students' internal awareness.

In addition to motivation, the integration of deep learning also deepens students' understanding of PAK material. According to Riomalen et al. (2025), AI can help students analyze biblical texts more deeply, so that they not only memorize verses but also understand their contextual meaning. This makes PAK a lively, contextual, and applicable learning experience. From a collaborative perspective, deep learning encourages students to learn together through group discussions, case studies, and collaborative projects. Research according to Saputri et al. (2024) found that interactive media allows for more intensive collaboration, thereby enriching students' understanding. In this context, understanding is not only the result of individual learning but also the fruit of mutual interaction and reflection. The integration of deep learning is also in line with Self-Determination theory (Kumbang Sigit Priyoaji, 2023), which emphasizes the importance of autonomy, competence, and connectedness in motivating students. With deep learning, students are given the space to choose their learning path, feel competent through reflective achievement, and connect with others through collaboration. These three aspects strengthen their intrinsic motivation.

In line with research EviTobeli et al. (2025), deep learning not only improves conceptual understanding but also 21st-century skills such as creativity, communication, and problem-solving. Students' understanding becomes more comprehensive as they learn to connect their faith with a broader global context. The effectiveness of this integration is also evident in students' spiritual engagement. According to Febri (2025), spiritual personalization through AI encourages students to experience their faith more deeply. Thus, learning motivation in PAK is not only academic but also spiritual. Therefore, the integration of deep learning models in PAK can improve students' motivation and understanding holistically, covering cognitive, affective, social, and spiritual aspects.

### **RQ3 What challenges are faced in implementing deep learning models in PAK in the digital age?**

The implementation of deep learning models in PAK faces several serious challenges, including limited technological infrastructure. According to Gerbin Tamba (2025), not all schools or universities have adequate internet access and digital devices, so the digital divide remains a significant obstacle to the implementation of modern learning. In addition to infrastructure, teacher readiness is an essential factor. According to Oktaviani (2024), the low digital literacy of religious teachers makes it difficult for them to integrate deep learning technology into PAK. Teachers who are accustomed to traditional lecture methods require special training to be able to design technology-based learning and deep reflection.

Another challenge is the ethical and spiritual aspect. According to Y. Waruwu, (2024), the use of AI in PAK risks reducing relational interactions between teachers and students. In line with this, research by Febri (2025) explains that the danger of technology addiction can weaken students' academic independence. This shows that clear ethical policies must

accompany the application of technology in PAK. The complexity of evaluation is also a challenge in itself. According to Tupahamhu (2025), assessing student discipline and engagement through digital media requires authentic assessment instruments. This type of evaluation requires teachers to assess both cognitive and spiritual aspects, which is not easy to do with traditional instruments.

In addition, resistance to change is also an obstacle. According to D. E. R. Waruwu & Setiawati (2025), some educators are still hesitant to adopt the deep learning curriculum because it is considered complex and difficult to implement. This resistance arises from limited knowledge and discomfort with new approaches. From the perspective of innovation diffusion theory (Rogers), every educational innovation will face challenges at the adoption stage. In the case of PAK, this challenge arises because the integration of deep learning not only concerns learning methods but also touches on a deeper dimension of spirituality (Sugiono, 2024). Therefore, its application requires a more careful approach. Another challenge arises from the digital literacy gap among students. Not all students have the same ability to operate learning technology. This has the potential to create inequality in the learning experience, so teachers must provide differentiation to accommodate diverse needs.

## **IMPLICATION**

Future studies should expand this work through empirical or mixed-methods approaches to provide quantitative evidence on the impact of deep learning integration in Christian Religious Education. Researchers may examine how specific elements such as project-based learning, AI-based personalisation, or reflective assessment affect student motivation, critical thinking, and faith formation. Comparative studies between different educational contexts (Christian, Islamic, and secular schools) could also enrich understanding of how deep learning operates across diverse spiritual settings.

In addition, future research should explore the long-term implications of AI-based deep learning for students' moral and spiritual development, as well as strategies to mitigate ethical concerns, such as dependency on technology or the weakening of teacher-student relational bonds. Expanding the research scope across regions with differing digital infrastructures may also provide insight into best practices and localised adaptations for implementing deep learning effectively within faith-based education.

## **CONCLUSION**

Based on the study's results and discussion, it can be concluded that the development of deep learning in Christian Religious Education (CRE) is a strategic necessity in the digital age. This approach provides deeper, more reflective, and transformative learning, so that students not only acquire cognitive knowledge but also experience real growth in their faith. This development can be realised through the integration of adaptive curricula, project-based learning models, the use of digital technology, and the strengthening of spirituality in the teaching and learning process. The effectiveness of deep learning integration has been proven to increase student motivation and understanding. This is demonstrated by students' active involvement in learning, the material's relevance to everyday life, and an increase in critical and reflective thinking skills. The use of deep learning-based technology also enables personalised learning that better suits individual needs and learning speeds, thereby creating a more meaningful learning experience and encouraging students' spiritual and academic engagement.

However, implementing deep learning in PAK still faces several challenges. Some of these include limitations in digital infrastructure, low pedagogical and technological literacy among teachers, and ethical and spiritual issues related to the use of digital media. In addition, evaluating students' deep understanding is also a problem in itself, as it requires authentic assessment instruments that can assess both cognitive and spiritual aspects. These challenges require close collaboration between teachers, schools, parents, and churches so that the application of deep learning can be balanced between technological, pedagogical, and spiritual aspects. Thus, this study confirms that deep learning has great potential to enrich Christian Religious Education in the digital age, both by improving the quality of learning and by fostering students' faith. However, its successful implementation depends heavily on the availability of resources, awareness of existing challenges, and a shared commitment to developing more innovative, relevant, and character-building learning strategies that foster authentic Christian values.

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