

DEEP-AI Pedagogical Model for Strengthening Al-Qur'an Interpretation Literacy in Islamic Religious Education

Tedi Supriyadi^{✉1}, J. Julia², Udin Supriadi³, Nan Rahminawati⁴, Allayorova Sarvinoz Baxtiyorovna⁵

^{1,2,3}Universitas Pendidikan Indonesia, Bandung, Indonesia

⁴Universitas Islam Bandung, Bandung, Indonesia

⁵Chirchik State Pedagogical University, Chirchik, Uzbekistan

ABSTRACT

Purpose- This study aims to develop and evaluate the effectiveness of the DEEP-AI (Developing Exegetical Engagement and Proficiency with AI Assistance) Model with four learning stages, namely Decode, Explore, Examine, Project–Artificial Intelligence Assisted as a technology-based interpretation learning approach that is gradual, integrative, and adaptive.

Design/Method/Approach - This study used a developmental research approach conducted in three stages: (1) needs analysis through questionnaires and interviews with 105 students, (2) model design and validation by three experts (interpretation, Islamic pedagogy, and learning technology), and (3) limited testing on 35 students. The model was evaluated quantitatively through pre-test and post-test analysis using normality tests, paired t-tests, and N-Gain calculations, and qualitatively through student perceptions.

Findings- The results showed a significant improvement ($p < 0.001$) in all aspects of interpretive literacy, with N-Gain values between 0.64 and 0.73, as well as excellent student perception scores (average of 4.64 on a scale of 5).

Research Implication /Limitation- The DEEP-AI model has proven to be effective and has been very well received by students in improving their interpretation literacy.

Originality/Value- This study offers an AI-based interpretation learning model that is pedagogically designed, competency-oriented, and relevant to the needs of Islamic education in the digital age.

 OPEN ACCESS

ARTICLE HISTORY

Received: 10-02-2025

Revised: 11-03-2025

Accepted: 30-06-2025

KEYWORDS

Al Quran
interpretation literacy;
Chatbot AI; Contextual
meaning; Islamic
Religious Education;
Learning model.

CONTACT: [✉]tedisupriyadi@upi.edu

© 2025 The Author(s). Published by Islamic Education Department, State Islamic University Sunan Kalijaga Yogyakarta, ID
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

Introduction

The lack of ability of prospective Islamic teacher students to read and understand Arabic tafsir books raises serious epistemological issues in the teaching of Qur'anic tafsir at universities. A preliminary study conducted through a survey of 265 students enrolled in Islamic education programs at three universities in West Java showed that 64% did not understand the differences between exegetical methods such as tahlili, ijmalī, or maudhui, and 72% had difficulty reading classical exegesis texts without harakat. Only 18% claimed to have the ability to argueatively relate the content of verses to the current social context. This condition is crucial because exegesis literacy is a fundamental competency for prospective Islamic teachers (Alsaied, 2025; Petersen et al., 2020). As educators, they are expected to be able to explain the contents of the Qur'an in a deep, critical, and contextual manner to their students. The inability to understand the source text directly and integrate the meaning of the verses with contemporary realities will weaken their role as agents of conveying the enlightening, tolerant, and relevant values of the Qur'an to the needs of the times (Felsenthal & Agbaria, 2023; Hanafi et al., 2022).

A more fundamental problem with the initial study above lies in the students' lack of ability to integrate textual mastery with contextual understanding in the study of interpretation. Contextual understanding refers to the ability to logically and critically link the content of verses to current social realities based on valid exegetical authorities (Alsaied, 2025; Petersen et al., 2020). Some students are able to master the linguistic structure and technical terms in tafsir books, but are less skilled at linking them to contemporary social dynamics. Conversely, some can explain the social relevance of verses but still rely on translations, resulting in a superficial textual understanding. This inconsistency leads to fragmented interpretations: strong in linguistic aspects but weak in contextual application, or vice versa, relevant in context but lacking in terms of evidence and methodology. This condition shows that the main challenge is not only to improve the two dimensions separately, but to build a harmonious integration so that the resulting interpretation is comprehensive, scientifically valid, and meaningful for social life. Therefore, there is a need to develop a pedagogical model of interpretive literacy that is not only oriented towards text mastery, but also towards contextual meaning-making based on an authentic and transformative epistemology of interpretation (Calis, 2022; Zakaria et al., 2024).

A review of previous studies shows the importance of developing contextual and transformative interpretation learning models in the education of prospective Islamic teachers. A study by Khoir et al. (2025) highlights the narrowing of the epistemic space for Islamic knowledge in Indonesian Islamic universities due to the dominance of modernistic approaches, which obscures attention to tafsir studies and emphasizes the need for revitalizing authentic and contextual tafsir pedagogy. In line with this, research by Alali (2020) proves that teacher development programs based on the flipped classroom strategy are effective in changing teachers' pedagogical practices and beliefs, which are relevant to be applied in tafsir teaching to increase student independence and active participation. Another study by Fakhrudin et al. (2025) shows that a collaborative

approach in Islamic studies can improve students' historical literacy and academic self-concept, which implicitly supports reflective and contextual tafsir learning. On the other hand, Huda et al. (2016) emphasize the importance of a comprehensive learning approach based on al-Zarnūjī's classical thinking, which emphasizes intention, method, and deep understanding in Islamic education, including in tafsir studies. These four studies show a consensus that without an explicit and integrative pedagogical framework, tafsir teaching will lose its transformative power and will not be able to produce prospective teachers who are able to read, understand, and convey the contents of the Qur'an in a profound, methodological, and relevant manner.

Responding to previous studies, this study presents a novelty in the form of developing a pedagogical model of Al-Qur'an interpretation literacy that integrates the dimensions of textual mastery and contextual understanding, with an emphasis on the taxonomy of verse meanings and understanding of the methodologies of the mufasssir. The purpose of this study is to design and test a model that can improve students' comprehensive interpretation literacy competencies, both from linguistic, methodological, and contextual aspects. Based on the research objectives, there are four main theoretical concepts that underlie this study, including:

Islam Interpretation Literacy for the Academic Quality of Prospective Islamic Teachers

Interpretive literacy in Islamic studies encompasses the ability to understand the Qur'an through a comprehensive exploration of the meanings of its verses, covering linguistic, historical, contextual, and spiritual dimensions (Mabrouk Matarid & Al-Hamwi Al-Olabi, 2022; Stimpson & Calvert, 2021). This literacy is not limited to the ability to read tafsir texts, but also the ability to interpret divine messages critically, methodologically, and in a manner relevant to social reality (Alsaied, 2025; Olshefski, 2025). This literacy includes sensitivity to the text (nash), context (siyāq), and the relationship between verses and maqashid sharia, which is the main spirit of interpretation (Ainur Rifqi & Halil Thahir, 2019). Therefore, tafsir literacy is an important indicator of the academic quality of prospective religious teachers who will serve as a bridge between revelation and the real lives of students (Bowie et al., 2022; Smith, 2013).

The development of interpretive literacy has become increasingly urgent as prospective teachers tend to experience epistemological disconnect due to their dependence on interpretations and translations and their weak competence in reading Arabic texts (Ali et al., 2020; Laajan et al., 2024). This results in their understanding of the Qur'an being superficial, failing to touch on the methodological aspects of interpretation and unable to address contemporary issues (Laajan et al., 2024; Poyas & Bawardi, 2018). In Islamic religious education, strong interpretation literacy not only provides religious information but also shapes contextual hermeneutical and pedagogical attitudes (Felsenthal & Agbaria, 2023; Hashim et al., 2020). Therefore, the development of an interpretation learning model must depart from the concept of literacy as a layered skill, not merely the readability of a text.

Text Mastery as a Critical Basis for Interpretation Literacy for Prospective Islamic Teachers

Textual mastery in exegesis studies refers to the ability to understand and process information from Arabic exegesis books, in terms of language, structure, and content (Al Shahat, 2024; Esmaili & Motaghizadeh, 2017). This competency includes grammatical, semantic, and syntactic abilities that enable readers to accurately grasp the meaning of primary sources (Abeidat, 2024; Felsenthal & Agbaria, 2023). In the context of classical tafsir books such as Tafsir al-Ṭabari, al-Kashani, or Fakhr al-Din al-Razi, understanding the text requires expertise in reading unvocalized manuscripts (without harakat) and interpreting technical terms in tafsir, ushul fiqh, and lughah (Demircigil, 2025; Hamdi & Alawi, 2024).

However, mastery of the text alone is not enough if it is not accompanied by the ability to interpret and reflect on the moral and social messages in the verses (Demircigil, 2025; Hamdi & Alawi, 2024). This is where the gap occurs in tafsir learning, students who are only emphasized on linguistic abilities will lose the depth of meaning, while those who are too focused on context can slip into relativism of meaning (Frisson, 2009; Hall, 2013). Therefore, mastery of the text must be placed as the foundation, but directed within an integrative framework so that tafsir literacy is not fragmented between the dimensions of nash and maqashid (Moch, 2022).

The Urgency of Contextual Interpretation in the Education of Prospective Religious Teachers

Contextual understanding in exegesis studies means capturing the message of the Qur'an in accordance with space and time, both in the context of the revelation of verses (asbāb al-nuzūl) and in the context of contemporary sociocultural conditions (Demircigil, 2022; Mujahidin et al., 2024). This includes the ability to interpret verses across disciplines, for example through historical, sociological, maqashidi, and even eco-theological approaches (Kabakci, 2023; Zakaria et al., 2024). In this framework, tafsir is not only understood as a theological study, but also as an ethical response to humanitarian problems (Saeed, 2013; Syukri & Subagio, 2024).

In Islamic religious education, the ability to read context is very important so that Qur'anic values are not reduced to dogma (Saeed, 2013; Saeed & Akbar, 2021). When prospective teachers only understand verses literally without exploring their context, the educational process tends to be normative-doctrinal and loses its transformative value (Pendergast et al., 2015; Saeed, 2013). Therefore, contextual understanding must be an integral part of interpretive literacy, so that the learning model is able to guide students to read verses reflectively, critically, and applicatively to social realities (Al Shahat, 2024; Saeed & Akbar, 2021).

Meaning Taxonomy and Interpretation Methodology in Religious Teacher Candidate Interpretation Education

The taxonomy of meanings is a classificatory approach to the meanings of verses that are divided into several levels, such as linguistic (language) meanings, legal (sharia)

meanings, spiritual (isyari) meanings, and maqashidi meanings (legal objectives) (Ainur Rifqi & Halil Thahir, 2019; Mahmut, 2024). This approach guides readers of tafsir to identify gradations of meaning and opens up space for in-depth analysis of the text of the Qur'an (Abdul-Raof, 2018; Nawaya et al., 2024). In a pedagogical context, this taxonomy is highly relevant for training students to understand verses not in a flat manner, but through a multi-level exploration of meaning, from the literal to the philosophical (Al Shahat, 2024; Calis, 2022; Saeed, 2013).

In addition to the taxonomy of meaning, understanding the mufassir's manhaj (interpretation methodology) is an important aspect that must be taught (Esmaili et al., 2016; Felsenthal & Agbaria, 2023). Manhaj such as tahlili, ijmalī, muqāran, or thematic not only shape the structure of interpretation, but also reflect the way a mufassir thinks about reality (Abdul-Raof, 2012; Alwani, 2019). By equipping prospective religious teacher students with the ability to recognize and apply these manhaj, they can develop critical, focused, and community-oriented interpretive insights (Esmaili & Motaghizadeh, 2017; Mujahidin et al., 2024). The integration of the ma'ani taxonomy and the mufassir manhaj in a learning model will result in tafsir literacy that is not only in meaning but also in approach.

The gap in the four theoretical frameworks lies in the absence of an interpretive learning model that systematically integrates textual mastery and contextual understanding in the education of prospective Islamic teachers. Existing literature still separates linguistic and methodological aspects and rarely combines the ma'ani taxonomy and mufassir manhaj in contextual pedagogical designs. Based on this, this study poses the main question: How can a pedagogical model of Qur'anic interpretation literacy be systematically developed to bridge the gap between textual mastery and contextual understanding among prospective Islamic religious teachers?

Methods

Research Design and Procedures

This study uses a Developmental Research approach that aims to design, develop, and test the effectiveness of an integrative pedagogical model of Qur'anic interpretation literacy, emphasizing a systematic process based on empirical and theoretical needs (Plomp & Nieveen, 2007; Richey & Klein, 2014). This design was chosen because it is able to integrate the conceptual framework of interpretive literacy with practical validation in the field. The research procedure consisted of three main stages: (1) needs analysis through literature study and surveys of students and lecturers to identify the gap between textual mastery and contextual understanding, (2) model design based on the taxonomy of ma'ani and manhaj mufassir, and (3) model implementation and evaluation through interpretation class trials using quantitative and qualitative approaches to assess its effectiveness.

Location and Participants

This study involved 105 undergraduate students (S1) in the Islamic Education Study Program from three universities in West Java, consisting of 35 students from the Indonesia University of Education, 35 students from Sunan Gunung Djati State Islamic University

Bandung, and 35 students from Bandung Islamic University. In addition, six lecturers teaching tafsir courses participated as respondents. Participants were selected purposively, considering their active involvement in tafsir learning and the need to improve tafsir literacy. The selection of the institutional context and participants was based on considerations of representativeness of the general challenges of tafsir literacy faced in Islamic higher education in Indonesia.

Instruments and Data Collection

The research instrument was designed to measure the effectiveness of the Al-Qur'an interpretation literacy model through two dimensions: textual mastery and contextual understanding, each covering five indicators with a total of 30 questionnaire items. The questionnaire was used in the initial stage for needs analysis. In addition, a conceptual description test based on an analytical rubric (text accuracy, reflection, argumentation, and relevance) was used, along with semi-structured interviews with lecturers and students, and participatory observation during the implementation of the model. This multimodal approach ensured the depth, diversity, and validity of the research data.

Data Analysis

The data obtained from the questionnaire was analyzed quantitatively using descriptive statistics and the N-Gain test to determine the effectiveness of the model in improving interpretation literacy. Interview and observation data were analyzed qualitatively through data reduction techniques, theme categorization, and conclusion drawing based on a thematic analysis approach. This mixed approach was chosen to provide a comprehensive picture of the model's achievements in terms of both statistical improvement and the dynamics of the implementation process in the classroom.

Instrument Validity and Reliability

To ensure the quality of the research instruments, validity and reliability tests were conducted in two stages. The first stage involved three experts to assess content validity and revise the instruments based on their input. The second stage tested empirical validity through a questionnaire administered to 20 non-participant respondents, showing a significant item-total correlation ($r > 0.30$). Reliability testing using Cronbach's Alpha showed high results: textual mastery ($\alpha = 0.872$), contextual understanding ($\alpha = 0.884$), and total interpretive literacy ($\alpha = 0.893$). All were in the high and reliable category (Borsboom & Molenaar, 2015; Wijzen et al., 2022). These results indicate that the instrument is valid, reliable, and suitable for use.

Result and Discussion

1. Model Requirements Analysis

A needs analysis was conducted quantitatively through questionnaires to map students' interpretation literacy, and qualitatively through in-depth interviews with

lecturers and students as the initial stage of the research. The findings from these two approaches formed the basis for the design of a contextual interpretation learning model that is responsive to real needs in the field.

1.1 Quantitative Profile of Interpretation Literacy of Prospective Religious Teachers

To obtain an objective picture of students' interpretation literacy levels prior to the implementation of the model, a questionnaire based on two main dimensions was used: textual mastery and contextual understanding, each covering five indicators on a 1–5 Likert scale. Data from 105 prospective PAI teacher students were analyzed descriptively to determine the minimum, maximum, average, and standard deviation values. The results are presented in Table 1.

Table 1. Descriptive Statistics of Students' Interpretation Literacy (N = 105)

Variable	Indicator	N	Minimum	Maximum	Mean	Std. Deviation
Textual mastery	Technical Terms	105	1.20	3.40	2.17	0.21
	Reading Bare Texts	105	1.10	3.50	2.16	0.19
	Syntax & Semantics	105	1.30	3.30	2.14	0.19
	Interpretive Vocabulary	105	1.00	3.20	2.14	0.20
	Analysis of Interpretive Arguments	105	1.10	3.10	2.13	0.21
Contextual understanding	Context of <i>Asbab al-Nuzul</i>	105	1.20	3.30	2.15	0.19
	Social Relevance	105	1.20	3.40	2.15	0.20
	Maqashidi Integration	105	1.00	3.10	2.14	0.19
	Interdisciplinary Approach	105	1.10	3.00	2.14	0.20
	Contextual Application	105	1.00	3.20	2.13	0.19

The results of descriptive analysis of 105 students show that the level of interpretive literacy is still low in both main dimensions, textual mastery and contextual understanding, with the average score for all indicators ranging from 2.13 to 2.17 on a scale of 5.00. The highest scores were found in the Technical Terms and Social Relevance indicators ($M = 2.17$ and $M = 2.15$), while the lowest scores were found in the Interpretation Argument Analysis and Contextual Application indicators ($M = 2.13$). The low standard deviation (0.19–0.21) indicates an even distribution of data at a low level of ability. These findings confirm the need for a pedagogical model that can systematically integrate text mastery and contextual understanding.

1.2 Exploring the Need for a Pedagogical Model of Interpretive Literacy

Interviews with six lecturers and four students yielded 423 statements that were analyzed and grouped into three main themes related to the needs of the interpretive literacy pedagogical model, namely:

1.2.1 Theme 1: Difficulties in Accessing Primary Sources and Understanding Interpretive Texts

The interview results show that the majority of students and lecturers stated that the ability to read and understand authoritative Arabic tafsir books without harakat is still a major challenge in tafsir learning. This has an impact on students' limited access to primary tafsir sources. This is supported by the following statements

“Most students are not accustomed to reading the original text. They tend to wait for the translated version of the interpretation, even though many important meanings are lost there.” (Lecturer 1)

“The main problem is the students' weak foundation in Arabic. They can read, but they don't understand the structure and technical terms in the tafsir books” (Lecturer 4)

“I often feel confused when lecturers discuss texts without vowel marks. It's difficult to grasp the meaning of each sentence.” (Student 1)

“Sometimes I just copy the interpretation from online sources because I can't understand it directly from the original book.” (Student 2)

Difficulties in accessing and understanding classical interpretive texts pose a serious obstacle to mastering interpretive literacy, underscoring the need to strengthen Arabic language skills and pedagogical strategies that facilitate the reading of primary texts.

1.2.2 Theme 2: Deflation Contextual Approach in Interpretation Learning

Lecturers and students highlighted the lack of an approach that links the content of the Qur'an with contemporary social realities in the learning process, resulting in an understanding of interpretation that feels normative and lacks practical application. This is supported by several statements from lecturers and students.

“Often, interpretation is taught as a memorization skill. But we need to guide students to connect verses with current social issues.” (Lecturer 3)

“We need an approach that makes interpretation a tool for analyzing life, not just a text to be understood literally.” (Lecturer 5)

“I am rarely invited to discuss how the interpretation of verses is relevant to our lives today.” (Student 2)

“If I only understand the verses literally, I find it difficult to see their connection to the social issues around me.” (Student 4)

The lack of a contextual approach in learning makes the process of interpreting verses from the Qur'an unrealistic. This emphasizes the need to integrate social context into the design of tafsir learning models.

1.2.3 Theme 3: The Need for Interactive and Structured Learning Strategies

There is hope from lecturers and students that interpretation learning will not only be a one-way lecture, but will involve an interactive, collaborative approach based on a clear methodological framework. This is supported by several statements from lecturers and students.

“We need a systematic interpretation learning model based on interpretation methodology that actively involves students.” (Lecturer 2)

“So far, students have been passive because they have not been given the tools to think. With the right approach, they can be very critical.” (Lecturer 6)

“I am more interested in learning interpretation when there are group discussions or case studies involving current issues.” (Student 2)

“If only interpretation learning had a structure like other courses that use models and strategies, I would understand it better.” (Student 4)

There is an urgent need for a more interactive and structured interpretation learning strategy so that students have critical and methodological thinking tools in understanding the content of verses.

In-depth interviews with six participants confirmed the quantitative findings that the exegesis literacy of prospective Islamic teacher students is still low, both in terms of textual mastery and contextual understanding, with an average score of only 2.13–2.17 on a scale of 5.00. Qualitative data show that students have difficulty reading plain texts, understanding technical terms, and relating verses to their social context. In addition, learning approaches that are not contextual and lack interactivity further highlight the weak achievement on key indicators. Thus, these two findings complementarily emphasize the need for an integrative pedagogical model that is responsive to the real needs of tafsir learning.

2. Pedagogical Model Design for Interpretation Literacy

An analysis of 105 prospective PAI teachers showed that their interpretation literacy was still low, both in textual mastery and contextual understanding, with an average score below 2.50. These findings were reinforced by interviews with lecturers and students who revealed difficulties in reading Arabic interpretation texts, understanding technical terms, and relating verses to social contexts. In response, the DEEP-AI (Developing Exegetical Engagement and Proficiency with AI Assistance) Model was developed, a technology-based pedagogical approach consisting of four stages: Decode the Text, Explore the Meaning, Examine the Method, and Project to Context. This model utilizes AI chatbots (ChatGPT, DeepSeek, Gemini) and Maktabah Syamilah to assist students in understanding texts, interpretation methods, and their application in contemporary contexts. The complete structure of the model is presented in Table 2.

Table 2. Instructional Stages of the DEEP-AI Learning Model

Step	Stage Name	Instructional Action	Achievement Indicator	Form of Evaluation
D	Decode the Text	Students read classical exegesis texts from the Maktabah Syamilah application; utilizing AI tools to translate, explain terms, and compare exegesis wording.	Students understand technical terms and linguistic structures in interpretive texts.	Arabic vocabulary tests, transliteration exercises, and clarification of meanings through the use of chatbots. (Text Accuracy / Understanding of vocabulary and interpretation structure)
E	Explore the Meaning	Students explore the taxonomy of verse meanings with guidance from lecturers and AI assistance in explaining variations in meaning and providing examples of usage in interpretation.	Students recognize the literal, legal, maqashidi, and spiritual meanings in layers.	Concept map of verse meanings, interpretation exercises based on maani taxonomy or interpretive meanings. (Depth of Reflection/Ability to explore meaning)
E	Examine the Method	Students compare interpretation methods from various schools of thought, with the help of AI as a complementary reference for exploring classical and contemporary sources.	Students understand and apply the methodology of interpretation appropriately and contextually.	Analysis of interpretation methods, integrative quizzes, comparative studies of approaches with the support of digital tools. (Methodological Argumentation/Analysis of Interpretation Methods)
P	Project to Context	Students compile contextual thematic interpretations; using AI as a tool to explore contemporary issues, relevant hadiths, and fatwas from scholars.	Students connect verses to community issues in a reflective and practical manner.	Presentation of contextual thematic interpretation, AI-assisted interpretation section, and writing of mini-essays on interpretation. (contextual relevance / Connectivity of interpretation with context)

The DEEP-AI model is designed not only to address students' linguistic and contextual weaknesses, but also as a learning innovation that integrates the scientific tradition of interpretation with digital technology. This model bridges the gap between

text and social reality, while shaping prospective religious teachers who are methodological, reflective, and digitally adaptive.

3. Model Validation

To assess the feasibility of the DEEP-AI Model, validation was carried out by three experts in the fields of interpretation, Islamic pedagogy, and learning technology. The assessment covered six aspects: clarity of steps, relevance of literacy objectives, integration of AI chatbots, coherence of text and context, feasibility of implementation, and suitability for student characteristics. The assessment results used a 1–5 Likert scale and are presented in Table 5 below.

Table 3. Validation Test Results

Aspects Assessed	Average Score (Scale 1-5)	Category
Clarity of Learning Steps	4.7	Very Good
Relevance of Steps to Interpretation Literacy Objectives	4.6	Very Good
Relevance of AI Chatbot Integration	4.5	Good
Integration of Text and Context Aspects	4.8	Very Good
Feasibility of Implementation in Classrooms	4.6	Very Good
Suitability for PAI Students	4.4	Good

The validation results show that the DEEP-AI Model is considered excellent and suitable for implementation, with an average score of 4.4–4.8. The highest score was in the aspect of textual and contextual approach integration (4.8), followed by clarity of steps (4.7) and relevance of objectives (4.6). The aspect of AI chatbot integration received a score of 4.5, but with notes for improvement, such as the need for clear technical guidelines to avoid misconceptions or dependence in the learning process, emphasizing AI as a reflective tool rather than the only source of interpretation, and the need to prepare digital literacy and technology use ethics training for lecturers and students before full implementation of the model. These recommendations are important inputs for refining the model before testing, while also reinforcing that DEEP-AI is capable of addressing the challenges of contextual and adaptive interpretation literacy in Islamic higher education.

4. Implementation model

The initial trial of the DEEP-AI model was conducted on 35 prospective PAI teacher students to assess its effectiveness and acceptability in Al-Qur'an interpretation learning. The model was implemented through four main stages with the support of Maktabah Syamilah and AI technology as tools. Effectiveness was assessed based on improvements in student competency before and after learning, covering four aspects: Text Accuracy, Methodological Argumentation, Contextual Relevance, and Depth of Reflection. Data was obtained through pre-tests and post-tests, then analyzed descriptively as presented in Table 4.

Table 4. Descriptive Statistics of Students' Pre-test and Post-test Results (N = 35)

Aspect	Period	N	Minimum	Maximum	Mean	Std. Deviation
Text Accuracy	Pre Test	35	40.30	56.40	49.6714	3.45556
Methodological Argumentation	Pos Test	35	79.56	88.50	84.7483	2.31479
Contextual Relevance	Pre Test	35	46.30	56.30	50.6171	2.28119
	Pos test	35	79.10	85.80	82.7029	2.03289
Text Accuracy	Pre Test	35	43.60	56.60	49.8371	3.13285
Methodological Argumentation	Pos Test	35	84.00	89.80	86.8171	1.74769
Contextual Relevance	Pre test	35	43.80	56.20	50.3886	3.26639
	Pos tets	35	83.10	89.90	86.6029	1.77706

Table 4 above shows that the results of testing the DEEP-AI Model on 35 students showed a significant increase in all aspects of interpretive literacy. The average pre-test score was in the range of 49–50, reflecting low initial competence. After applying the model, the post-test scores jumped to the range of 82–86, with the highest increase in the aspect of Contextual Relevance (from 49.83 to 86.81), followed by Depth of Reflection, Methodological Argumentation, and Text Accuracy. This improvement shows that the DEEP-AI Model is effective in forming a comprehensive understanding of interpretation, from linguistic accuracy to interpretative depth, and is able to harmoniously integrate textual and contextual approaches.

5. Evaluation model

A quantitative evaluation of the DEEP-AI Model was conducted using a Paired Sample t-Test and N-Gain calculations. Previously, a Shapiro-Wilk normality test was conducted to ensure that the distribution of pre-test and post-test data met the assumption of normality. The results showed that all variables had a p-value > 0.05, so the data was declared to be normally distributed, as shown in Table 5.

Table 5. Pre-Test and Post-Test Data Distribution Test

Variable	p-value	Distribution
Text Accuracy (Pre)	0.7806	Normal
Text Accuracy (Post)	0.4984	Normal
Methodological Argumentation (Pre)	0.9072	Normal
Methodological Argumentation (Post)	0.0849	Normal
Contextual Relevance (Pre)	0.2687	Normal
Contextual Relevance (Post)	0.0700	Normal
Depth of Reflection (Pre)	0.4925	Normal
Depth of Reflection (Post)	0.2533	Normal

Based on the test results in Table 5, which show normally distributed data, further testing can be performed using a parametric test, namely the Paired t-Test. Table 6 shows the results of the paired t-test.

Table 6. Results of Paired Sample T Test Analysis

Aspect	N	df	t-Statistic	p-value	Conclusion
Text Accuracy	35	34	57.5199	0.0000	Significant
Methodological Argumentation	35	34	56.9190	0.0000	Significant
Contextual Relevance	35	34	73.6492	0.0000	Significant
Depth of Reflection	35	34	83.8218	0.0000	Significant

The results of the Paired t-Test showed a significant increase in all aspects of interpretive literacy ($p < 0.001$), with high t-values (56.91–83.82), indicating that the DEEP-AI Model is effective in improving student competence. To measure its effectiveness, an N-Gain analysis was conducted, as presented in Table 7.

Table 7. N-Gain Test Results

Evaluation Aspect	Average N-Gain	Effectiveness Category
Text Accuracy	0.6964	Moderate
Methodological Argumentation	0.6487	Moderate
Contextual Relevance	0.7370	High
Depth of Reflection	0.7303	High

Based on the N-Gain analysis in Table 7, the DEEP-AI model shows high effectiveness in the aspects of Contextual Relevance (0.7370) and Depth of Reflection (0.7303), while the other two aspects are in the moderate category but close to high. These findings confirm that this model is effective in improving students' learning outcomes cognitively, methodologically, and reflectively. In addition, students' acceptance of the model was also evaluated through a perception questionnaire covering the clarity of the stages, the benefits of AI, the relevance of the material, as well as comfort and confidence during learning. The results are presented in Table 8.

Table 8. Results of the Analysis on the Acceptance of the DEEP AI Model

Aspects Assessed	Average Score	Category
Clarity of the DEEP model stages	4.55	Very Good
Ease of use of AI as a tool	4.78	Very Good
Relevance of material to PAI teachers' needs	4.69	Very Good
Increased confidence in reading interpretations	4.64	Very Good
Comfortable learning with the DEEP AI approach	4.46	Good
Average Acceptance	4.64	Very Good

The survey results show a very positive reception of the DEEP-AI Model, with an average score of 4.64 out of 5. Students consider this model effective in guiding systematic

understanding of verses through clear stages. The use of AI and Maktabah Syamilah was considered to support the process of understanding the meaning of verses more quickly and broadly, but it was still positioned as a support, not a substitute for analytical and critical reasoning skills in interpretation. This model also increased students' confidence and methodological awareness in dealing with contemporary religious issues.

The results of the study show that the implementation of the DEEP-AI Model has a significant impact on improving students' interpretation literacy, particularly in terms of contextual understanding and depth of reflection. These findings indicate that artificial intelligence (AI) has great potential in facilitating complex religious learning processes such as Quranic interpretation. AI enables students to access, navigate, and interpret classical texts with the help of adaptive digital systems. According to Maha et al. (2025), the integration of AI in Islamic education can expand access to primary literature and support competency-based learning that is relevant to the digital age.

The DEEP-AI model combines a step-by-step approach to understanding interpretive texts with the use of AI as a learning assistant. This enables a more personalized and participatory learning process. AI not only speeds up the search for meaning, but also facilitates the clarification of concepts and the exploration of interpretation methods interactively. Rapi et al., (2024) explain that AI can increase student engagement through personalized learning paths, accelerated feedback, and strengthened mastery of material in Islamic religious education, especially when used in dialogue-based platforms such as chatbots.

However, the application of AI in Islamic religious education is not without challenges, especially in terms of ethics and epistemology. Over-reliance on AI in interpreting religious texts can lead to distortion of meaning or scientifically invalid interpretations. Andri Nirwana et al. (2025) emphasize the importance of framing the use of AI in Islamic education with strict ethical guidelines. AI should function as a reflective tool, not as an authority of interpretation. An imbalance in the use of technology has the potential to obscure scientific authority in the study of interpretation.

The success of AI integration in tafsir learning is also highly dependent on institutional readiness. This ranges from lecturer training and student digital literacy to the availability of adequate technological infrastructure. The effectiveness of AI in Islamic higher education is highly dependent on organizational policies, software and hardware readiness, and adaptive strategies that enable sustainable pedagogical transformation (Andri Nirwana et al., 2025; Rapi et al., 2024).

A follow-up study by Papakostas (2025) states that AI in religious education will only be valuable if it is placed within a humanistic framework that preserves spiritual values. AI should not replace the teacher-student relationship, but rather strengthen it by expanding the space for critical dialogue and reflection (Andri Nirwana et al., 2025). The ethics of AI use must consider sensitivity to religious teachings and caution in simplifying complex sacred texts (Maha et al., 2025; Rapi et al., 2024).

Considering these opportunities and challenges, the DEEP-AI model offers a holistic and adaptive approach to interpretation learning. The advantage of this model lies in the

combination of textual, methodological, and contextual approaches reinforced by AI technology as an exploration tool. It affirms that the use of AI in Islamic religious education can integrate multimodal learning that strengthens critical understanding of sacred texts, as long as its use is controlled by appropriate pedagogical principles and high scientific integrity.

Conclusion

This study shows that the DEEP-AI Model, which integrates a step-by-step approach to interpreting the Qur'an with the help of artificial intelligence and classical digital sources, has proven effective in improving the interpretive literacy of prospective PAI teachers. Through four instructional stages, Decode the Text, Explore the Meaning, Examine the Method, and Project to Context, this model is able to bridge the gap between textual mastery and contextual understanding. Statistical test results show significant improvements in all aspects of learning, with N-Gain scores in the moderate to high range. Additionally, student acceptance of this model is very good, indicating that the DEEP-AI approach is not only cognitively effective but also affectively and pedagogically accepted in the context of technology-based interpretation education.

Declarations

Recommendation

Based on the results of this study, it is recommended that the DEEP-AI Model be implemented more widely in interpretation learning in religious universities, especially in Islamic Education study programs. Educational institutions need to prepare training for lecturers in the pedagogical use of AI, as well as provide digital infrastructure that supports access to classical interpretation books and reliable AI tools. In addition, academic ethics guidelines for the use of AI need to be developed to ensure that the technology is used as a reflective tool and not a substitute for scientific authority in Islamic studies. The development of a DEEP-AI-based curriculum can also be directed at strengthening students' ability to interpret the Qur'an methodologically and contextually in accordance with the needs of the times.

Limitation

This study has several limitations that need to be considered. First, the number of participants in the trial was limited to 35 students from one Islamic higher education institution, so the results need to be generalized with caution. Second, the evaluation of the model's effectiveness focused on cognitive and affective aspects, while psychomotor or practical aspects have not been studied in depth. Third, the integration of AI in this study was limited to the use of applications such as chatbots and Maktabah Syamilah, without testing more complex generative AI. Therefore, further research is recommended to include a broader population, a multi-method approach, and exploration of more advanced NLP (Natural Language Processing)-based AI in the context of digital interpretation.

AI Declaration

The author states that the use of Artificial Intelligence (AI) technology in writing this article is solely for the purpose of checking and refining the language, such as typos, readability, and

clarity. Meanwhile, all content, data, analysis, and interpretation contained in this article are entirely the work and responsibility of the author.

Acknowledgement

The author would like to express his gratitude to the Institute for Research and Community Service of the Indonesia University of Education and the Ministry of Education, Culture, Research, and Technology for their financial support for this research through the Fundamental Regular scheme, which enabled this research to be carried out successfully.

References

- Abdul-Raof, H. (2012). Theological Approaches to Qur'anic Exegesis: A Practical Comparative-Contrastive Analysis. In *Theological Approaches to Qur'anic Exegesis: A Practical Comparative-Contrastive Analysis*. <https://doi.org/10.4324/9780203127018>
- Abdul-Raof, H. (2018). Text linguistics of qur'anic discourse: An analysis. In *Text Linguistics of Qur'anic Discourse: An Analysis*. <https://doi.org/10.4324/9781315670942>
- Abeidat, R. A. (2024). An Analysis of Media Discourse Produced by Non-Arabic Speakers of Arabic in light of the Text Syntax: The American Discourse as an Applied Model. *Dirasat: Human and Social Sciences*, 51(6), 545–558. <https://doi.org/10.35516/hum.v5i16.1551>
- Ainur Rifqi, M., & Halil Thahir, A. (2019). Maqasidi Interpretation; Building Interpretation Paradigm Based on Mashlahah. *Millah: Journal of Religious Studies*, 18(2), 335–356. <https://doi.org/10.20885/millah.vol18.iss2.art7>
- Al Shahat, M. (2024). Interpretation as a Migrated Concept Between Critical Theory and Cultural Studies: From The Image of an Interpreter to a Cultural Critic. *Dragoman*, 14(15), 420–436. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85194134583&partnerID=40&md5=c971c17c6141abea1a1a6e805de8dc0f>
- Alali, Reem Abdulaziz. (2020). Effectiveness of a Proposed Program in Developing Practices and Modifying Beliefs of Practitioner Teachers About the Flipped Classroom. *SAGE Open*, 10(2), 2158244020919775. <https://doi.org/10.1177/2158244020919775>
- Ali, N., Abdullah, M. H., & Rahman, A. H. A. (2020). The content analysis of the self-learning module on Arabic reading comprehension strategies. *International Journal of Scientific and Technology Research*, 9(4), 2440–2445. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85084863265&partnerID=40&md5=6da575615a3e35c4760f7177e65bdo82>
- Alsaied, M. A. (2025). Interpretation of Religious Texts and Its Impact on Coexistence with Others. *Journal of Posthumanism*, 5(3), 1508–1528. <https://doi.org/10.63332/joph.v5i3.944>
- Alwani, Z. (2019). With 'A'isha in mind: Reading Surat al-Nur through the Qur'an's structural unity. In *Muslim Women and Gender Justice: Concepts, Sources, and Histories* (pp. 123–139). <https://doi.org/10.4324/9781351025348-8>
- Andri Nirwana, A. N., Rifai, A., Ali, M., Ali Mustofa, T., Nur Vambudi, V., Nur Rochim Maksum, M., & Umar Budihargo, M. (2025). SWOT Analysis of AI Integration in Islamic Education: Cognitive, Affective, and Psychomotor Impacts. *Qubahan Academic*

- Journal*, 5(1), 476–503. <https://doi.org/10.48161/qaj.v5n1a1498>
- Borsboom, D., & Molenaar, D. (2015). Psychometrics. In *International Encyclopedia of the Social & Behavioral Sciences: Second Edition* (pp. 418–422). <https://doi.org/10.1016/B978-0-08-097086-8.43079-5>
- Bowie, R. A., Panjwani, F., & Clemmey, K. (2022). A meta approach to texts in religious education: researching teachers' engagement with sacred text scholarship in English secondary schools. *British Journal of Religious Education*, 44(3), 271–280. <https://doi.org/10.1080/01416200.2022.2054773>
- Calis, H. (2022). The Theoretical Foundations of Contextual Interpretation of the Qur'an in Islamic Theological Schools and Philosophical Sufism. *Religions*, 13(2). <https://doi.org/10.3390/rel13020188>
- Demircigil, B. (2022). Disputes on the Meanings of the “al-Jin” in the Qur'an. *Cumhuriyet İlahiyat Dergisi*, 26(1), 433–449. <https://doi.org/10.18505/cuid.1076156>
- Demircigil, B. (2025). The Conceptualization of Jurisprudential Exegesis as the Intersection of Tafsir and Fiqh: A Critical Approach. *Religions*, 16(2). <https://doi.org/10.3390/rel16020254>
- Esmaeili, Z., Farashbani, R., & Alizadeh, J. (2016). Islamic education from the perspective of holy Quran. *International Journal of Pharmacy and Technology*, 8(2), 14017–14027. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84978512555&partnerID=40&md5=22e477e726f05dc87bcd9248a01cb750>
- Esmaili, S., & Motaghizadeh, I. (2017). An investigation the effect of critical thinking skills on reading comprehension of literary Arabic texts among Iranian language and literature Arabic students. *Language Related Research*, 8(8TOME37), 1–23. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85019760381&partnerID=40&md5=426a4597f483dd15f81c383841dd7b2f>
- Fakhruddin, A., Saepul, A., & and Fajar Islamy, M. R. (2025). Enhancing academic self-concept and historical literacy in Islamic studies through collaborative learning: a study on prospective Islamic Education teachers in Indonesia. *Cogent Education*, 12(1), 2491871. <https://doi.org/10.1080/2331186X.2025.2491871>
- Felsenthal, I., & Agbaria, A. (2023). How to Read the Quran in Religious Islamic Education: What Educators Can Learn from the Work of Mohammed Arkoun. *Religions*, 14(1). <https://doi.org/10.3390/rel14010129>
- Frisson, S. (2009). Semantic underspecification in language processing. *Linguistics and Language Compass*, 3(1), 111–127. <https://doi.org/10.1111/j.1749-818X.2008.00104.x>
- Hall, R. (2013). Henry James: Interpreting an Obsessive Memory. In *Essays on Gay Literature* (pp. 83–97). <https://doi.org/10.4324/9780203063576-12>
- Hamdi, S. A., & Alawi, T. (2024). Fundamental issues in the book Al-Bustan in the parsing of the problems of the Qur'an by Ibn Al-Ahnaf Al-Yemeni (d. 717 AH). *Journal of Ecohumanism*, 3(8), 9229–9242. <https://doi.org/10.62754/joe.v3i8.5540>
- Hanafi, Y., Saefi, M., Diyana, T. N., Ikhsan, M. A., Faizin, N., Thoriquattyas, T., & Murtadho, N. (2022). Students' perspectives on religious moderation: A qualitative study into religious literacy processes. *HTS Teologiese Studies / Theological Studies*, 78(1).

- <https://doi.org/10.4102/hts.v78i1.7638>
- Hashim, A., Ani, N. I., Rahim, M. M. A., & Huda, M. (2020). Investigating Effective Teaching Strategy For Tafseer Of Quran: An Empirical Study. *Journal of Critical Reviews*, 7(2), 712–717.
- Huda, Miftachul, Yusuf, Jibrail Bin, Azmi Jasmi, Kamarul, & Zakaria, Gamal Nasir. (2016). Understanding Comprehensive Learning Requirements in the Light of al-Zarnūjī's Ta'lim al-Muta'allim. *SAGE Open*, 6(4), 2158244016670197. <https://doi.org/10.1177/2158244016670197>
- Kabakci, E. (2023). Is it Possible to Write a Child-centered Qur'ān Translation? A Study in the Context of the Qur'ān Translation named the Meaning of the Holy Qur'ān for School Children. *Hitit Theology Journal*, 22(1), 103–138. <https://doi.org/10.14395/hid.1251993>
- Khoir, T., Ma'arif, S., Elizabeth, M. Z., & Permata, K. I. (2025). The narrowing spaces for Islamic knowledge at Islamic higher education in Indonesia: opportunity and challenge. *Higher Education*. <https://doi.org/10.1007/s10734-024-01370-3>
- Laajan, Y., Dehhane, S., & Nachit, B. (2024). Impact Of Weak Reading Comprehension Skills On Language Usage. *International Journal on Technical and Physical Problems of Engineering*, 16(2), 44–50. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85198417502&partnerID=40&md5=354d9a17ee86767a7a3c70e784e91d86>
- Mabrouk Matarid, R. M. A., & Al-Hamwi Al-Olabi, A. A. R. (2022). Al-Qā'ida al-Nūrāniyya, Approach in Quranic Learning in Qatar An Evaluative Comparative Study. *Journal of College of Sharia and Islamic Studies*, 40(1), 19–50. <https://doi.org/10.29117/jcsis.2022.0314>
- Maha, A. T., Habtiter, Z. A., Ahmed, H. A., & Mijbel, Y. K. (2025). Employing Artificial Intelligence Applications in the Service of Islamic Religion and Belief. *Lecture Notes in Networks and Systems*, 1268 LNNS, 167–176. https://doi.org/10.1007/978-3-031-82377-0_15
- Mahmut, R. İ. (2024). The Origin of Esotericism: An Analysis of the Ismaili Esoteric Approach to Qur'anic Interpretation. *Jurnal Studi Ilmu-Ilmu Al-Qur'an Dan Hadis*, 25(1), 105–120. <https://doi.org/10.14421/qh.v25i1.5392>
- Moch, M. (2022). Critique of Nash< in Contemporary Qur'ānic Hermeneutics Using the Example of Naṣr Ḥāmid Abū Zayd's Works. *Religions*, 13(2). <https://doi.org/10.3390/rel13020187>
- Mujahidin, A., Itmam, M. S., & Rofiq, A. C. (2024). The Dynamic of Contextualization in Indonesian Qura'anic Tafsirs: A Comparative Study of Tafsir Al-Azhar And Tafsir Al-Mishbāh on The Story of The Prophet Moses. *Jurnal Studi Ilmu-Ilmu Al-Qur'an Dan Hadis*, 25(2), 221–246. <https://doi.org/10.14421/qh.v25i2.5397>
- Nawaya, F. R., Burhan, A. S., & Hajji, A. E. (2024). Expansion of the Meaning and Its Influence on Exegesis of Qur'anic Texts. *Forum for Linguistic Studies*, 6(3), 824–836. <https://doi.org/10.30564/fls.v6i3.6657>
- Olshefski, C. A. (2025). Literacy-Rich Religious Literacy: A Critical Approach for ELA Classrooms. In *Religious Literacies in Educational Contexts: Interdisciplinary Perspectives* (pp. 19–36). <https://doi.org/10.4324/9781003536574-3>

- Papakostas, C. (2025). Artificial Intelligence in Religious Education: Ethical, Pedagogical, and Theological Perspectives. In *Religions* (Vol. 16, Issue 5). <https://doi.org/10.3390/rel16050563>
- Pendergast, M., May, L., Bingham, G., & Kurumada, K. S. (2015). Acquiring Responsive Practices: Preservice Teachers Learn to Conduct Interactive Read-Alouds. *Action in Teacher Education*, 37(1), 65–81. <https://doi.org/10.1080/01626620.2014.969851>
- Petersen, E., Hui, D., Hamer, D. H., Blumberg, L., Madoff, L. C., Pollack, M., Lee, S. S., McLellan, S., Memish, Z., Prahara, J., Wasserman, S., Ntoumi, F., Azhar, E. I., Mchugh, T. D., Kock, R., Ippolito, G., Zumla, A., & Koopmans, M. (2020). Li Wenliang, a face to the frontline healthcare worker. The first doctor to notify the emergence of the SARS-CoV-2, (COVID-19), outbreak. *International Journal of Infectious Diseases*, 93(February), 205–207. <https://doi.org/10.1016/j.ijid.2020.02.052>
- Plomp, T., & Nieveen, N. (2007). An introduction to educational design research. *Proceedings of the Seminar Conducted at the East China Normal University, Shanghai (PR China)*, 23.
- Poyas, Y., & Bawardi, B. (2018). Reading literacy in Arabic: What challenges 1st grade teachers face. *L1 Educational Studies in Language and Literature*, 18, 1–15. <https://doi.org/10.17239/L1ESLL-2018.18.01.11>
- Rapi, M., Rusdi, M., & Idris, R. (2024). Challenges and Opportunities of Artificial Intelligence Adoption in Islamic Education in Indonesian Higher Education Institutions. *International Journal of Learning, Teaching and Educational Research*, 23(11), 423–443. <https://doi.org/10.26803/ijlter.23.11.22>
- Richey, R. C., & Klein, J. D. (2014). *Design and Development Research BT - Handbook of Research on Educational Communications and Technology* (J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (eds.); pp. 141–150). Springer New York. https://doi.org/10.1007/978-1-4614-3185-5_12
- Saeed, A. (2013). Reading the Qur'an in the twenty-first century: A contextualist approach. In *Reading the Qur'an in the Twenty-First Century: A Contextualist Approach*. <https://doi.org/10.4324/9781315870922>
- Saeed, A., & Akbar, A. (2021). Contextualist approaches and the interpretation of the Qur'ān. *Religions*, 12(7). <https://doi.org/10.3390/rel12070527>
- Smith, B. H. (2013). Teaching the devout student: Faith and scholarship in the classroom. *Teaching Theology and Religion*, 16(2), 132–149. <https://doi.org/10.1111/teth.12024>
- Stimpson, B., & Calvert, I. (2021). Qur'anic educational philosophy: Foundational principles of education in Islam's holiest text. *Religions*, 12(2), 1–17. <https://doi.org/10.3390/rel12020082>
- Syukri, S., & Subagio, E. A. (2024). Integration and interconnection between Al-afidah and neurosciences in the human learning process. In *Religion, Education, Science and Technology towards a More Inclusive and Sustainable Future: Proceedings of the 5th International Colloquium on Interdisciplinary Islamic Studies (ICIIS 2022), Lombok, Indonesia, 19-20 October 2022* (pp. 139–143). <https://doi.org/10.1201/9781003322054-23>
- Wijisen, L. D., Borsboom, D., & Alexandrova, A. (2022). Values in Psychometrics. *Perspectives*

on *Psychological Science*, 17(3), 788–804. <https://doi.org/10.1177/17456916211014183>
Zakaria, M. Z., Khairuddin, M. N., Isa, A. A. M., Majid, M. A. A., Suparia, F. A. A., & Raffi, M. S. M. (2024). Implicit Meanings in the Quran: A Pragmatic Perspective. *Theory and Practice in Language Studies*, 14(11), 3546–3556. <https://doi.org/10.17507/tpls.1411.23>