



The Integration of Artificial Intelligence in Christian Religious Education Learning and Its Implications for Critical Thinking and Learning Autonomy among Upper Elementary Students at SD Swasta Generasi Bintang Medan

Cristin Mandasari Purba

Mahasiswa, Magister Pendidikan Agama Kristen, STT Baptis Medan Sumatera Utara

*correspondence: cristinmandasariurba01@gmail.com

ABSTRACT

This study aims to describe the implementation of Artificial Intelligence (AI) in Christian Religious Education (CRE) and examine its implications for the critical thinking and learning autonomy of upper elementary students at SD Swasta Generasi Bintang Medan. The study is motivated by the rapid advancement of AI technologies in education, where AI functions not only as an instructional support tool but also as a catalyst for pedagogical transformation in enhancing the quality of twenty-first-century learning. This research employed a qualitative approach using a case study design. The participants consisted of Christian Religious Education teachers and Christian students in Grades IV, V, and VI. Data were collected through classroom observations, in-depth interviews, and document analysis. The data were analyzed using the interactive model of Miles, Huberman, and Saldaña, which includes data condensation, data display, and conclusion drawing and verification. The findings indicate that AI integration in Christian Religious Education was implemented through the use of educational chatbots, interactive digital learning media, and AI-powered search applications that enabled students to develop a more contextual understanding of biblical teachings. The integration of AI was found to enhance students' critical thinking skills, as reflected in their ability to analyze information, formulate meaningful questions, and evaluate responses more reflectively. Furthermore, AI contributed to the development of students' learning autonomy by strengthening their learning initiative, time management, and capacity for independent information exploration. Nevertheless, the study also identified a tendency among some students to become overly dependent on AI, highlighting the need for teachers to play an active role in guiding the ethical and responsible use of AI technologies. Overall, the integration of AI into Christian Religious Education positively contributes to the development of students' critical thinking and learning autonomy when implemented systematically and grounded in Christian values.

Keywords: *artificial intelligence, Christian Religious Education, critical thinking*

INTRODUCTION

The rapid advancement of digital technology has brought profound changes to the field of education, particularly with the emergence of Artificial Intelligence (AI), which enables learning processes to become more adaptive, interactive, and personalized. AI is no longer viewed merely as a technological innovation but has evolved into a key driver of global educational transformation, influencing how teachers design instruction, how students acquire knowledge, and how educational institutions cultivate twenty-first-century competencies. The United Nations Educational, Scientific and Cultural Organization (UNESCO) emphasizes that AI holds significant potential to enhance the quality of education, expand access to learning, and support the achievement of Sustainable Development Goal (SDG) 4 on quality education. Nevertheless, its implementation should adhere to the principles of human-centeredness, equity, inclusiveness, and ethical responsibility, ensuring that AI serves to strengthen teaching and learning rather than replace the role of teachers or diminish students' cognitive development (UNESCO, 2024). Recent advances in AI have facilitated the development of numerous educational technologies, including intelligent tutoring systems, educational chatbots, automated assessment tools, and generative AI applications based on natural language processing that assist students in understanding academic content more efficiently. A growing body of research indicates that AI integration enhances learning effectiveness through personalized instructional content, immediate feedback, and learning experiences tailored to individual learners' needs. However, the successful implementation of AI depends largely on the pedagogical design adopted by teachers. AI should not be positioned as a substitute for the educational process but rather as a tool that enriches learning when integrated in a critical, ethical, and learner-centered manner (Holmes & Tuomi, 2022; Zawacki-Richter et al., 2019).

At the elementary school level, AI offers considerable potential because students are in a developmental stage that requires concrete, interactive, and contextual learning experiences. AI-supported instruction enables teachers to present learning materials through simulations, visualizations, adaptive exercises, and interactive dialogue, thereby increasing student engagement throughout the learning process. On the other hand, AI also introduces new challenges, particularly the tendency of students to accept AI-generated responses without engaging in deeper analytical thinking. Without appropriate instructional strategies, AI may inadvertently reduce students' critical thinking abilities and hinder the development of learning autonomy. Consequently, UNESCO (2024) argues that AI should be employed to foster metacognition, reasoning, and reflective thinking rather than merely improving task completion efficiency. The integration of AI possesses distinctive characteristics compared to other academic disciplines. CRE is not solely intended to transmit biblical knowledge but also to nurture faith, develop Christian character, cultivate moral decision-making, and encourage students to apply biblical values in the context of an increasingly digital society. Therefore, AI integration in CRE should not focus exclusively on improving instructional efficiency; rather, it should facilitate faith reflection, meaningful dialogue, the cultivation of wisdom, and Christ-centered character formation. Furthermore, AI integration should preserve the relational dimension between teachers and students, ensuring that technology functions as a

supportive educational resource rather than a substitute for spiritual formation and pastoral guidance (Mau et al., 2024).

One of the essential competencies that should be cultivated through Christian Religious Education is critical thinking. Critical thinking refers to students' ability to analyze information, evaluate alternative solutions, construct logical arguments, and make informed decisions based on evidence and deeply held values. From a Christian educational perspective, critical thinking extends beyond intellectual competence to include the discernment of truth according to biblical principles. Students should therefore develop the ability to critically evaluate digital information, including AI-generated content, rather than accepting it uncritically or without reflective verification. Accordingly, Christian Religious Education bears the responsibility of guiding students to utilize AI wisely, ethically, responsibly, and consistently with Christian values (Holmes & Tuomi, 2022). In addition to critical thinking, learning autonomy constitutes another essential competency for twenty-first-century education. Learning autonomy refers to students' capacity to establish learning goals, regulate learning strategies, monitor their own progress, and evaluate learning outcomes independently. AI has considerable potential to promote learning autonomy by providing easily accessible learning resources, adaptive learning activities, and immediate feedback. Nevertheless, the excessive use of AI without adequate teacher guidance may foster technological dependence, limiting students' opportunities to develop independent reasoning and self-directed learning skills. Consequently, AI integration should be carefully designed to encourage students to remain active learners who seek information independently, sustain intellectual curiosity, and engage in reflective learning practices (Holmes & Tuomi, 2022; Porayska-Pomsta et al., 2024).

Previous studies have primarily examined the effectiveness of AI in improving learning outcomes, digital literacy, or instructional practices in general education subjects. Research on AI integration within religious education has also begun to emerge, although it has predominantly focused on ethical considerations, digital theology, and challenges associated with implementing AI in faith-based education. Empirical studies that comprehensively investigate the implementation of Artificial Intelligence in Christian Religious Education and its implications for critical thinking and learning autonomy among elementary school students remain relatively scarce. This situation reveals a significant research gap that warrants further investigation to ensure that AI integration in Christian Religious Education is supported not only by theoretical assumptions but also by empirical evidence. Preliminary observations conducted at SD Swasta Generasi Bintang Medan revealed that teachers have begun incorporating various AI-based applications as instructional support tools, while upper elementary students are already familiar with using digital technologies during classroom learning. However, the extent to which AI integration contributes to the development of students' critical thinking and learning autonomy has not yet been systematically examined. These competencies are essential indicators of preparing students to meet the challenges of the digital era while simultaneously developing strong Christian character. Therefore, this study aims to analyze the influence of Artificial Intelligence integration in Christian Religious Education on the critical thinking and learning autonomy of 47 Christian students enrolled in the

upper elementary grades at SD Swasta Generasi Bintang Medan. The findings are expected to contribute to the development of an effective, ethical, and learner-centered AI-based instructional model for Christian Religious Education while providing practical guidance for teachers seeking to integrate AI responsibly in ways that enhance educational quality. The novelty of this study lies in its investigation of AI integration within Christian Religious Education at the elementary school level, specifically focusing on the development of students' critical thinking and learning autonomy through a pedagogical framework grounded in Christian values.

METHODS

This study employed a qualitative approach using a case study design. A qualitative methodology was selected because the research sought to develop an in-depth understanding of how the integration of Artificial Intelligence (AI) in Christian Religious Education (CRE) influences the critical thinking and learning autonomy of upper elementary students at SD Swasta Generasi Bintang Medan. The participants consisted of 47 students enrolled in Grades IV, V, and VI. The interview participants included one Christian Religious Education teacher and several students who were purposively selected based on their active involvement in the use of AI during CRE instruction. According to Creswell and Poth (2018), qualitative research is an approach used to explore and understand the meanings that individuals or groups attribute to social or educational phenomena within their natural settings. A case study design was considered appropriate because the investigation focused on a single educational setting, SD Swasta Generasi Bintang Medan, which had incorporated AI-based technologies into Christian Religious Education instruction. Yin (2018) argues that case studies are particularly suitable for investigating contemporary phenomena within real-life contexts, especially when the boundaries between the phenomenon and its context are not clearly defined. Accordingly, the case study design enabled a comprehensive exploration of how AI was implemented in CRE instruction and how it influenced students' cognitive development and learning autonomy.

The participants comprised Christian Religious Education teachers and Christian students in the upper elementary grades (Grades IV-VI) at SD Swasta Generasi Bintang Medan. Participants were selected using purposive sampling, whereby individuals were chosen based on their direct experience with and knowledge of AI integration in classroom instruction. As suggested by Sugiyono (2022), purposive sampling is widely employed in qualitative research to identify information-rich participants who are most relevant to the objectives of the study. Data were collected using three primary techniques: classroom observation, in-depth interviews, and document analysis. Classroom observations were conducted to examine the implementation of AI-integrated Christian Religious Education, including students' interactions with AI technologies, their engagement in classroom activities, and the development of self-directed learning behaviors throughout the instructional process. In-depth interviews with the Christian Religious Education teacher and selected students were undertaken to gain a deeper understanding of their experiences, perceptions, and interpretations regarding the use of AI in learning. Document analysis was employed to collect supporting evidence, including instructional

materials, lesson plans, students' assignments, and records of AI-supported learning activities.

In qualitative research, the researcher serves as the primary research instrument (human instrument). Accordingly, the researcher was responsible for designing the study, collecting data, analyzing and interpreting the findings, and preparing the research report. This role is consistent with the perspective of Lincoln and Guba (1985), who contend that the researcher is the principal instrument in qualitative inquiry, determining the quality and credibility of the data through direct interaction with research participants. The data were analyzed using the interactive model developed by Miles, Huberman, and Saldaña (2014), which comprises three interrelated stages. The first stage, data condensation, involved selecting, focusing, simplifying, and organizing data obtained from observations, interviews, and documentation. The second stage, data display, consisted of systematically organizing the data into descriptive narratives, thematic categories, and supporting tables to facilitate interpretation. The final stage, conclusion drawing and verification, involved identifying patterns, interpreting meanings, and examining relationships among emerging themes throughout the research process. Data credibility was established through triangulation, including both source triangulation and methodological triangulation. Source triangulation was conducted by comparing information obtained from teachers and students, whereas methodological triangulation involved comparing evidence gathered through classroom observations, interviews, and document analysis. According to Sugiyono (2022), triangulation enhances the credibility and dependability of qualitative research findings by corroborating evidence from multiple sources and methods. Participants' identities were kept confidential, formal permission to conduct the research was obtained from the school administration, and all participants provided voluntary consent without coercion. The data collected were used exclusively for academic research purposes and were not disclosed beyond the scope of this study.

RESULTS AND DISCUSSION

The findings indicate that the integration of Artificial Intelligence (AI) into Christian Religious Education (CRE) at SD Swasta Generasi Bintang Medan, has developed in a systematic and increasingly well-structured manner within daily instructional practices. AI integration is not merely understood as the adoption of digital technology but as a form of pedagogical transformation that influences teachers' instructional practices, students' learning experiences, and the internalization of Christian values throughout the educational process. Within this context, AI functions as an integral component of a modern learning ecosystem that enriches students' educational experiences without diminishing the fundamental mission of Christian education, namely, the formation of Christian character and spiritual maturity. The implementation of AI identified in this study encompasses a variety of educational technologies. Teachers and students regularly utilized AI-powered educational chatbots, intelligent search applications, and digital learning platforms capable of providing adaptive responses tailored to students' learning needs. These technologies were employed to support students in understanding biblical content, explaining fundamental theological concepts, and connecting Christian values with everyday life experiences. During several learning activities, students were encouraged to use AI as an exploratory learning tool, enabling them to expand their

knowledge beyond conventional textbooks by accessing more dynamic and diverse digital resources.

One Christian Religious Education teacher explained: "AI helps students obtain additional information about biblical figures more quickly; however, the information must always be verified through Scripture and confirmed by the teacher." This statement illustrates that teachers remain the central facilitators and instructional leaders in AI-supported learning. Rather than allowing students to use AI without guidance, teachers established clear boundaries and instructional directions to ensure that AI use remained aligned with the educational objectives of Christian Religious Education. These findings demonstrate that AI does not replace the teacher's role but instead extends teachers' pedagogical capacity to integrate technology into meaningful learning experiences. From the perspective of Christian pedagogy, teachers continue to serve as the primary guides in leading students toward an authentic understanding of God's Word, while AI functions as a complementary instructional resource that enriches the learning process (Groome, 2011). AI integration created broader opportunities for students to engage in independent knowledge exploration. Students were no longer exclusively dependent on teachers' classroom explanations but actively sought additional information using AI-supported technologies. They explored biblical characters, investigated the historical contexts of scriptural events, and examined the contemporary relevance of Jesus Christ's teachings to modern life. These learning activities fostered a more interactive, participatory, and learner-centered educational environment.

Within this instructional context, AI functioned as a "learning partner" by enabling students to access information efficiently and conveniently. However, its contribution extended beyond simply providing information. AI also encouraged students to broaden their perspectives by comparing different explanations, considering multiple viewpoints, and constructing more comprehensive understandings of Christian Religious Education topics. Consequently, classroom learning became cognitively richer while simultaneously creating opportunities for students to construct knowledge actively through interaction with AI-supported technologies.

The findings also reveal that teachers consistently emphasized the limitations of AI within Christian Religious Education. Teachers repeatedly reminded students that AI should never be regarded as the ultimate source of truth, particularly concerning biblical interpretation and Christian doctrine. All information generated by AI was expected to be verified against Scripture and confirmed through teachers' theological and pedagogical guidance. This emphasis is particularly important because AI-generated responses may provide generalized or contextually inappropriate interpretations that do not always align with biblical theology. Consequently, students were encouraged to engage in critical reflection rather than accepting AI-generated information uncritically. From the perspective of Christian education, maintaining a balance between technological innovation and faith-based values is essential. Christian education extends beyond the transmission of cognitive knowledge to encompass the holistic development of students' moral character, spirituality, and ethical responsibility. Accordingly, AI should consistently be employed to reinforce Christian virtues such as love, honesty, responsibility, humility, and compassion. Teachers therefore bear the responsibility of ensuring that technological innovation strengthens rather than displaces the authority of Scripture as the foundational source of truth in Christian Religious Education. These findings suggest that

the successful integration of AI within Christian Religious Education depends not only on technological accessibility but also on pedagogical intentionality. AI becomes educationally meaningful when its implementation remains grounded in biblical values, guided by competent teachers, and directed toward the holistic development of learners. Rather than functioning as a replacement for faith-based instruction, AI serves as an instructional innovation that enriches students' learning experiences while preserving the relational, spiritual, and formative dimensions that distinguish Christian education.

Impact of AI Integration on Students' Critical Thinking

The findings further demonstrate that the integration of Artificial Intelligence (AI) into Christian Religious Education (CRE) has made a substantial contribution to the development of critical thinking skills among upper elementary students. Students exhibited noticeable improvements in their ability to formulate questions, analyze information, and construct logical arguments during classroom discussions. AI-supported learning encouraged students to become more actively engaged in processing information rather than merely accepting answers without deeper cognitive reflection.

One sixth-grade student commented: "Sometimes the AI's answer is different from what my teacher explains, so I ask my teacher again to make sure which one is correct." One of the most significant findings of this study is the transformation of students' learning behaviors from relatively passive recipients of knowledge into more active and reflective learners. When interacting with AI, students did not simply search for ready-made answers; instead, they compared AI-generated information with the knowledge previously provided by their teachers. In several instances, students identified discrepancies between AI-generated responses and biblical interpretations presented during classroom instruction. These differences prompted students to seek clarification from their teacher, thereby fostering meaningful dialogue and reflective inquiry rather than unquestioning acceptance of digital information. Beyond strengthening students' analytical and evaluative abilities, AI integration also contributed to the development of inferential reasoning. Students demonstrated an increased capacity to synthesize information from multiple sources and formulate well-founded conclusions. For example, while studying biblical themes such as love, forgiveness, and humility in the teachings of Jesus Christ, students were able to relate these theological concepts to their own experiences within the school environment and broader social interactions. This finding suggests that AI can function as a cognitive catalyst, enabling students to connect abstract biblical concepts with authentic real-life situations.

Within this instructional framework, AI did not replace students' thinking processes but instead served as a stimulus for higher-order thinking. Although AI provided rapid access to extensive information, students were still required to evaluate the credibility of that information, compare alternative perspectives, and formulate their own conclusions independently. Consequently, AI became an integral component of an active learning environment that encouraged deeper cognitive engagement and reflective reasoning rather than passive information consumption. These findings are consistent with UNESCO's (2024) perspective that digital technologies, including Artificial Intelligence, possess considerable potential to cultivate twenty-first-century competencies when implemented through active, reflective, and learner-centered pedagogical approaches. In other words, AI does not automatically improve students' critical thinking skills. Rather, it

creates pedagogical opportunities for teachers to design instructional experiences that promote inquiry, exploration, reflection, and meaningful problem-solving.

The findings also indicate that students gradually developed greater confidence in questioning information obtained from digital technologies. Instead of assuming that AI-generated responses were inherently accurate, they became increasingly aware of the importance of examining information critically through comparison with biblical teachings, classroom discussions, and teachers' explanations. This emerging habit reflects the development of epistemic awareness, an essential dimension of critical thinking that enables learners to recognize the limitations of knowledge sources and evaluate their reliability before accepting them as truth. This development holds particular significance because critical thinking extends beyond intellectual competence to encompass spiritual discernment. Students are expected not only to distinguish between accurate and inaccurate information but also to evaluate ideas in light of biblical truth and Christian ethical principles. Consequently, AI-supported learning provides opportunities for students to cultivate both cognitive reasoning and spiritual discernment simultaneously, provided that teachers intentionally facilitate reflective dialogue throughout the instructional process.

The study also revealed that the positive influence of AI on critical thinking was largely dependent on teachers' pedagogical practices. When AI was used merely as a tool for obtaining quick answers, opportunities for critical reflection diminished considerably. Conversely, when teachers encouraged students to justify AI-generated responses, compare multiple sources, formulate independent arguments, and engage in collaborative classroom discussions, AI became a powerful instrument for developing higher-order thinking skills. These findings suggest that AI integration in Christian Religious Education has considerable potential to enhance students' critical thinking abilities by promoting analytical reasoning, reflective inquiry, evidence-based evaluation, and contextual application of biblical principles. However, the effectiveness of AI in fostering critical thinking depends fundamentally on teachers' ability to design learning experiences that position AI not as an authority that provides definitive answers, but as an instructional resource that stimulates intellectual curiosity, theological reflection, and independent reasoning. Within this pedagogical framework, AI serves not as a replacement for human cognition but as a catalyst for deeper learning and holistic intellectual development.

The Influence of AI Integration on Students' Learning Autonomy

In addition to enhancing students' critical thinking skills, the findings of this study demonstrate that the integration of Artificial Intelligence (AI) into Christian Religious Education (CRE) substantially contributes to the development of learning autonomy among upper elementary students at SD Swasta Generasi Bintang Medan. Within this context, learning autonomy extends beyond the ability to study independently without direct teacher assistance. It encompasses students' capacity to plan, regulate, implement, and evaluate their own learning processes consciously and responsibly.

One student explained: "I usually search for information using AI before asking my teacher whenever I have difficulty understanding the lesson." This statement illustrates a significant shift in students' learning behaviors. Following the integration of AI into classroom instruction, students became increasingly proactive in seeking additional information beyond the explanations provided by their teachers. Rather than relying exclusively on a single source of knowledge, they demonstrated greater initiative in exploring various digital resources through AI-powered applications. During several learning activities, students utilized AI to clarify biblical concepts they had not fully understood, obtain additional information about biblical figures, and explore the moral lessons embedded within biblical narratives presented in class.

This increased level of independent learning reflects a pedagogical transition from teacher-centered instruction toward a more learner-centered approach. Students gradually assumed greater responsibility for their own learning by using AI as an accessible supplementary learning resource capable of providing timely and diverse explanations. In this context, AI functioned as an instructional support tool that students could access whenever needed, enabling them to overcome learning difficulties more independently rather than waiting exclusively for teacher assistance. Beyond encouraging learning initiative, AI integration also strengthened students' abilities to regulate their learning strategies and manage their study time more effectively. Upper elementary students demonstrated noticeable improvement in planning their learning activities by organizing systematic steps for completing assignments while appropriately utilizing AI-supported technologies. Furthermore, students increasingly monitored their own learning progress by reviewing AI-generated responses and comparing them with classroom instruction and biblical sources. These behaviors reflect the essential dimensions of self-regulated learning proposed by Zimmerman (2002), namely forethought, performance control, and self-reflection.

Throughout the learning process, AI played an important role by providing immediate explanations whenever students encountered difficulties in understanding instructional materials. Rapid access to information reduced students' frustration when facing academic challenges and enabled them to seek alternative explanations independently. Consequently, AI supported the development of a more flexible and adaptive learning environment in which students could learn according to their individual needs, interests, and learning pace. The findings also identified important challenges associated with AI-supported learning autonomy. The most prominent concern was the emergence of technological dependence among some students. Several participants tended to consult AI immediately to obtain answers without first attempting to understand, analyze, or solve problems independently. This behavioral pattern suggests that although AI possesses considerable potential to promote learning autonomy, its inappropriate or uncontrolled use may inadvertently weaken students' independent thinking and self-directed learning capacities. This tendency toward technological dependence represents a significant concern within Christian education, where character formation, personal responsibility, and integrity constitute fundamental educational objectives. Excessive reliance on AI may hinder students' opportunities to internalize biblical values, construct personal understanding, and develop independent judgment. Therefore, effective

pedagogical strategies are required to ensure that AI remains an educational resource that strengthens rather than diminishes students' learning autonomy.

The teacher assumes an indispensable role as both facilitator and instructional guide. Teachers are responsible not only for delivering instructional content but also for ensuring that AI genuinely supports students' learning processes rather than replacing them. Accordingly, teachers should establish clear expectations regarding when and how AI should be used, thereby preserving opportunities for students to engage in independent reasoning before seeking technological assistance. One practical instructional strategy observed during the study involved asking students to explain AI-generated responses using their own words. This approach encouraged students to demonstrate genuine understanding rather than merely reproducing information generated by AI systems. Teachers also encouraged students to compare AI-generated explanations with Scripture, textbooks, and classroom discussions. Such instructional practices fostered information verification, reflective thinking, and balanced development of both critical thinking and learning autonomy. Learning autonomy encompasses more than technical competence or cognitive independence. It also reflects students' personal responsibility before God in the stewardship of knowledge and learning. Students are expected not merely to become competent users of technology but to exercise wisdom, discernment, and ethical responsibility in accordance with biblical principles. Consequently, AI integration in Christian Religious Education should consistently reinforce Christian virtues such as discipline, honesty, integrity, responsibility, and faithful stewardship. The findings indicate that AI possesses considerable potential to strengthen students' learning autonomy when implemented intentionally within an appropriate pedagogical framework. AI can function as an effective educational resource by expanding access to information, facilitating self-directed learning, and enabling students to overcome learning difficulties efficiently. However, without sufficient pedagogical guidance, AI may also encourage excessive dependence on technology, thereby limiting opportunities for students to cultivate independent reasoning and lifelong learning habits. The success of AI integration in fostering learning autonomy ultimately depends on achieving an appropriate balance between technological innovation and teacher guidance. Meaningful collaboration among AI technologies, teachers, and students forms the foundation of an effective, learner-centered educational environment that promotes sustainable learning autonomy while preserving the holistic goals of Christian Religious Education. Rather than replacing students' responsibility for learning, AI should empower learners to become reflective, self-directed, and ethically responsible individuals capable of navigating both digital environments and faith-informed decision-making.

The Teacher's Role in Guiding AI Integration in Christian Religious Education

The findings of this study underscore that teachers occupy a pivotal role in ensuring the successful integration of Artificial Intelligence (AI) within Christian Religious Education (CRE). Rather than delegating instructional responsibilities to AI technologies, teachers consistently maintained their position as pedagogical leaders, spiritual mentors, and ethical facilitators throughout the learning process (Panjaitan et al., 2023). AI was employed as a complementary instructional resource, while teachers remained

responsible for directing learning activities, monitoring students' engagement, and evaluating learning outcomes in accordance with the educational objectives of Christian Religious Education. The participants reported that teachers consistently emphasized the responsible and ethical use of AI. Students were reminded that AI should not be used merely to obtain instant answers or complete assignments without meaningful reflection, as such practices could undermine academic honesty and personal integrity. Instead, AI was introduced as a learning resource that supports inquiry, exploration, and deeper understanding while preserving students' responsibility for independent thinking.

These findings suggest that AI integration does not diminish the teacher's significance; rather, it transforms the teacher's professional role into one that is increasingly multifaceted. In addition to functioning as instructional facilitators, teachers also become digital mentors who help students navigate technological resources critically and responsibly, while simultaneously serving as spiritual guides who nurture Christian faith and character. This transformation reflects the principles of human-centered learning, which emphasize that educational technologies should enhance rather than replace meaningful human interaction within the learning environment (Holmes & Tuomi, 2022). The findings further reinforce the theoretical perspective that AI contributes to educational quality only when it is integrated within a sound pedagogical framework. Regarding critical thinking, AI functions as a cognitive stimulus that encourages students to question, analyze, compare, and evaluate information rather than accepting it uncritically. This finding is consistent with Facione's (1990) conceptualization of critical thinking as a multidimensional process involving interpretation, analysis, evaluation, inference, explanation, and self-regulation. AI provides access to extensive information; however, it is the teacher's instructional design that determines whether students merely consume information or engage in higher-order cognitive processes. Similarly, the findings concerning learning autonomy support Zimmerman's (2002) theory of self-regulated learning. Students demonstrated increasing capacities for planning their learning activities, monitoring their academic progress, evaluating learning outcomes, and independently seeking additional information. AI accelerated access to educational resources and expanded opportunities for self-directed learning. Nevertheless, the findings also revealed that technological assistance alone does not automatically foster learning autonomy. Without adequate teacher guidance, some students exhibited a tendency to rely excessively on AI-generated responses, thereby reducing opportunities to develop independent reasoning and problem-solving skills. This finding highlights that self-regulated learning requires not only technological support but also intentional pedagogical scaffolding that gradually cultivates students' independence and metacognitive awareness. These findings affirm that AI should never replace Scripture as the ultimate authority or teachers as spiritual mentors in the educational process. Christian Religious Education seeks not merely to develop students' cognitive competencies but also to nurture spiritual maturity, moral discernment, Christ-centered character, and faithful discipleship. Consequently, AI should be understood as an instructional resource that enriches educational experiences while remaining subordinate to biblical truth and the relational dimensions of Christian teaching and learning.

The present findings also align with UNESCO's (2024) recommendations regarding the ethical implementation of Artificial Intelligence in education. UNESCO emphasizes that AI should be designed and utilized to promote equity, human agency, critical reflection, and responsible citizenship rather than simply increasing instructional efficiency. The instructional practices observed in this study reflect these principles by positioning teachers as active mediators who encourage students to verify AI-generated information, compare multiple sources, engage in reflective dialogue, and exercise moral judgment grounded in Christian values. Such pedagogical practices ensure that AI serves educational purposes while preserving students' intellectual autonomy and ethical responsibility. An important implication of this study concerns instructional design within Christian Religious Education. Teachers should intentionally develop learning activities that require students to justify AI-generated responses, compare information with biblical texts and other credible sources, formulate independent arguments, and participate in collaborative discussions. Through these approaches, AI becomes a catalyst for inquiry rather than a mechanism for producing immediate answers. Consequently, technology contributes not only to knowledge acquisition but also to the cultivation of analytical reasoning, theological reflection, and moral discernment. The findings also suggest important institutional implications. Schools should provide continuous professional development opportunities that enable teachers to integrate AI effectively, ethically, and pedagogically. Such training should encompass not only technical competencies but also instructional strategies for promoting critical thinking, learning autonomy, digital ethics, and responsible AI literacy within faith-based educational settings. Establishing institutional guidelines for AI use would further assist teachers in implementing technology consistently while maintaining the theological foundations and educational philosophy of Christian Religious Education. For students, AI should be positioned as an instrument that stimulates intellectual curiosity, encourages lifelong learning, and strengthens personal responsibility rather than as a shortcut for completing academic tasks. Students need to develop the capacity to evaluate AI-generated information critically, verify its accuracy through reliable sources, and interpret knowledge in light of biblical principles. Such practices cultivate not only digital competence but also spiritual discernment, ethical reasoning, and responsible decision-making. This study demonstrates that the successful integration of Artificial Intelligence in Christian Religious Education depends fundamentally on the dynamic interaction among technology, pedagogy, and Christian values. AI possesses considerable potential to enhance students' critical thinking and learning autonomy; however, these benefits are realized only when technology is implemented within a pedagogically intentional, ethically responsible, and Christ-centered instructional framework. The teacher therefore remains the indispensable architect of meaningful learning, ensuring that technological innovation supports rather than compromises the holistic mission of Christian education. Ultimately, AI should be regarded not as a substitute for teachers or biblical instruction but as an educational innovation that enriches learning while fostering intellectually competent, spiritually mature, morally responsible, and lifelong learners capable of engaging faithfully with the opportunities and challenges of the digital age.

Research Focus	Key Findings	Implications
AI Integration in Christian Religious Education	Artificial Intelligence (AI) was integrated through educational chatbots, AI-powered search applications, and interactive digital learning media to support students in understanding biblical content.	AI enriched learning resources and enhanced students' engagement throughout the instructional process.
Teachers' Role in AI Integration	Teachers served as facilitators, instructional guides, and spiritual mentors, ensuring that AI was used in ways consistent with Christian values and educational objectives.	AI did not replace teachers but rather supported more effective, meaningful, and learner-centered instruction.
Students' Critical Thinking	Students demonstrated improved abilities to analyze information, formulate questions, compare multiple sources, and critically evaluate AI-generated responses.	AI-supported learning contributed to the development of higher-order thinking skills (HOTS), particularly analytical reasoning, evaluation, and reflective judgment.
Students' Learning Autonomy	Students became more proactive in seeking information, managing their own learning processes, and completing learning tasks independently with AI support.	AI fostered the development of self-regulated learning by strengthening students' initiative, responsibility, and independent learning skills.
Challenges of AI Implementation	Some students exhibited a tendency to rely excessively on AI for obtaining immediate answers without engaging in independent reasoning.	Continuous teacher guidance is essential to ensure that AI is used critically, ethically, and responsibly rather than fostering technological dependence.
Christian Educational Perspective	AI was regarded as a supportive instructional tool, while the Bible remained the ultimate source of truth and teachers continued to serve as spiritual and pedagogical guides.	AI integration should promote holistic student development by strengthening Christian character, spiritual formation, and biblical values alongside twenty-first-century competencies.

CONCLUSION

Based on the findings of this study on the integration of Artificial Intelligence (AI) in Christian Religious Education (CRE) at SD Swasta Generasi Bintang Medan, it can be concluded that the implementation of AI has made a significant contribution to the teaching and learning process, particularly in enhancing upper elementary students' critical thinking skills and learning autonomy. First, the integration of AI into Christian

Religious Education has developed in a positive, systematic, and pedagogically meaningful manner. The use of AI-powered technologies, including educational chatbots, intelligent search applications, and interactive digital learning media, has enabled students to understand biblical content more effectively, efficiently, and contextually. Throughout this process, teachers have continued to play a central role as facilitators and instructional leaders, ensuring that the use of AI remains aligned with the objectives of Christian education, which emphasize faith, moral values, and Christ-centered character formation. Consequently, AI functions as a complementary instructional resource that enriches the educational experience rather than replacing the indispensable role of teachers. Second, the findings demonstrate that AI integration contributes substantially to the development of students' critical thinking skills. Students exhibited improved abilities to formulate meaningful questions, analyze information critically, evaluate AI-generated responses, and connect instructional concepts with authentic real-life situations. AI-supported learning encouraged students to move beyond passive information consumption by engaging in verification, comparison, and reflective evaluation of the information they obtained. Thus, AI serves as a catalyst for higher-order thinking when implemented within a well-designed pedagogical framework and supported by appropriate teacher guidance. Third, AI integration also exerted a positive influence on students' learning autonomy. Students demonstrated greater initiative in managing their own learning, organizing study schedules, and independently searching for and processing information. AI facilitated immediate access to educational resources, enabling students to complete learning tasks and comprehend instructional materials with greater flexibility. Nevertheless, the study also identified a tendency among some students to become overly dependent on AI by relying on instant answers without first attempting to understand learning materials independently. This finding suggests that learning autonomy does not emerge automatically through technological use but requires continuous teacher guidance, pedagogical scaffolding, and systematic supervision to ensure that technology promotes rather than diminishes students' independent learning capacities. Fourth, within the context of Christian Religious Education, AI integration should remain firmly grounded in the broader mission of nurturing students' Christian character and spiritual formation. AI cannot replace the Bible as the ultimate source of truth, nor can it substitute for teachers in their role as spiritual mentors and faith educators. Accordingly, AI should always be employed to reinforce Christian values such as responsibility, honesty, discipline, wisdom, and reflective decision-making throughout the learning process.

This study confirms that the integration of Artificial Intelligence into Christian Religious Education holds considerable potential to enhance instructional quality, particularly by fostering students' critical thinking and learning autonomy. However, the effectiveness of AI integration depends fundamentally on teachers' pedagogical competence in designing meaningful learning experiences that balance technological innovation with faith formation, ethical responsibility, and holistic student development. In conclusion, Artificial Intelligence should be viewed as an educational innovation that supports the transformation of twenty-first-century learning rather than as a replacement for human educators. When implemented thoughtfully, ethically, and within a learner-centered pedagogical framework grounded in Christian values, AI can become a powerful instrument for cultivating intellectually competent, spiritually mature, morally

responsible, and self-directed learners who are well prepared to engage faithfully and critically with the opportunities and challenges of the digital age.

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