



INTEGRATING PEDAGOGICAL DEEP LEARNING IN ISLAMIC EDUCATION: A SYSTEMATIC LITERATURE REVIEW

Syalsa Nur Saputri ^{1*}, Abd. Madjid ²

^{1,2} Universitas Muhammadiyah Yogyakarta, Indonesia

Abstract

This study analyzes the effectiveness of pedagogical deep learning, defined as a learning approach emphasizing meaningful understanding, reflective thinking, and active student engagement, in improving students' academic achievement in Islamic Religious Education (PAI) through a Systematic Literature Review (SLR) using the PRISMA framework, where 1,512 articles from Scopus, Google Scholar, Emerald, and Springer were initially identified and filtered into 30 eligible studies, with findings indicating that this approach enhances conceptual understanding, critical thinking, learning motivation, and student engagement through student-centered and reflective learning processes, while the integration of digital technology supports interactive and flexible learning environments rather than functioning as purely technical artificial intelligence, although its effectiveness remains context-dependent and influenced by factors such as teacher readiness, infrastructure availability, and student characteristics, leading to the conclusion that pedagogical deep learning offers a promising yet conditional framework for improving the quality of PAI learning when supported by adequate institutional resources, teacher professional development, and equitable access to educational facilities.

Keywords: Deep Learning Pedagogy Islamic Religious Education, Academic Achievement, Systematic Literature Review

* Correspondence Address:	syalsanursaputri@gmail.com			
Article History	Received	Revised	Accepted	Published
	2026-01-06	2026-04-02	2026-04-24	2026-06-15

INTRODUCTION

مقدمة

In the 21st century, there is such a rapid development of technology in education that students who are unable to adapt will be left behind, resulting in a decrease in students' academic achievement. This is due to the fact that conventional learning systems are often no longer able to meet the needs of students living in a fast-paced, adaptive, and data-based digital era. And conventional learning is only centered on knowledge transfer without paying attention to the personalization and deep-thinking skills of students. In the data that Sidik & Intan (2025) found, reading literacy activity in Indonesia in 2024 is reported to be still relatively low, namely 38.1%. So that the Deep learning model is a solution in overcoming these problems. Study Gumiandari et al (2022) emphasized Islamic education emphasizes not only cognitive development but also students' spiritual resilience, where shape character and support meaningful learning, deep learning becomes relevant in PAI.

According to Ariyani et al (2026) Deep learning pedagogy through Problem-Based Learning (PBL) is effective in increasing the academic learning achievement of junior high school students by 15-20% in a short time, as well as fostering critical thinking skills and learning motivation. In

the context of education, Arif et al (2025) emphasized that deep learning is not only interpreted as technology, but also as a pedagogic paradigm that encourages students to think critically and be actively involved. Various literature shows that the application of deep learning is learning that is able to significantly improve students' conceptual understanding, critical thinking skills, and academic achievement. Research by Widiyawati et al (2020) confirms that the ulû al-'ilm model, which is in line with the principles of deep learning, is effective in improving six domains of student learning outcomes in cognitive, affective, psychomotor, ethical, social, and spiritual aspects in Islamic Religious Education (PAI) subjects. The studies Pamoengkas & Utami (2025) found that deep learning learning is able to predict student success in learning outcomes with a high level of accuracy. Research by Nurdin et al (2024) confirms that digital innovations such as interactive PowerPoint are able to enrich the collaborative student learning experience in improving students' academic achievement. These facts affirm the great potential of deep learning in strengthening the quality of Islamic education, both from intellectual and spiritual aspects, so that it is concluded that it can provide the results of students' academic achievements in Islamic religious education in the midst of rapid technological developments.

Based on these findings, the author sees that the deep learning learning model in Islamic religious education learning increases students' capacity to achieve achievement in school. This model allows for a high level of accuracy to be formed because it uses high technology as a tool. Therefore, the deep learning model can be seen as one of the models that provides effective student processes in the learning process at school.

Based on the background The purpose of this research focuses on an in-depth analysis related to the deep learning model on improving students' academic achievement in PAI learning, as well as analyzing the benefits and results of the deep learning learning process. The results of this research can have a theoretical and practical impact, both for the development of innovative PAI learning strategies based on Islamic values, as well as for the development of educational policies based on the formation of students' holistic characters. The integration of deep learning models in the PAI curriculum is not only directed to improve academic achievement, but also to strengthen Islamic spiritual and moral values in the digital era.

and focus of this research, the main problem discussed is how deep learning pedagogy functions as an effective approach in improving students' academic achievement in Islamic Religious Education (PAI), especially by examining the theoretical mechanisms underlying its effectiveness from a constructivist perspective that emphasizes meaningful understanding, reflective thinking, and active student engagement, while analyzing the strengths of the weaknesses, opportunities, and threats (SWOT) of its implementation in relation to Islamic education theory and education policy in Indonesia; Furthermore, this study investigates how the integration of digital technologies supports pedagogical deep learning through the framework of the Technology Acceptance Model (TAM) and the Integrated Technology Acceptance and Use Theory (UTAUT), as well as identifies key challenges such as infrastructure limitations, teacher readiness, and student characteristics, and explores how these challenges can be addressed through pedagogical and systemic approaches to strengthen the Implementation of Deep Learning in PAI Learning in the Digital Era.

METHOD

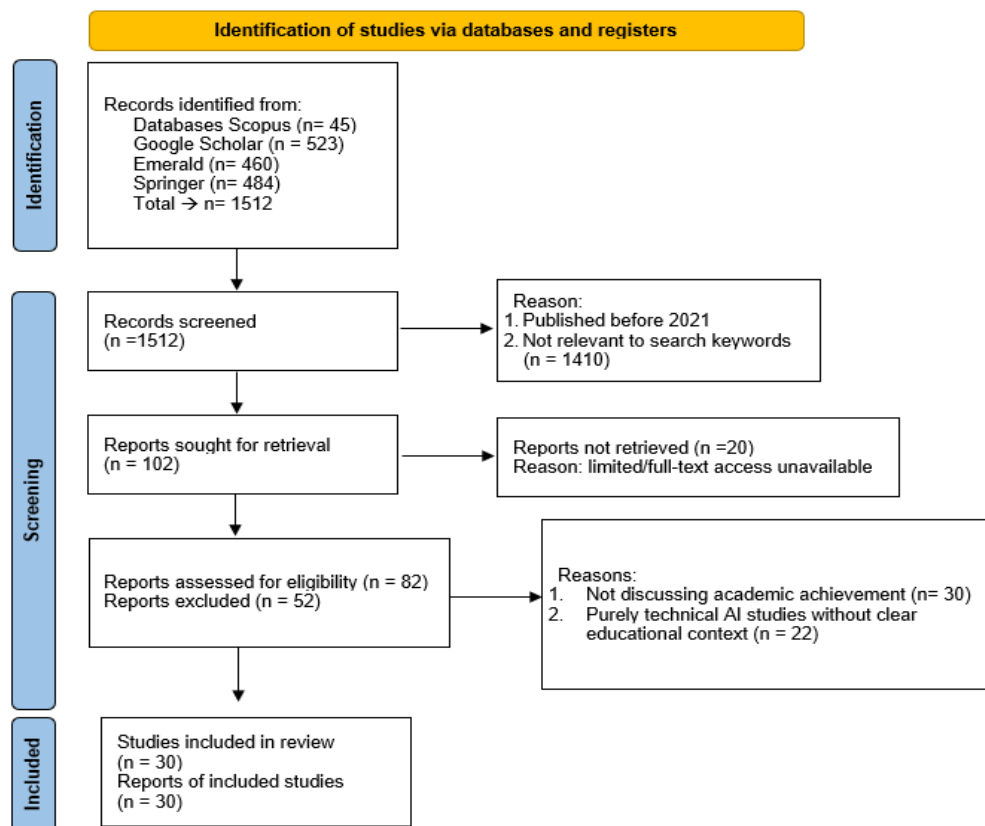
منهج

The study uses a Systematic Literature Review (SLR) approach following the PRISMA (Preferred Reporting Item for Systematic Review and Meta-Analysis) guidelines to ensure the transparency, rigor, and replicability of the research process. Data was collected from four major

academic databases, namely Scopus, Google Scholar, Emerald, and Springer. Literature searches are performed using a combination of Boolean operators with the following search strings: ("deep learning approach" OR "deep learning pedagogy" OR "deep approach to learning") AND ("academic achievement" OR "learning outcomes") AND ("Islamic education" OR "PAI" OR "religious education"). To complement this, additional keywords related to educational technology are also used, such as ("artificial intelligence in education" OR "learning analysis") AND ("student performance" OR "academic achievement").

A total of 1,512 articles were initially identified through a database search process. During the screening phase, 1,410 articles were excluded based on publication year limitations (before 2021) and lack of relevance to pre-determined keywords. Furthermore, 102 articles were deemed eligible for taking, of which 20 articles were not accessible in full text due to limited availability. The remaining 82 articles were then assessed for eligibility through a comprehensive review of titles, abstracts, and full text to ensure alignment with the research focus.

At the eligibility stage, 52 articles were excluded because they did not explicitly address academic achievement or purely technical studies of artificial intelligence without a clear educational context. The inclusion of pedagogical and AI-based studies in this review was intentional. Pedagogical deep learning is positioned as a learning approach that emphasizes meaningful understanding and critical thinking, while AI-based deep learning is considered a supporting tool in educational analysis, such as predicting student performance and enabling personalized learning. Finally, 30 articles that met all inclusion criteria were selected and analyzed in depth. This classification also helps to avoid conceptual ambiguities between pedagogical deep learning and artificial intelligence-based deep learning in research.



RESULT | نتائج

From the results of the analysis search conducted by the researcher, there are several summaries of results concluded from the 30 final articles that have been analyzed previously. The results of the author's analysis include the following:

Table 1. Search Results for Articles in Scopus, Google Scholar, Emerald and Springer

Author	Paper title	Summary	Main Finding	Metodologi
Maelasari & Lusiana (2025)	The Effectiveness of Deep Learning in Learning: A Systematic Literature Review (SLR) Review	This study aims to find out the effectiveness of the deep learning approach on student learning outcomes through the Systematic Literature Review (SLR) method to identify the main impacts and challenges in the world of education.	The research findings show that deep learning approaches significantly improve students' concept understanding, long-term retention, and critical thinking and problem-solving skills.	This study uses the SLR approach, which collects and analyzes various studies related to deep learning in education.
Bambang et al (2025)	Deep Learning Approach in Improving Students' Problem-Solving Skills and Learning Motivation in Functional Composition Materials	The purpose of this study is to analyze the presence or absence of an influence Deep Learning approach in improving problem-solving skills and learning motivation of students in class XI MAS DDI BARUGA on functional composition materials.	These findings suggest that while the approach using Deep Learning methods has the potential to have an impact, its implementation still requires further adjustments and optimization to achieve optimal results.	The type of experimental quantitative research with a pre-experiment design and a one-shot case study design is used in this study.
Puspa (2025)	Analysis of deep learning learning approach: Bibliometric analysis	This research was conducted to examine in depth the trends and directions of the development of deep learning approaches through a literature analysis of 15 scientific articles obtained from Google Scholar.	This study provides an overview of the direction of deep learning research development and the potential for innovation in learning in higher education settings.	The articles analyzed are relevant publications published between 2020 and 2025. The bibliometric data of these articles is managed and analyzed using Mendeley software to facilitate the citation process and reference management.
Arif et al (2025)	Strategies to Foster Students' Interest in Learning Through a Deep Learning Approach	This research aims to explore various strategies that can be used to foster students' interest in learning through a deep learning approach, as well as identify the factors that affect the successful implementation of these strategies.	The deep learning approach is an approach that emphasizes a deep understanding of concepts and their relationships that can be used to increase students' interest in learning.	The research method used is the library research method by referring to Sinta-indexed journals and relevant books. The sources were selected based on several criteria, namely relevance to the research topic on strategies, learning interests, and deep learning approaches, as well as the actuality of information.
Supyana (2025)	The Role of Deep Learning in Improving Language and Critical Thinking Competencies of Elementary School Students	This study shows the role of deep learning in improving the achievement of language skills (listening, speaking, reading, and writing) and critical thinking among elementary school students.	The study found that applying deep learning can improve language learning achievement through active, collaborative, and reflective student-centered strategies.	This study uses the SLR method with a focus on the analysis of previous research related to deep learning in improving achievement. Data collection involves searching databases such as Google Scholar, Scopus, and DOAJ for relevant

				articles published between 2020 and 2025.
Lestari (2025)	The Role of Student Discipline in Improving Academic Achievement at Sdn Jetisharjo: A Perspective of Parents and Teachers in the Context of Deep Learning	This study aims to identify and analyze the definition of discipline according to parents and teachers, its implementation at home and school, its impact on the learning process, and the relationship between discipline and students' academic achievement.	The findings of the study show that discipline is interpreted by parents as a child's habit of carrying out learning routines and tasks without coercion, while teachers emphasize more on punctuality, obedience to rules in class, and orderly completion of assignments.	The research method used was interviews and observations with parents and teachers in the elementary school environment.
Qohar & Widyaningrum (2025)	The Influence of Deep Learning Models, Learning Motivation and Emotional Intelligence on Students' Academic Achievement in Islamic Religious Education at SDN 1 Badegan and SDN 3 Badegan in Ponorogo Regency	This study investigated the impact of deep learning models, learning motivation, and emotional intelligence on students' academic achievement in Islamic Religious Education (PAI) in two elementary schools in Ponorogo Regency.	The key findings are that the deep learning model, learning motivation, and emotional intelligence each have a significant positive impact on students' academic achievement in Islamic Religious Education, either partially or concurrently.	This study uses a quantitative approach using an explanatory correlational method. Data collection involves the distribution of a closed questionnaire on a Likert scale.
Varela et al (2024)	Understanding the role of study strategies and learning disabilities on student academic performance: A proposal using artificial intelligence	This article proposes a conceptual framework that uses AI (Deep Learning) to predict academic achievement by analyzing complex factors such as learning strategies and learning disabilities. The goal is to create a personalized early warning and intervention system.	The main finding is the proposed model. This model hypothesizes that deep learning can accurately identify at-risk students much better than traditional statistical methods, due to its ability to process large amounts of non-linear data.	Proposal articles (conceptual studies) that propose the use of Artificial Intelligence (AI), specifically Deep Learning (DL), to predict academic achievement. The proposed method is to collect data from online learning platforms and questionnaires, then use DL models to analyze complex patterns.
Pujiharjono (2024)	Implementation of Deep Learning Approach Through Google Sites-Assisted Problem-Based Learning to Improve Student Learning Achievement	This study aims to find out the extent to which the Deep Learning approach through Problem Based Learning is able to encourage deep understanding, critical thinking, and better problemsolving skills to improve the achievement of student learning outcomes in grade XII of SMK N 1 Nanggulan.	The findings of the study show that the Deep Learning model of Problem Based Learning is able to improve students' conceptual understanding, critical thinking skills, and creativity.	Data collection techniques use observation, documentation, test instruments. The instruments used are observation, guidelines, interviews, and learning outcome tests.
Feriyanto & Anjariyah (2024)	Deep Learning Approach Through Meaningful, Mindful, and Joyful Learning: A Library Research	This study explores how integrating Meaningful, Conscious, and Fun Learning can improve the approach to Deep Learning in education. The goal is to increase student engagement and understanding. Meaningful Learning connects new	The core finding is that by integrating Meaningful, Conscious, and Fun Learning, a holistic framework is created that significantly improves the quality of education in the Deep Learning approach.	The researcher uses a library research method. It involves collecting, reading, recording, and analyzing data from a variety of relevant literature sources, including journal articles, books, and previous studies, specifically those

		information with existing knowledge, Mindful Learning focuses on mindfulness and reflection, and Joyful Learning aims to create a positive and motivating learning environment.		published between 2000 and 2024.
Ramadhan (2025)	The Influence of Meaningful, Joyful, and Mindful Learning as Pillars of Deep Learning on Learning Outcomes: Literature Review	This study aims to examine the role of meaningful, mindful, and joyful learning approaches as pillars of deep learning in improving student learning outcomes.	Studies show that meaningful learning helps improve students' critical thinking skills, reading comprehension, activeness, and writing skills by associating new knowledge with existing experiences.	The method used qualitatively through a literature study, this study analyzes various articles and books that discuss each approach and its integration.
Mundofi (2025)	Integration of Deep Learning Approach in Transforming Islamic Religious Education Learning in Schools: A Pedagogical and Technological Study	This research aims to examine the integration of a deep learning approach as a transformative force in Islamic Religious Education (PAI) learning in schools, from both pedagogical and technological perspectives.	The findings suggest that the deep learning approach enables a paradigm shift in PAI from a conventional knowledge transfer model to one that fosters character formation and spiritual intelligence.	The methodological analysis in this study employs a qualitative research design with a library research approach. Source selection was purposive, based on criteria of recency (within the last five to ten years), relevance to the topic, and the credibility of authors and publishers.
Giovanny & Istanto (2026)	Implementation of Deep Learning in Islamic Religious Education Learning at SMP Muhammadiyah PK Kottabarat	This study aims to examine the application of the Deep Learning approach in Islamic Religious Education (PAI) learning at SMP Muhammadiyah PK Kottabarat.	The research findings reveal that the application of this approach is able to increase student engagement, deepen spiritual understanding, and create meaningful and pleasant learning experiences. The implementation of Deep Learning is supported by internal factors in the form of the openness and adaptive attitude of teachers, as well as external factors in the form of institutional support and infrastructure.	The research uses a descriptive qualitative method with a case study design. Data collection techniques were carried out through interviews, observations, and documentation of two PAI teachers and students.
Tursilaningsih et al (2026)	Digital Learning Transformation, Deep Learning Pedagogy, and Teacher Professionalism: Effects on Primary School Students' Motivation	This study is motivated by the challenges of educational transformation in the digital era, where sixth-grade students' learning motivation often declines due to conventional teaching methods and academic pressure prior to graduation.	This study concludes that digitalization of learning, the application of deep learning principles, and teachers' professional competence significantly influence students' learning motivation, both individually and collectively, among Grade 6 students in Gugus IV Dongko District, Trenggalek Regency.	This study employed a quantitative research design, which aims to examine causal relationships between independent and dependent variables through statistical testing. Quantitative research is characterized by empirical, objective, measurable, and systematic procedures using numerical data to test hypotheses and validate theoretical assumptions.
Utami (2023)	Implementasi Pembelajaran Berbasis ADLX	This study aims to determine the implementation of ADLX	From this study, it can be concluded that ADLX-based learning with an INTEGRATED	The method used in this study is qualitative descriptive. Data collection

	Dengan Pendekatan Terpadu Untuk Meningkatkan Prestasi Belajar PAI Siswa	<i>(Active Deep Learning Experience)-based learning</i> with the INTEGRATED approach at SD IT Permata Mulia and applied to PAI subjects for grade VI students.	approach can improve student achievement. Not only academic achievements, but students' manners and behavior also get better.	is carried out through observation, interviews and documents so that it goes directly into the field.
Munadirin et al (2023)	Transformation of PAI Learning Through Approaches to Active Deep Learning Experience (ADLX) In The Digital Era	Islamic Religious Education (PAI) learning often encounters negative perceptions among students. This is because the learning model used is still conventional, resulting in a rigid and monotonous perception	The results of the study indicate that the ADLX model is able to provide a significant impact in various aspects, including critical reasoning, character development, learning motivation, student involvement, academic achievement, and technology utilization.	The author uses a literature study method (library research) with a descriptive qualitative approach. The literature study method was chosen because it allows the author to analyze, evaluate, and synthesize related information clearly and concisely
Niam (2025)	Pengembangan Model Pembelajaran Pendidikan Agama Islam Berbasis Deep Learning Melalui Pendekatan Multidisipliner	This study aims to develop a deep learning-based Islamic Religious Education (IRE) learning model through a multidisciplinary approach in order to improve students' conceptual understanding, value reflection, and critical thinking skills.	The research results confirm that the development of a PAI learning model based on deep learning with a multidisciplinary approach increases students' conceptual understanding, emotional involvement, and internalization of spiritual values.	The research method used was qualitative with a research and development design, involving four stages: needs analysis, conceptual model design, cross-disciplinary expert validation (religious education, educational psychology, and learning technology), and limited implementation testing in three
Haliha et al (2025)	Persepsi Guru PAI Terhadap Deep Learning: Analisis Hermesneutika dalam Konteks Pendidikan Islam	This research aims to deeply describe and analyze Islamic Religious Education (PAI) teachers' perceptions of the concept of deep learning in PAI teaching practices.	The research results show that Islamic Education teachers' perceptions of the concept of deep learning vary greatly, but all of them associate deep learning with achieving essential religious education goals.	Using a qualitative-hermeneutic phenomenological approach, this study attempts to interpret the meaning of deep learning based on teachers' reflective experiences, linking it to the philosophy of integrative Islamic education.
Yuspitasari (2025)	Analisis Transformasi Pembelajaran Agama Islam Dari Surface Learning Ke Deep Learning (Studi Kasus Kelas X SMA Insan Rabbany)	This research analyzes the transformation of Islamic Religious Education (PAI) from surface learning to deep learning at SMA Insan Rabbany.	The implementation of deep learning on the pillars of mindful, meaningful, and joyful learning through the use of reflective journals and emotional dialogue has proven effective in increasing students' intrinsic motivation and emotional involvement in religious teachings.	The research method used is a qualitative approach with a case study design to explore the phenomenon of learning transformation in depth in class X of SMA Insan Rabbany, South Tangerang.
Wibowo (2025)	Implementation of Deep Learning in Islamic Education Learning to Improve The Quality of Learning	The rapid advancement of digital technology and the growing complexity of modern educational challenges have created an urgent need to transform the learning paradigm in Islamic education.	The findings reveal that Deep Learning encourages students to engage in higher-order thinking, reflection, and contextual understanding of Islamic values.	The research employed a qualitative descriptive method, collecting data through observation, interviews, and documentation.
Usman et al (2025)	Transformasi Pembelajaran	The transformation of Pendidikan Agama Islam	This study successfully identified that the	This research uses a qualitative approach that

	Pendidikan Agama Islam di Era Merdeka Belajar: Pendekatan Deep Learning	(PAI) learning is a necessity in the era ofMerdeka Belajar. The deep learning approach with its principles, mindful, meaningful, and joyful is seen as a strategy that can increase student understanding and participation.	implementation of the deep learning approach in Islamic Religious Education (PAI) learning at Muhammadiyah Margasari Middle School has brought significant changes in the learning process.	describes and analyzes phenomena and is inductive in nature and produces descriptive data in the form of written or oral data from people and behavior that can be observed as research subjects.
Latifah et al (2026)	Transformasi Pembelajaran Pendidikan Agama Islam Berbasis Deep Learning di Sma Itassalam Martapura	This study aims to analyze the transformation of deep learning based on Islamic Religious Education (PAI) that integrates spiritual values with 21st-century skills.	Deep learning-based Islamic Religious Education (PAI) learning has been proven to be able to transform the learning process from a conventional teacher-centered approach to student-centered learning.	This research used a descriptive qualitative method with a case study approach, conducted at SMA IT Assalam Martapura. The research subjects consisted of three Islamic Religious Education (PAI) teachers, fifteen 11th-grade students, and one principal.
Dewi et al (2025)	Deep Learning Dalam Pembelajaran Mi Tinjauan Literatur Dalam Makanan Learning Mindful Learning Dan Joyful Learning	The low level of active engagement and meaningful learning among Madrasah Ibtidaiyah (MI) students highlights the need for a deeper and more contextualized learning approach	It is concluded that deep learning contributes positively to creating active, contextual, and meaningful learning in MI settings. The implication is that MI teachers need to design learning activities that promote deep understanding, self-awareness, and joyful, collaborative learning environment	This research is a type of literature analysis conducted by analyzing the latest sources on the topic. Sources were obtained from Google Scholar journals, Publish or Perish, and others.
Fathurohim et al (2025)	The Philosophical Value and Urgency of Deep Learning in Islamic Education: A Study on Teachers' Perspectives	The urgency of applying deep learning approaches in Islamic Religious Education is increasingly relevant in the digital age, which demands meaningful and character-building learning, not just memorization. This study aims to analyze the opportunities and challenges of implementing deep learning approaches in the context of IRE in Indonesia.	Deeper learning is not merely a pedagogical trend; it has become an urgency for revitalizing Islamic Religious Education (PAI) in Indonesia. This approach offers a way out of the trap of surface-level, rote-memorization-oriented learning, moving towards an educational process capable of shaping insan kamil—a complete human being who is intellectually, emotionally, and spiritually whole.	Using qualitative methods with a case study approach and thematic analysis of the perspectives of IRE teachers, this study explores the perceptions, practices, and obstacles encountered in the implementation process.
Nafi'ah & Faruq (2025)	Conceptualizing Deep Learning Approach in Primary Education: Integrating Mindful, Meaningful, and Joyful	The era of instant information from artificial intelligence (AI) and social media has also contributed to the decline in students' cognitive quality. Therefore, mindful, meaningful, and joyful deep learning has been implemented as a learning approach in Indonesia.	This review confirms that integrating mindful, meaningful, and joyful learning within the deep learning framework offers a coherent pedagogical strategy to enhance cognitive, emotional, and reflective engagement in primary education.	This study employs a library research approach and is analyzed through a qualitative synthesis method guided by the PRISMA framework.
Meirina et al (2025)	Implementasi Pendekatan Pembelajaran	This study aims to examine the application of a deep learning approach in	The findings show that it is able to encourage students to understand religious	This study uses a qualitative descriptive approach which aims to describe in depth

	Mendalam (Deep Learning) dalam Pembelajaran PAI di Sekolah Dasar	improving students' learning motivation, critical thinking skills, and religious character in Islamic Religious Education (PAI) subjects in elementary schools.	concepts in a reflective, contextual and meaningful way, while strengthening religious character values such as discipline, responsibility and politeness.	the process of implementing the deep learning approach in Islamic Religious Education (PAI) learning at the elementary school level.
Siregar et al (2026)	Implementation Of a Deep Learning-Based Approach In Islamic Religious Education at Madrasah Tsanawiyah Muallimin in Medan	This study examines the implementation of the Deep Learning approach in Islamic Religious Education at Muallimin Islamic Middle School (MTs) Medan within the Merdeka Curriculum framework.	The deep learning method at Madrasah Tsanawiyah Muallimin Medan has successfully integrated three core pillars of deep learning, namely attentive learning, meaningful learning, and enjoyable learning.	This study employs a qualitative method with a descriptive research design, which examines data to describe social and concrete realities regarding the issues occurring at Muallimin Islamic Junior High School (MTs) Medan
Rochyati (2025)	Deep Learning-Based Islamic Education Transformation: Innovation in Islamic Learning in the Digital Era	The development of information technology and digitalization has transformed almost all aspects of human life, including the world of education. The era of the Industrial Revolution 4.0 to Society 5.0 has given rise to new demands on the education system, including in the field of Islamic Religious Education (PAI)	With a deep learning model that incorporates mindful, meaningful, and joyful learning, Islamic Religious Education (PAI) can be a lesson that is not boring but transformative, developing students' intellectual and spiritual well-being.	This study uses a library research method that aims to analyze and understand the transformation of deep learning-based Islamic education in the digital era based on relevant literature sources
Mazrur et al (2025)	Integrating Technology Acceptance and Pedagogical Deep Learning in Islamic Education: A TAM-Based Study	This study investigates the integration of technology acceptance and pedagogical deep learning in Islamic Religious Education (IRE), where deep learning is conceptualized as a pedagogical approach that emphasizes meaningful understanding, reflective thinking, and enjoyable engagement, rather than artificial intelligence-based deep learning	Technology acceptance significantly influences the implementation of deep learning pedagogy, with perceived usefulness as the strongest predictor, and meaningful learning as the dominant dimension.	this study uses a quantitative survey design involving 321 teachers and students selected through simple random sampling from a population of 1,287 participants. Data were collected using a validated Likert scale questionnaire using SPSS version 25.
Janati et al (2025)	Deep Learning Approach in Islamic Religious Education Learning to Develop HOTS of Students of SMA Muhammadiyah PK Kottabarat Surakarta	This research is directed to examine in depth the application of the deep learning approach in the learning of Islamic Religious Education (PAI), examine its impact on the development of Higher-Order Thinking Skills (HOTS) of students, and uncover various challenges that arise along with their implementing solutions at SMA Muhammadiyah PK Kottabarat Surakarta	The implementation of a deep learning approach in Islamic Religious Education fosters meaningful, reflective, and contextual learning, shifting the focus from memorization to deep understanding, critical thinking, and internalization of Islamic values, while simultaneously enhancing cognitive development, religious character, spiritual awareness, and student engagement.	Using qualitative phenomenological method; data collected through participatory observation, in-depth interviews, and document analysis; analyzed inductively with triangulation.

Based on the number of 30 studies above, the results of the analysis of the Deep learning approach to student learning outcomes include:

1. Deep Learning in Enhancing Cognitive Skills and Conceptual Understanding

Studies Maelasari & Lusiana (2025) and Pujiharjono (2024) highlight that deep learning significantly enhances students' cognitive abilities, particularly in conceptual understanding, critical thinking, and problem-solving skills. The implementation of deep learning encourages students to move beyond memorization toward analytical and higher-order thinking processes. Research by Bambang et al (2025) and Supyana (2025) shows that deep learning improves long-term retention and comprehension of subject matter. The application of deep learning strategies contributes to the development of problem-solving skills and academic competencies across disciplines. Studies by Niam (2025) and Janati et al (2025) confirm that use of multidisciplinary approaches also strengthens conceptual understanding and reflective thinking. Furthermore, deep learning supports language development and critical reasoning skills through active and student-centered learning processes. These findings confirm that deep learning plays a central role in developing students' cognitive capacities and higher-order thinking skills. (Dewi et al 2025)

2. Deep Learning in Motivation, Engagement, and Affective Development

Deep learning is closely associated with students' motivation, engagement, and emotional involvement in learning. Studies Lestari (2025) and Qohar & Widyaningrum (2025) emphasize that internal factors such as discipline, motivation, and emotional intelligence significantly influence learning outcomes. According Arif et al (2025) and Giovanni & Istanto (2026) the implementation of deep learning creates a more engaging and student-centered learning environment, increasing students' active participation and interest in learning. Quoted Tursilaningsih et al (2026) and Meirina et al (2025) said digital transformation and teacher professionalism also contribute to improving student motivation in deep learning environments. And Yuspitasi (2025) and Siregar et al (2026) said the integration of deep learning principles fosters emotional engagement and reflective learning experiences, particularly in Islamic education contexts. These findings demonstrate that deep learning supports not only cognitive development but also affective and motivational aspects of learning.

3. Deep Learning as Meaningful, Mindful, and Reflective Learning

Studies Feriyanto & Anjariyah (2024) and Ramadhan (2025) conceptualize deep learning as an approach that integrates meaningful, mindful, and joyful learning to create holistic learning experiences. This approach emphasizes the connection between new knowledge and prior understanding, reflection, and positive learning environments. Quoted Nafi'ah & Faruq (2025) emphasized that the integration of these elements strengthens students' engagement and comprehension while promoting reflective thinking. and Usman et al (2025) and Rochyati (2025) Deep learning also supports the transformation of learning into a more meaningful and value-oriented process, particularly in Islamic education. Furthermore, this approach enhances students' emotional awareness, participation, and learning outcomes. These findings indicate that deep learning pedagogy is built upon meaningful, mindful, and reflective learning experiences that foster holistic student development. And teachers are also able to instill the values of reflection in students. (Haliha et al., 2025)

4. Transformation of Learning and Improvement of Educational Outcomes

The findings also reveal that deep learning contributes to transforming traditional learning into more student-centered, meaningful, and contextual practices. Studies Mundofi

(2025) and Wibowo (2025) Islamic Religious Education, deep learning supports the development of character, spiritual awareness, and value internalization. According to Utami (2023) and Munadirin et al (2023), the implementation of innovative models such as Active Deep Learning Experience (ADLX) has been shown to improve both academic achievement and student behavior. Quoted by Puspa (2025) and Mazrur et al (2025) Deep learning also facilitates educational transformation in the digital era, making learning more adaptive and relevant to contemporary challenges. Additionally, Varela et al (2024) said the integration of technology and pedagogical approaches enhances the effectiveness of learning processes. And studies Latifah et al (2026) and Fathurohim et al (2025) confirm that deep learning improves students' academic performance and overall learning quality across educational settings.

DISCUSSION

مناقشة

1. Theoretical Mechanisms of the Effectiveness of Deep Learning in Islamic Education

The effectiveness of deep learning in improving students' academic achievement can be explained theoretically through constructivist learning theory, which emphasizes that knowledge is built by learners through meaningful interactions with their environment. The deep learning model aligns with this theory because it encourages students to relate prior knowledge to new information, engage in reflection, and apply concepts in real-life contexts. According to Ratnawati & Suardi (2025), cognitive development occurs when learners actively manage their understanding through the process of assimilation and accommodation. And Madjid (2025) said student-centered learning experiences. When combined with e-learning, this approach facilitates deeper understanding and improves students' learning outcomes

Quoted by Slam & Nugroho (2025) that deep learning improves higher-level thinking skills (HOTS), including analysis, evaluation, and creation, which are important competencies in 21st century education. And Dewi et al (2025) emphasized that deep learning emphasizes students' cognition to organize their own learning process and develop reflective thinking. In Islamic Religious Education this mechanism is very relevant because learning is not only cognitive but also involves the internalization of values and spiritual reflection. So it becomes effective because it integrates cognitive, affective, and spiritual dimensions, creating a holistic learning experience.

2. Linking SWOT Factors with Educational Theory and Islamic Education Policy

The strengths, weaknesses, opportunities, and threats identified in the implementation of deep learning can be better understood through theoretical and policy perspectives. From a constructivist point of view, strengths such as meaningful learning, student engagement, and critical thinking development reflect a successful knowledge process. According to Nur et al (2025), teachers have a central role as facilitators, innovators, motivators, and mediators in learning, even though they are faced with limited facilities, administrative burdens, and low family support. And Maulidya et al (2025) emphasized that success supported by advanced technology and supporting facilities is very important to support independent learning and research.

However, Syaekhan et al (2025) emphasized that weaknesses such as uneven student motivation and poor teacher competence show gaps in teaching and data from Falasifah et al (2022) show that only about 37% of schools in Indonesia have adequate facilities, while the rest still have inadequate or inadequate facilities, while facilities greatly affect the quality of the process Student Learning. And studies show that while these policies support the adoption of

deep learning approaches, their implementation is often limited by gaps in infrastructure and teacher readiness.

Opportunities such as technology integration are in line with the national strategy for digital transformation in education, so Oktaviani (2024) emphasized that especially PAI teachers, it is necessary to provide digital literacy training in order to be able to optimize the use of technology wisely and in accordance with Islamic values. Meanwhile, Arif (2025) was quoted that threats such as limited infrastructure reflect the inequality of access to education that continues to occur in various regions in Indonesia). Therefore, the effectiveness of deep learning is determined not only by pedagogical design but also by systemic factors, including policy support, institutional readiness, and resource availability.

In this section, SWOT analysis is used to identify strengths, weaknesses, opportunities, and threats that affect the success of deep learning implementation in improving students' academic achievement is shown in the form of a diagram as follows:

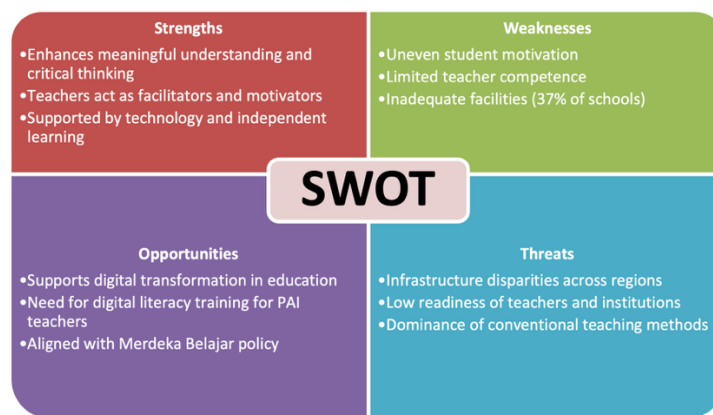


Figure 1: SWOT Analysis

3. Bridging Pedagogy and Technology through TAM and UTAUT

According to Mazrur et al (2025) the integration of digital technology in deep learning can be explained through the Technology Acceptance Model (TAM) and the Acceptance Theory and Supriyanto et al (2025) research on the use of Unified Technology (UTAUT), which describes how users receive and utilize technology in the context of education.

Fitri & Hasibuan's (2024) shows that the success of technology integration in education depends on teachers' digital competence, institutional support, and the perception of the benefits of technology in improving learning outcomes. In the context of deep learning pedagogy, technology serves as a cognitive tool that supports inquiry-based learning, collaboration, and personalized learning experiences. Study Shodiq (2023) the use of digital technology has been shown to enhance students' independence, motivation, and social interaction, which are key components in supporting student-centered and meaningful learning, as emphasized in pedagogical deep learning approaches.

1. Addressing Challenges through Pedagogical and Systemic Approaches

Challenges in implementing deep learning, such as infrastructure limitations, teacher readiness, and student reliance on rote learning, require pedagogical and systemic solutions. From a pedagogical perspective, teachers need to adopt reflective and adaptive teaching practices that support student-centered learning and encourage critical thinking. Professional

development programs that focus on deep learning pedagogy and digital literacy are essential to improve teacher competence.

Studies Suryani (2023) that the successful implementation of deep learning requires alignment between curriculum design, teacher training, and technological infrastructure. Studies show that continuous professional development and collaborative learning communities among teachers can significantly improve the quality of teaching. So addressing these challenges requires a holistic approach that combines pedagogical innovation, technological support, and policy alignment.

CONCLUSION

خاتمة

This study concludes that the implementation of pedagogical deep learning in Islamic Religious Education (PAI) contributes positively to improving students' conceptual understanding, critical thinking, learning engagement, and reflective learning processes. The findings from the analysis of 30 selected studies indicate that deep learning is most effective when it is implemented through meaningful, mindful, and student-centered learning strategies that encourage active participation and knowledge construction. In addition, the integration of digital technology can support the effectiveness of deep learning by facilitating interactive and flexible learning environments.

However, the findings also reveal that the effectiveness of deep learning is not absolute and remains highly dependent on contextual factors. Limitations such as unequal infrastructure, varying levels of teacher readiness, and differences in student motivation significantly influence the success of its implementation. These constraints indicate that deep learning cannot be applied uniformly across all educational settings, particularly in regions with limited technological and institutional support.

Therefore, while deep learning shows strong potential as an approach to enhance the quality of PAI learning, its implementation must be carried out gradually, contextually, and supported by adequate infrastructure and teacher professional development. It is recommended that educators adopt deep learning strategies in a structured manner, particularly those that emphasize conceptual understanding and student engagement. Future research should focus on empirical classroom-based studies in PAI settings to examine the effectiveness of deep learning more comprehensively, as well as explore strategies to overcome implementation challenges related to infrastructure, teacher competence, and digital literacy.

BIBLIOGRAPHY

مراجع

- Arif. (2025). Lived Experience Ketidaksetaraan Pendidikan Di Daerah 3T: Sebuah Fenomenologi Kritis Tentang Akses, Identitas, dan Relasi Kuasa. *Jurnal Ilmiah El Makrifah PAI*, 1(2). <https://ojs.stitmakrifatulilmi.ac.id/index.php/pai/article/view/117>
- Arif, M. N., Parawansyah, M. I., Huda, F. H., & Zulfahmi, M. N. (2025). Strategi Menumbuhkan Minat Belajar Siswa Melalui Pendekatan Deep Learning. *Jurnal Muassis Pendidikan Dasar*, 4, 8–16. <https://muassis.journal.unusida.ac.id/index.php/jmpd/article/view/989>
- Ariyani, A. H., Martina, E., Saputra, M., & Rosidin, U. (2026). Evaluasi Program Implementasi Pendekatan Deep Learning di Sekolah Menengah Pertama. *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan*, 4(3), 16988–16993. <https://jerk.in.org/index.php/jerk.in/article/view/4600/3497>
- Bambang, M., Pajria, P., Amelia, R., & Apriliah, G. (2025). Pendekatan Deep Learning Dalam

- Meningkatkan Kemampuan Pemecahan Masalah Dan Motivasi Belajar Siswa Pada Materi Komposisi Fungsi. *Pedagogy Jurnal Pendidikan Matematika*, 10, 1519–1532.
<https://doi.org/https://doi.org/10.30605/pedagogy.v10i4.7116>
- Dewi, A. C., Fitri, S., Satriani, I., & Herdiani, R. (2025). Integrasi Konsep Deep Learning dalam Pengajaran Menulis: Upaya Meningkatkan Kemampuan Berpikir Kritis dan Reflektif Siswa. *Jurnal Ilmiah Multidisiplin Mahasiswa Dan Akademisi*, 1(5).
<https://jurnal.yayasanmeisyarainsanmadani.com/index.php/intelektual/article/view/459>
- Dewi, A. R., Maily, M. E. W., Safitri, F. N. C., Zaitunnah, P. N., Mala, Z. L., & Suttriso, S. (2025). Deep Learning Dalam Pembelajaran Mi Tinjauan Literatur Dalam Meaningful Learning Mindful Learning Dan Joyful Learning. *Jurnal Kepemimpinan Dan Kepengurusan Sekolah*, 10(2). <https://www.ejurnal.stkip-pessel.ac.id/index.php/kp/article/view/580>
- Falasifah, A., Shafa, F., & Munisah, H. (2022). *LIPUTAN KHUSUS: Fasilitas Pendidikan Indonesia yang Tidak “Simetris.”* Masjid Kampus UGM.
<https://masjidkampus.ugm.ac.id/2022/12/30/fasilitas-pendidikan-indonesia-yang-tidak-simetris/#:~:text=Menurut data Kementerian Pendidikan dan Kebudayaan tahun,guru penuh waktu dengan jumlah yang tidak>
- Fathurohim, Fernando, F., Aniroh, Prayoga, G., Habib, M., Supriyanto, & Andianingsih, V. (2025). The Philosophical Value and Urgency of Deep Learning in Islamic Education: A Study on Teachers’ Perspectives. *Jurnal At Tarbiyat Pendidikan Islam*, 8(3).
<https://jurnal.iaianawawi.ac.id/index.php/at-tarbiyat/article/view/131>
- Feriyanto, & Anjariyah, D. (2024). Deep Learning Approach Through Meaningful, Mindful, and Joyful Learning: A Library Research. *Electronic Journal of Education, Social Economics and Technology*, 5(2). <https://www.ejeset.saintispub.com/ejeset/article/view/321/73>
- Fitri, T., & Hasibuan, R. (2024). Transformasi Pembelajaran Bahasa Arab Di Sekolah Dasar Islam Terpadu Alam Talago: Pendekatan Kurikulum Berbasis Teknologi. *JITERA: Journal in Teaching and Education Area*, 1(1).
<https://journal.jitera.ac.id/index.php/jitera/article/view/19>
- Giovanny, G. R., & Istanto. (2026). Implementation of Deep Learning in Islamic Religious Education Learning at SMP Muhammadiyah PK Kottabarat. *Journal of Educational Sciences*.
- Gumiandari, S., Madjid, A., Nafi’a, I., Safii, S., & Hidayat, A. (2022). ISLAMIC RESILIENCE AS SPIRITUAL AND PSYCHOLOGICAL COPING STRATEGIES FOR MUSLIMS DURING COVID-19 PANDEMIC. *Afkar*, 2022, 313–348. <https://doi.org/10.22452/afkar.sp2022no1.10>
- Haliha, H., Puspita, A., Bintang, D., Fauzi, K., & Nuralita, S. (2025). Persepsi Guru PAI Terhadap Deep Learning: Analisis Hermeneutika dalam Konteks Pendidikan Islam. *Advances in Education Journal*, 2(3). <https://journal.al-afif.org/index.php/aej/article/view/496>
- Janati, A. A. A., Ali, M., & Sholihah, M. M. (2025). Deep Learning Approach in PAI Learning to Develop HOTS of Students of SMA Muhammadiyah PK Kottabarat Surakarta. *Proceeding ISETH (International Summit on Science, Technology, and Humanity)*.
<https://proceedings.ums.ac.id/iseth/article/view/6843>
- Latifah, Erawati, D., & Dakir. (2026). Transformasi Pembelajaran Pendidikan Agama Islam Berbasis Deep Learning Di Sma Itassalam Martapura. *Jurnal Ilmu Pendidikan*, 2(1).
<https://ypmsc.org/index.php/jipdik/article/view/89/73>
- Lestari, A. P. (2025). Peran Kedisiplinan Siswa Dalam Meningkatkan Prestasi Akademik Di Sdn Jetisharjo : Perspektif Orang Tua Dan Guru Dalam Konteks Deep Learning. *Jurnal Ilmiah Tut Wuri Handayani*, 14(2), 64–74. <https://doi.org/https://doi.org/10.30738/twh.v14i2.20464>

- Madjid, A. (2025). Penerapan Metode Contextual Teaching Learning (CTL) dan E-Learning dalam Perspektif Islam. *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan, Vol. 3 No. 3 (2025): Jurnal Pengabdian Masyarakat dan Riset Pendidikan Volume 3 Nomor 3 (Januari 202, 186–193*. <https://jerkin.org/index.php/jerkin/article/view/379/264>
- Maelasari, N., & Lusiana. (2025). Efektivitas Deep Learning Dalam Pembelajaran: Sebuah Kajian Systematic Literature Review (SLR). *Jurnal Education and Development Institute Pendidikan Tapanuli Selatan, 13(2)*, 298–305. <https://doi.org/DOI : 10.37081/ed.v13i2.7006>
- Maulidya, D., Setiawati, D. N. A. E., Umamy, N. A., & Syukri, M. (2025). Analisis Literatur Peran Deep Learning dalam Mendorong Pembelajaran Bermakna di Sekolah Dasar. *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan, 4(2)*. <https://jerkin.org/index.php/jerkin/article/view/3330>
- Mazrur, Jennah, R., Norhidayah, S., & Surawan. (2025a). Integrating Technology Acceptance and Pedagogical Deep Learning in Islamic Education: A TAM-Based Study. *Ta'dib, 2(28)*. <https://ejournal.uinmybatusangkar.ac.id/ojs/index.php/takdib/article/view/15981>
- Mazrur, M., Jennah, R., Norhidayah, S., & Surawan, S. (2025b). Integrating Technology Acceptance and Pedagogical Deep Learning in Islamic Education: A TAM-Based Study. *Ta'dib*. <https://ejournal.uinmybatusangkar.ac.id/ojs/index.php/takdib/article/view/15981>
- Meirina, R., Sartini, J., Nurwahidiansyah, D., Meirissa, L. V., Rokhaniah, I., Kartikasari, A., & Abdurrahmansyah, A. (2025). Implementasi Pendekatan Pembelajaran Mendalam (Deep Learning) dalam Pembelajaran PAI di Sekolah Dasar. *Jurnal Basicedu, 9(5)*. <https://jbasic.org/index.php/basicedu/article/view/10764>
- Munadirin, A., Muslim, R., & Fatah, Z. (2023). Transformation of PAI Learning Through Approaches to Active Deep Learning Experience (ADLX) In The Digital Era. *Nadwa: Jurnal Pendidikan Islam, 17(2)*. <https://doi.org/https://doi.org/10.21580/nw.2023.17.2.26745>
- Mundofi, A. A. (2025). Integration of Deep Learning Approach in Transforming Islamic Religious Education Learning in Schools: A Pedagogical and Technological Study. *Journal of Asian Primary Education (JoAPE), 2(1)*, 79–80. <https://doi.org/https://doi.org/10.59966/joape.v2i1.1787>
- Nafi'ah, J., & Faruq, D. J. (2025). Conceptualizing Deep Learning Approach in Primary Education: Integrating Mindful, Meaningful, and Joyful. *Journal of Educational Research and Practice, 3(2)*. <https://cesmid.or.id/index.php/jerp/article/view/384/156>
- Niam, F. (2025). Pengembangan Model Pembelajaran Pendidikan Agama Islam Berbasis Deep Learning Melalui Pendekatan Multidisipliner. *Netizen: Journal Of Society And Bussiness, 12(1)*. <https://languar.net/index.php/NETIZEN/article/view/492/475>
- Nur, S. F., Retta, E. M., Prasasti, T. I., Aprilia, M., Lubis, N. A., & Annisa, N. (2025). Peran Guru Menghadapi Hambatan dalam Mengimplementasi Pendekatan Deep Learning di SMPN 11 Medan. *Carong: Jurnal Pendidikan Sosial Dan Humaniora, 2(4)*. <https://teewanjournal.com/index.php/carong/article/view/2253>
- Nurdin, N., Anhusadar, L., Lubis, M., Hadisi, L., & Rijal, M. (2024). Beyond The Chalkboard: Digital Innovations In Islamic Learning Through Interactive Powerpoint. *Jurnal Ilmiah Peuradeun, 12(3)*, 1099–1128. <https://doi.org/10.26811/peuradeun.v12i3.1637>
- Oktaviani, R. (2024). Integrasi Teknologi Deep Learning dalam Pembelajaran Pendidikan Agama Islam di Era Digital. *Jurnal Ilmu Pendidikan, 1(1)*. <https://ojs.pustakapublisher.com/index.php/jurnalilmupendidikan/article/view/29>
- Pamoengkas, M. A., & Utami, E. (2025). Classification of Tahfidz Certification Success Among

- Students Using Machine Learning Algorithms. *ICoCSETI 2025 - International Conference on Computer Sciences, Engineering, and Technology Innovation, Proceeding*, 54–59.
<https://doi.org/10.1109/ICoCSETI63724.2025.11019153>
- Pujiharjono, A. (2024). Implementasi Pendekatan Deep Learning Melalui Problem Based Learning Berbantu Google Sites Untuk Meningkatkan Prestasi Belajar Siswa. *Jurnal Ilmiah Tut Wuri Handayani*, 14(1), 53–60.
<https://doi.org/https://doi.org/10.30738/twh.v14i1.19978>
- Puspa, A. A.-F. (2025). Analisis pendekatan pembelajaran deep learning : Analisis bibliometrik. *Jurnal Pendidikan Mediatama Edukasi*, 4(3), 118–127.
<https://jurnalpgrikabbekasi.com/ojs/index.php/jpme/article/view/102>
- Qohar, H. S., & Widyaningrum, R. (2025). Pengaruh Model Pembelajaran Deep Learning, Motivasi Belajar dan Kecerdasan Emosional terhadap Prestasi Akademik Siswa dalam Pendidikan Agama Islam di SDN 1 Badegan dan SDN 3 Badegan Kabupaten Ponorogo. *Analysis Journal of Education*, 3(2), 223–229.
<https://doi.org/https://ejournal.edutechjaya.com/index.php/analysis/article/view/1651>
- Rahmawati, Usman, A. T., & Holis, A. (2025). Efektivitas Penggunaan Media Digital Kahoot Dalam Meningkatkan Motivasi Belajar Peserta Didik Pada Pembelajaran Al-Qur'an Hadits. *Jurnal Ilmiah Pendidikan Citra Bakti*, 12, 167–177.
<https://doi.org/https://doi.org/10.38048/jipcb.v12i1.5131>
- Ramadhan, A. (2025a). Pengaruh Meaningful, Joyful, dan Mindful Learning Sebagai Pilar Deep Learning terhadap Hasil Belajar: Literature Review. *Jurnal Pendidikan Tematik*, 6(2), 151–158. <https://doi.org/https://doi.org/10.62159/jpt.v6i2.1736>
- Ramadhan, A. (2025b). Pengaruh Meaningful, Joyful, dan Mindful Learning Sebagai Pilar Deep Learning terhadap Hasil Belajar: Literature Review. *Jurnal Pendidikan Tematik*, 6(2).
<https://siducat.org/index.php/jpt/article/view/1736/1226>
- Ratnawati, & Suardi. (2025). Merancang Dan Menganalisis Pelajaran Berbasis Tahap Perkembangan Kognitif Piaget Pada Kelas Sosilogi. *Riset: Jurnal Ilmiah Multidisiplin Ilmu*, 1(1). <https://jurnalriset.com/index.php/riset/article/view/4>
- Rochyati, A. (2025). Deep Learning-Based Islamic Education Transformation : Innovation in Islamic Learning in the Digital Era. *International Journal of Islamic Educational Research*.
<https://international.aripafi.or.id/index.php/IJIER/article/view/430/240>
- Shodiq, S. F. (2023). Pendidikan Karakter dalam Konteks Digital: Memperkuat Kemandirian dan Keterampilan Sosial. *At Tuots: Jurnal Pendidikan Islam*, 5(1).
<https://journal.stitmadani.ac.id/index.php/JPI/article/view/208>
- Sidik, B., & Intan, N. (2025). Skor PISA, Acuan Tingkat Keterampilan Pelajar dalam Visi Indonesia Emas 2045. Kompas. <https://www.kompas.id/artikel/skor-pisa-acuan-tingkat-keterampilan-pelajar-dalam-visi-indonesia-emas-2045>
- Siregar, R., Siregar, N. A., Sirega, N., & Nasution, S. N. (2026). Implementation Of A Deep Learning-Based Approach In Islamic Religious Education At Madrasah Tsanawiyah Muallimin In Medan. *Journal Of English Language And Education*, 11(1).
<https://jele.or.id/index.php/jele/article/view/2087>
- Slam, Z., & Nugroho, M. N. (2025). Model Talking Stick Based Deep Learning untuk Pengembangan High Order Thinking Skills Mahasiswa. *Prosiding Seminar Nasional Fakultas Ilmu Tarbiyah Dan Keguruan UIN Syarif Hidayatullah Jakarta*, 2(1).
<https://eproceeding.fitkuinjktconferences.com/index.php/semnas/article/view/166>

- Supriyanto, D., Abidin, Y., Kurniawan, D. T., & Cahya, A. I. (2025). Diseminasi Teknologi Pembelajaran Berbasis Inklusivitas dan Deep Learning dengan Media Digital Canva, Flipbook, dan Ispring Suite Menggunakan Model UTAUT. *PENDAS: Jurnal Pendidikan Dasar*, 10(2). <https://journal.unpas.ac.id/index.php/pendas/article/view/26562>
- Supyana, G. (2025). Peran Pembelajaran Mendalam (Deep Learning) Dalam Meningkatkan Kompetensi Berbahasa Dan Berpikir Kritis Siswa Sekolah Dasar. *Jurnal Sultra Elementary School*, 6(2), 1275–1285. <https://doi.org/https://doi.org/10.64690/jses.v6i2.481>
- Suryani, E. (2023). Implementasi Kolaborasi Guru Dan Orang Tua Dalam Pembelajaran 5.0 Strategi Dan Tantangan Dalam Konteks Sekolah Dasar. *Jurnal Kependidikan*, 8(1). <https://ejournalppmunsa.ac.id/index.php/kependidikan/article/view/1203>
- Syaekhan, F., Pahlevi, S. R., Fathurrahman, & Fauzi, H. (2025). Problem Pendidikan Di Indonesia: Analisis Fenomena Guru Tanpa Kompetensi. *QOSIM : Jurnal Pendidikan Sosial & Humaniora*, 3(3). <https://ejournal.yayasanpendidikandzurriyatulquran.id/index.php/qosim/article/view/1945>
- Tursilaningsih, T., Suja'i, I. S., Asrori, M. A. R., & Sujono, I. (2026). Digital Learning Transformation, Deep Learning Pedagogy, and Teacher Professionalism: Effects on Primary School Students' Motivation. *Journal of Mathematics and Mathematics Education*, 1(1), 9–15. <https://doi.org/https://doi.org/10.58905/sempoa.v1i1.577>
- Usman, K., Makhful, & Darodjat. (2025). Transformasi Pembelajaran Pendidikan Agama Islam dalam Era Merdeka Belajar: Pendekatan Deep Learning. *Instructional Development Journal*, 8(2). <https://ejournal.uin-suska.ac.id/index.php/IDJ/article/view/37448/12817>
- Utami, Y. (2023). Implementasi Pembelajaran Berbasis ADLX Dengan Pendekatan Terpadu Untuk Meningkatkan Prestasi Belajar PAI Siswa. *Jurnal Pedagogy*, 16(2), 26–37. <https://doi.org/https://doi.org/10.63889/pedagogy.v16i2.175>
- Varela, C., Bressane, A., Zwirn, D., Essiptchouk, A., Luiz, F., Carvalho, D. C., Kennety, J., Formiga, S., & Liliam, C. (2024). Computers and Education : Artificial Intelligence Understanding the role of study strategies and learning disabilities on student academic performance to enhance educational approaches : A proposal using artificial intelligence. *Computers and Education: Artificial Intelligence*, 6(September 2023). <https://doi.org/10.1016/j.caeai.2023.100196>
- Wibowo, T. D. (2025). Implementation of Deep Learning in Islamic Education Learning to Improve The Quality of Learning. *Procceding of International Conference on Islamic Studies*. <https://proceeding.uingusdur.ac.id/index.php/icis/id/article/view/3146>
- Widiyawati, Y., Nurwahidah, I., Sari, D. S., Masykuri, M., & Budiyanto, C. W. (2020). The 21 st century science learning : HOTS and digital literacy among junior high school students in Semarang , Indonesia The 21 st century science learning : HOTS and digital literacy among junior high school students in Semarang , Indonesia. *International Conference on Science Education and Technology (ICOSETH)*. <https://doi.org/10.1088/1742-6596/1842/1/012081>
- Yuspitasari, S. (2025). Analisis Transformasi Pembelajaran Agama Islam Dari Surface Learning Ke Deep Learning (Studi Kasus Kelas X SMA Insan Rabbany). *Journal of Educational Research and Learning Analytics*, 1(2). <https://jurnal.smartpedia.co.id/index.php/JERLRA/article/view/126/138>

