

Authentic Assessment in Qur'anic Studies: A Multidimensional Approach to Developing Higher-Order Thinking Skills in Islamic Higher Education

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Abstract. Higher-Order Thinking Skills (HOTS) have become an essential learning outcome in higher education, including Qur'anic studies, where students are expected to interpret religious texts in their contexts critically. However, assessment practices in many Qur'anic learning settings continue to emphasize knowledge acquisition rather than the integrated development of cognitive, psychomotor, and affective competencies. This study examined the contribution of a multidimensional authentic assessment approach to fostering students' HOTS in Qur'anic studies. A mixed-methods sequential explanatory design was employed. The study was conducted at the Faculty of Ushuluddin and Islamic Studies, UIN Imam Bonjol Padang, Indonesia, involving 50 undergraduate students enrolled in the Uṣūl al-Tafsīr wa Qawā'iduhu course. Quantitative data were analyzed using multiple linear regression, while qualitative interview data were analyzed through thematic analysis to explain the statistical findings. The results showed that cognitive, psychomotor, and affective domains collectively made a significant contribution to HOTS. Among these domains, psychomotor engagement emerged as the strongest predictor, indicating that performance-based learning activities such as presentations, academic writing, and interpretive discussions play a central role in the development of higher-order thinking. The qualitative findings further revealed that conceptual understanding, active knowledge application, and reflective engagement operate as complementary processes that strengthen students' analytical and evaluative thinking. These findings suggest that authentic assessment should be viewed not merely as a means of evaluating learning outcomes but as an instructional approach that integrates knowledge, practice, and reflection to promote higher-order thinking. The study contributes to the growing body of research on authentic assessment by providing empirical evidence from the context of Islamic higher education and offering a multidimensional framework for enhancing HOTS in Qur'anic learning.

Keywords: Authentic Assessment, Higher-Order Thinking Skills, Multidimensional Learning, Qur'anic Studies, Islamic Higher Education

INTRODUCTION

The rapid transformation of contemporary civilization, marked by the digital revolution, technological disruption, and increasing global complexity, compels higher education institutions to undertake fundamental reforms to prepare generations of intellectuals who are not only academically competent but also emotionally mature, ethically grounded, and spiritually aware. In Indonesia's pluralistic context, Islamic higher education has a strategic responsibility to cultivate students capable of critical reasoning, respectful engagement with diversity, and balanced judgment when addressing differences (Qodir et al., 2023). The principles of Islamic moderation emphasize an equilibrium between conviction and tolerance, theological commitment and intellectual openness, which align conceptually with the cultivation of Higher-Order Thinking Skills (HOTS). These principles resonate with twenty-first-century competencies that prioritize creativity, collaboration, communication, and critical thinking as essential graduate attributes (Murtonen & Balloo, 2019). Consequently, Qur'anic education in Islamic higher education must move beyond mere knowledge transmission and serve as a dynamic space for fostering deep, reflective, and contextually grounded intellectual engagement.

Although these educational expectations are widely recognized, classroom practices in Qur'anic studies often do not fully reflect them. Preliminary observations conducted during the implementation of the *Uşūl al-Tafsīr wa Qawā'iduhū* course indicated that classroom assessment remained predominantly oriented toward measuring students' mastery of conceptual knowledge through written examinations and recall-based tasks. Opportunities for students to justify interpretations, engage in analytical discussion, and demonstrate reflective reasoning through authentic learning activities were relatively limited. Informal discussions with course lecturers also suggested that assessment practices tended to prioritize cognitive achievement, while affective dispositions and psychomotor performance were evaluated separately or received considerably less attention. As a result, students had fewer opportunities to demonstrate higher-order thinking in authentic interpretive contexts. These preliminary observations are consistent with previous studies reporting that assessment in Islamic higher education often remains text-centered and knowledge-oriented, thereby limiting the development of analytical, evaluative, and creative thinking (D. I. Pratiwi & Waluyo, 2023; Qithrotun Nida Aulia et al., 2025).

Higher-Order Thinking Skills have become a central indicator of educational quality in higher education. HOTS encompass analytical, evaluative, and creative capacities situated at the highest levels of Bloom's revised taxonomy (Piaw et al., 2025). Students who demonstrate well-developed HOTS do not merely comprehend instructional material; they interpret meanings, evaluate arguments, and construct new ideas through systematic, logical reasoning. Empirical findings indicate that students with strong higher-order thinking abilities tend to exhibit greater autonomy, adaptability, and problem-solving competence in complex situations (Foo, 2025). In the context of Qur'anic studies, HOTS are indispensable, as interpreting the Qur'an cannot be limited to memorizing or reproducing classical commentaries. Rather, it requires analytical depth, critical evaluation of interpretive perspectives, and sensitivity to evolving social contexts.

Despite this urgency, instructional and assessment practices in Islamic higher education, particularly in Qur'anic studies, often remain predominantly text-centered and memorization-oriented. Evaluation frequently relies on written examinations that emphasize descriptive mastery of content, thereby limiting opportunities for students to develop analytical, evaluative, and creative competencies (M. F. A. Pratiwi & Amalia, 2021). However, understanding Qur'anic messages demands profound reasoning, contextual interpretation, and the ability to construct arguments that meaningfully connect scriptural principles with contemporary realities. Research by Qithrotun Nida Aulia et al. (2025) demonstrates that analytically oriented and dialogical Qur'anic instruction significantly enhances students' critical and reflective thinking abilities. These findings suggest that the development of HOTS in Qur'anic education depends on learning and assessment designs that create space for dialogue, interpretive exploration, and contextual application of Qur'anic values.

The development of HOTS cannot be reduced to cognitive processes alone. Beyond conceptual understanding and analytical reasoning, higher-order thinking is influenced by affective and psychomotor dimensions of learning. The affective domain encompasses attitudes, values, motivation, and reflective commitment, all of which shape how individuals process information and make judgments (Alafnan, 2025). Students who possess intrinsic motivation, intellectual curiosity, and openness to diverse viewpoints are more likely to engage in sustained critical evaluation. Anderson (2001) emphasizes that emotional engagement in learning catalyzes the development of higher-order thinking. Meanwhile, the psychomotor domain, expressed through academic writing, presentation skills, and active participation in scholarly discussions, plays a crucial role in connecting knowledge to practice (Coffman & Kittur, 2024). In Qur'anic studies, this dimension can be operationalized through thematic interpretation projects, academic debates, and technology-supported analytical presentations that require students to construct and articulate their interpretive reasoning actively.

Therefore, an effective approach to developing HOTS must integrate cognitive, affective, and psychomotor domains simultaneously and systematically. Higher-order thinking emerges not solely from theoretical mastery but from the interaction between conceptual clarity, active engagement, and reflective internalization (Chasokela & Hlongwane, 2024). Studies indicate that instructional designs that integrate affective and psychomotor elements alongside cognitive learning produce deeper understanding and stronger application skills (Halimah, 2021). In this regard, Qur'anic education within Islamic higher education must adopt a multidimensional orientation that treats these domains as interdependent and collectively cultivates higher-order intellectual capacities.

Within this framework, authentic assessment offers a promising pedagogical strategy. Authentic assessment evaluates students through meaningful, contextually grounded tasks that resemble real-world challenges (Sutadji et al., 2021; Wiggins, 1993). In Qur'anic studies, such assessments may include analysis of contemporary social issues through Qur'anic perspectives, thematic interpretation projects, argumentative presentations, and reflective essays addressing current ethical concerns. However, authentic assessment will only be transformative if it operates beyond isolated performance measurement. It must function as a multidimensional system that simultaneously activates cognitive reasoning, affective engagement, and psychomotor articulation within an integrated pedagogical structure (Oroh et al., 2025). Although previous studies have demonstrated the benefits of authentic assessment and higher-order thinking in Islamic education, most have examined the cognitive, affective, and psychomotor domains independently or treated them as parallel learning outcomes rather than as an integrated assessment framework. In addition, empirical evidence from Qur'anic studies remains limited, particularly studies that combine quantitative modeling with qualitative inquiry to explain how these three domains interact in fostering HOTS. Consequently, there remains limited understanding of how authentic assessment can simultaneously foster conceptual understanding, reflective attitudes, and active interpretive performance within a single pedagogical framework. This conceptual and empirical gap highlights the need for a multidimensional approach that explains not only whether authentic assessment supports HOTS but also how the different learning domains work together to promote higher-order thinking in Qur'anic education.

In response to these gaps, this study examines a multidimensional approach to authentic assessment in Qur'anic studies within Islamic higher education. Specifically, it investigates the individual and collective contributions of the cognitive, affective, and psychomotor domains to the development of students' Higher-Order Thinking Skills (HOTS). It explores how these domains interact through authentic assessment practices. By integrating quantitative and qualitative evidence, the study moves beyond conventional assessment models. It offers a more comprehensive understanding of authentic assessment as a pedagogical system that simultaneously promotes conceptual understanding, reflective engagement, and active knowledge construction. The findings

are expected to contribute to both assessment theory and pedagogical practice by providing an empirically grounded framework for strengthening higher-order thinking in Qur'anic education.

METHOD

This study employed a mixed-methods approach using a sequential explanatory design. This research strategy begins with the collection and analysis of quantitative data, followed by a qualitative phase to deepen and clarify the statistical findings (Creswell, 2012). This design was selected to identify statistical patterns and predictive relationships in the initial phase and to subsequently explore the underlying meanings, experiences, and contextual dynamics that explain these patterns and relationships. The integration of quantitative and qualitative data enhances the robustness of the findings by combining numerical precision with interpretive depth, thereby strengthening the study's overall validity (Akker et al., 2013). The research procedure followed a structured sequence: quantitative phase, quantitative data analysis, qualitative phase, qualitative data analysis, and final integration of findings, as illustrated in Figure 1.

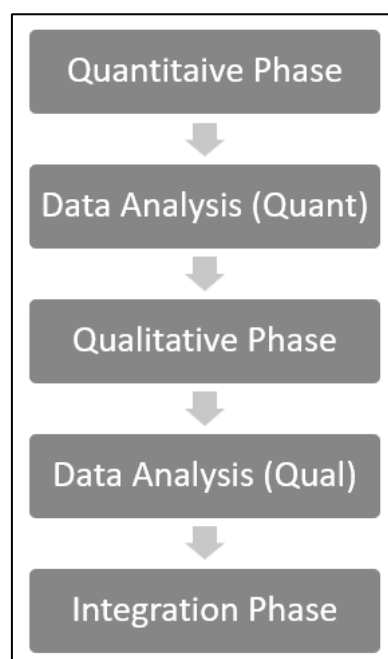


Figure 1. Design Mix Methods Sequential Explanatory

The study was conducted at the Faculty of Ushuluddin and Islamic Studies, UIN Imam Bonjol Padang, within the course *Uşūl al-Tafsīr wa Qawā'iduhū*. This course was purposively selected for its conceptual complexity and potential to foster analytical, reflective, and applied engagement in Qur'anic interpretation. The participants were 50 undergraduate students enrolled in the course during the research period. A purposive sampling technique was employed to ensure that participants had meaningful exposure to authentic assessment practices across cognitive, affective, and psychomotor domains. This selection strategy was intended to ensure that the data accurately reflected the implementation of a multidimensional authentic assessment approach in Qur'anic learning.

Quantitative data were collected using validated assessment instruments and rubrics designed to measure the three learning domains. The cognitive domain was assessed through midterm and final examinations that evaluated students' conceptual understanding and analytical reasoning regarding key principles of *Uşūl al-Tafsīr wa Qawā'iduhū*. The psychomotor domain was assessed using structured rubrics for academic papers, oral presentations, and participation in scholarly discussions, with a focus on students' ability to systematically construct, articulate, and

defend interpretive arguments. The affective domain was assessed using self- and peer-assessment instruments designed to capture reflective attitudes, academic responsibility, openness to diverse perspectives, and engagement in learning processes.

The dependent variable in this study was Higher-Order Thinking Skills (HOTS). HOTS were measured using a structured questionnaire developed based on Bloom's revised taxonomy, with particular emphasis on the cognitive processes of analysis (C4), evaluation (C5), and creation (C6) (Krathwohl, 2002). The instrument consisted of 18 items, comprising six items for each HOTS dimension, thereby ensuring balanced representation of the three higher-order cognitive domains. Responses were recorded using a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). The absence of a neutral response category was intended to encourage respondents to express clear judgments and reduce central tendency bias.

Prior to the main data collection, the questionnaire underwent a rigorous psychometric evaluation. Content validity was established through expert judgment involving three specialists in educational assessment and Islamic education. The evaluation employed Aiken's V coefficient, yielding values ranging from 0.86 to 0.97, indicating that all items demonstrated high content validity and exceeded the recommended acceptance threshold of 0.80. Following the expert review, revisions were made to improve item clarity and alignment with the intended HOTS constructs. A pilot study was subsequently conducted to examine the instrument's internal consistency. Reliability analysis using Cronbach's Alpha produced an overall coefficient of 0.91, with the analysis ($\alpha = 0.88$), evaluation ($\alpha = 0.89$), and creation ($\alpha = 0.90$) subscales all exceeding the recommended criterion of 0.70, indicating excellent reliability. These results confirmed that the questionnaire had adequate validity and reliability for measuring students' Higher-Order Thinking Skills in the context of implementing authentic assessment.

Before conducting regression analysis, statistical assumptions, including normality, linearity, and multicollinearity, were tested to ensure the regression model was appropriate. Descriptive statistics were used to summarize performance across the three learning domains, while multiple linear regression analysis was conducted to examine the predictive contribution of each domain to students' HOTS (Yusuf et al., 2021). Quantitative data were processed using SPSS version 27. The regression model was formulated as follows:

$$Y(\text{HOTS}) = \beta_0 + \beta_1(\text{Cognitive}) + \beta_2(\text{Psychomotor}) + \beta_3(\text{Affective}) \quad (1)$$

where Y represents the HOTS score, β_0 denotes the intercept, and β_1 , β_2 , and β_3 represent the regression coefficients indicating the individual and combined contributions of the independent variables to the dependent variable.

The qualitative phase was conducted after the completion of quantitative analysis to interpret and elaborate on the statistical findings. Participants for this phase were selected through purposeful sampling based on variations in HOTS scores and domain performance levels. Semi-structured interviews were used to elicit participants' descriptions of their learning experiences, perceptions of authentic assessment, and reflections on the development of their higher-order thinking skills, while remaining aligned with the research focus. Qualitative data were analyzed using thematic analysis following Creswell's (2012) procedures, including transcription, open coding, categorization, theme identification, and interpretative synthesis. Integration of quantitative and qualitative findings occurred during the final interpretation stage, in which statistical results were linked to narrative explanations drawn from interview data. Through this integrated approach, the study provides not only numerical evidence of predictive relationships but also a comprehensive understanding of the multidimensional learning dynamics that influence the development of HOTS in Qur'anic education.

FINDINGS

The results of this study are presented in accordance with the mixed-methods sequential explanatory design employed. The presentation begins with quantitative findings to identify empirical patterns and the predictive contributions of the learning domains to students' Higher-Order Thinking Skills (HOTS). This initial quantitative phase provides statistical evidence on the extent to which the cognitive, affective, and psychomotor domains contribute to HOTS within a multidimensional, authentic assessment framework. Qualitative findings from student interviews subsequently elaborate on the quantitative results. The qualitative phase aims to explain and enrich the statistical results by exploring students' learning experiences, perceptions of authentic assessment practices, and the learning dynamics that support the development of higher-order thinking. Through this approach, the findings extend beyond numerical relationships to reveal the underlying processes and meanings associated with the observed statistical patterns.

Quantitative Results

Descriptive statistics were calculated to provide an initial overview of students' performance across the cognitive, psychomotor, affective, and Higher-Order Thinking Skills (HOTS) domains before conducting inferential analyses. Table 1 presents the mean, standard deviation, minimum, and maximum scores for each variable.

Table 1. Descriptive Statistics of the Study Variables

Variable	N	Mean	Standart Deviation	Minimum	Maximum
Cognitive	50	84.07	2.893	78	90
Psychomotor	50	86.86	4.541	77	94
Affective	50	90.13	5.344	79	100
HOTS	50	86.84	3.094	78	92

The descriptive statistics indicate that students demonstrated generally high levels of achievement across all learning domains. Among the independent variables, the affective domain recorded the highest mean score ($M = 90.13$, $SD = 5.344$), suggesting that students exhibited positive learning attitudes, strong motivation, and active participation throughout the learning process. The psychomotor domain also showed a relatively high mean score ($M = 86.86$, $SD = 4.541$), reflecting students' active engagement in performance-based learning activities, including presentations, academic writing, and classroom discussions. Meanwhile, the cognitive domain obtained a mean score of 84.07 ($SD = 2.893$), indicating a consistently good level of conceptual understanding among the participants. The average HOTS score was 86.84 ($SD = 3.094$), with scores ranging from 78 to 92. The relatively small standard deviation suggests that students' higher-order thinking abilities were distributed fairly consistently across the sample, although sufficient variation remained for subsequent inferential analysis. Overall, these descriptive findings indicate that students performed well across the cognitive, psychomotor, and affective domains, with sufficient variability to support further examination of the relationships between these domains and HOTS through multiple regression analysis.

Before conducting multiple linear regression, several classical assumption tests were performed to ensure the data met the statistical requirements for regression modeling. These tests included normality, linearity, and multicollinearity. Meeting these assumptions is essential to ensure the validity, reliability, and interpretability of the regression results. The normality of the data was examined using the Kolmogorov–Smirnov and Shapiro–Wilk tests. A significance value greater than 0.05 indicates that the data are normally distributed. The results of the normality tests are presented in Table 2.

Table 2. Normality Test Results

Variabel	Kolmogorov-Smirnov Sig.	Shapiro-Wilk Sig.
Cognitive	0.091	0.366
Psychomotor	0.200	0.096
Affective	0.200	0.500
HOTS	0.118	0.074

As shown in Table 2, all variables have p-values greater than 0.05 in both tests, indicating that the data for the cognitive, psychomotor, affective, and HOTS domains are normally distributed. Therefore, the assumption of normality is satisfied.

The linearity test was conducted to determine whether the relationships between each independent variable and the dependent variable (HOTS) were linear. The test was performed using the deviation-from-linearity criterion, where a p-value greater than 0.05 indicates a linear relationship. The results are presented in Table 3.

Table 3. Linearity Test Results

Variabel	F	Sig
HOTS*Cognitive	2.592	0.084
HOTS*Psychomotor	1.212	0.311
HOTS*Affective	1.794	0.102

Table 3 shows that the significance values for all variable pairs exceed the 0.05 threshold. This indicates no significant deviation from linearity, and the relationships between the cognitive, psychomotor, and affective domains and HOTS are linear. Consequently, the linearity assumption for multiple regression analysis is fulfilled.

The multicollinearity test was conducted to examine the extent of correlation among the independent variables. Multicollinearity was assessed using tolerance and Variance Inflation Factor (VIF) values. A tolerance value greater than 0.10 and a VIF value lower than 10 indicate the absence of multicollinearity. The results are presented in Table 4.

Table 4. Multicollinearity Test Results

Variabel	Tolerance	VIF
Cognitive	0.995	1.047
Psychomotor	0.980	1.020
Affective	0.947	1.056

As shown in Table 3, all independent variables have tolerance values well above 0.10 and VIF values close to 1. This indicates that there is no multicollinearity among the cognitive, psychomotor, and affective domains. Therefore, each variable contributes independently to the regression model without causing instability in coefficient estimates.

Overall, the results of the assumption tests indicate that the dataset satisfied the principal requirements for multiple regression analysis. The data were normally distributed, the relationships between the independent variables and HOTS were linear, and no evidence of problematic multicollinearity was detected. Therefore, the regression analysis was considered appropriate for examining the individual and combined contributions of the cognitive, psychomotor, and affective domains to students' Higher-Order Thinking Skills.

Multiple regression analysis was performed to examine the individual and combined contributions of the cognitive, psychomotor, and affective domains to students' Higher-Order

Thinking Skills (HOTS). Prior to the analysis, all regression assumptions were verified and found to be satisfactory, indicating that the data were appropriate for regression modeling. The overall results of the regression model are presented in Table 5.

Table 5. Multiple Regression Model Summary

R	R Square	Adjusted R Square	Std. Error	F	Sig
0.873	0.691	0.671	1.774	34.360	<0.001

As shown in Table 5, the regression model produced a multiple correlation coefficient ($R = 0.832$), indicating a strong positive relationship between the three learning domains and students' HOTS. The coefficient of determination ($R^2 = 0.691$) indicates that the cognitive, psychomotor, and affective domains collectively explained 69.1% of the variance in HOTS, with the remaining 30.9% attributable to other factors not included in the present model. The adjusted coefficient of determination (Adjusted $R^2 = 0.671$) remained relatively high, suggesting that the model retained substantial explanatory power after adjusting for the number of predictors.

Furthermore, the regression model was statistically significant ($F = 34.360, p < .001$), indicating that the three predictor variables jointly explained variation in students' Higher-Order Thinking Skills. The individual contributions of each learning domain to HOTS are presented in Table 6.

Table 6. Regression Coefficients

Predictor	B	t	Sig.
(Constant)	9.804	1.112	0.272
Cognitive	0.247	2.751	0.008
Psychomotor	0.365	6.649	<0.001
Affective	0.273	5.609	<0.001

The regression coefficients presented in Table 6 indicate that all three learning domains made significant positive contributions to HOTS. The cognitive domain showed a positive and statistically significant effect ($\beta = 0.231, t = 2.751, p = .008$), suggesting that stronger conceptual understanding was associated with higher HOTS scores. Likewise, the affective domain significantly predicted HOTS ($\beta = 0.472, t = 5.609, p < .001$), indicating that students' attitudes, motivation, and reflective engagement contributed meaningfully to higher-order thinking.

Among the three predictors, the psychomotor domain demonstrated the strongest standardized regression coefficient ($\beta = 0.535, t = 6.469, p < .001$), making it the most influential predictor of HOTS. This finding suggests that students who actively participated in performance-based learning activities, such as academic presentations, classroom discussions, and scientific writing, tended to demonstrate stronger higher-order thinking skills than those whose learning was primarily reflected through cognitive achievement alone. Based on the regression analysis, the estimated regression equation can be expressed as follows:

$$Y (\text{HOTS}) = 9.804 + 0.247(\text{Cognitive}) + 0.365(\text{Psychomotor}) + 0.273(\text{Affective}) \quad (2)$$

The equation indicates that improvements in each learning domain were associated with corresponding increases in HOTS, assuming that the other variables remained constant. The larger regression coefficient observed for the psychomotor domain further supports its prominent role in explaining variations in students' higher-order thinking performance. Overall, these findings suggest that authentic assessment should not be viewed solely as an evaluation of cognitive achievement. Rather, learning activities that engage students cognitively, behaviorally, and affectively collectively

contribute to the development of higher-order thinking, with active performance emerging as the most influential component in the present model.

Qualitative Results

The qualitative phase was conducted after the quantitative analysis to provide a deeper understanding of the statistical findings. Participants were selected through purposive sampling based on variation in their Higher-Order Thinking Skills (HOTS) scores from the quantitative phase. This sampling strategy enabled the researcher to capture diverse learning experiences and perceptions regarding the implementation of authentic assessment in the *Uşūl al-Tafsīr wa Qawā'idubū* course. To ensure confidentiality, participants were assigned anonymous identification codes (P1–P6). These codes are used consistently throughout the presentation of the qualitative findings. The participant profiles are presented in Table 7.

Table 7. Profile of Interview Participants

Participant	Gender	HOTS Category	Selection Rationale
P1	Female	High	Representative of students with consistently high HOTS performance
P2	Male	High	Representative of students actively engaged in authentic learning activities
P3	Female	Moderate	Representative of average academic achievement
P4	Male	Moderate	Representative of moderate HOTS performance
P5	Female	Low	Representative of students experiencing learning challenges
P6	Male	Low	Representative of students with relatively low HOTS performance

Theme 1: Cognitive Engagement as the Foundation of Higher-Order Thinking

The first theme highlights the importance of conceptual understanding as the foundation for developing higher-order thinking in Qur'anic studies. Students consistently explained that a solid understanding of the principles of Qur'anic interpretation enabled them to analyze verses more critically, compare different scholarly opinions, and construct more logical interpretations. Rather than simply memorizing interpretive concepts, students emphasized the importance of understanding the reasoning behind different interpretations before concluding.

One participant stated:

“When I understand the principles of interpretation clearly, I can compare different interpretations and decide which argument is more convincing. Without understanding the concepts, I only repeat what the lecturer explains.” (P2, High HOTS)

Another participant explained:

“Learning the theoretical framework helps me organize my analysis. It becomes easier to identify the strengths and weaknesses of different interpretations.” (P3, Moderate HOTS)

These responses indicate that conceptual mastery serves as the intellectual basis for analytical and evaluative thinking. However, students also acknowledged that conceptual understanding alone was insufficient without opportunities to apply concepts through authentic learning activities. This finding supports the quantitative result showing that the cognitive domain significantly contributed to HOTS, although its influence was smaller than that of the psychomotor domain.

Theme 2: Psychomotor Engagement as the Primary Driver of HOTS

The second theme revealed that active participation in authentic learning activities played a decisive role in developing students' higher-order thinking skills. Participants consistently described presentations, classroom discussions, and scientific writing as the learning experiences that most strongly challenged them to analyze evidence, defend interpretations, and respond to alternative viewpoints.

One participant commented:

"Preparing presentations forced me to study the topic more deeply because I had to explain and defend my interpretation in front of my classmates." (P1, High HOTS)

Another participant added:

"Writing academic papers made me rethink my arguments several times. Feedback from lecturers and classmates encouraged me to improve my interpretation." (P4, Moderate HOTS)

These experiences demonstrate that performance-based learning activities encouraged students to move beyond knowledge acquisition toward knowledge construction. Students were required not only to understand Qur'anic concepts but also to communicate, defend, and refine their interpretations through continuous interaction. This finding provides qualitative support for the regression analysis, which identified the psychomotor domain as the strongest predictor of HOTS.

Theme 3: Affective Engagement as a Sustaining Factor

The third theme illustrates how affective engagement supported the development of higher-order thinking by fostering motivation, openness, and reflective learning. Participants frequently mentioned that personal interest in Qur'anic studies and emotional engagement with contemporary issues motivated them to explore different interpretations more critically.

One participant explained:

"When the discussion relates to real social issues, I become more interested in exploring different interpretations because I want to understand how the Qur'an can provide guidance." (P5, Low HOTS)

Another participant stated:

"Listening to different opinions during classroom discussions taught me to appreciate other perspectives before making conclusions." (P6, Low HOTS)

These findings suggest that positive learning attitudes and reflective dispositions encouraged students to remain engaged in analytical thinking throughout the learning process. Although the affective domain was not the strongest predictor in the regression model, it played an essential role in sustaining students' motivation and openness during authentic learning activities.

Integration of Quantitative and Qualitative Results

The integration of quantitative and qualitative findings provides a comprehensive understanding of how a multidimensional, authentic assessment approach contributes to the development of Higher-Order Thinking Skills (HOTS) in Qur'anic studies. This integration was conducted during the interpretation stage by systematically linking statistical results to thematic insights derived from student interviews.

Quantitatively, the regression analysis showed that the cognitive, psychomotor, and affective domains collectively accounted for a substantial proportion of the variance in students' HOTS, with the psychomotor domain emerging as the strongest predictor. These results indicate that students'

active engagement significantly influences higher-order thinking in learning tasks that require analysis, evaluation, and articulation of ideas.

Qualitative findings provide explanatory depth to these statistical relationships. The theme of cognitive engagement clarifies that conceptual understanding serves as the intellectual foundation for higher-order reasoning, enabling students to analyze and evaluate interpretive arguments more systematically. However, cognitive mastery alone was insufficient to activate HOTS without opportunities for full active application. This explains why the cognitive domain, although significant, did not emerge as the strongest predictor in the quantitative model.

The prominence of the psychomotor domain in the regression results is further supported by qualitative evidence indicating that activities such as presentations, academic writing, and interpretive discussions serve as critical spaces where higher-order thinking is enacted. Through these activities, students were compelled to synthesize knowledge, defend interpretations, and respond to critique, thereby transforming conceptual understanding into observable higher-order cognitive performance.

Similarly, the affective domain's significant contribution to HOTS is supported by qualitative insights indicating that motivation, reflective attitudes, and openness to diverse perspectives sustain students' engagement in higher-order thinking processes. Affective engagement was shown to influence the persistence and depth of students' analytical efforts, suggesting that HOTS development is not merely a technical cognitive process but also an attitudinal and emotional commitment.

Taken together, the integrated findings confirm that the development of HOTS in Qur'anic studies is best understood as a multidimensional process resulting from the dynamic interaction of cognitive understanding, psychomotor practice, and affective engagement. Authentic assessment operates as the pedagogical mechanism that brings these domains into productive alignment, enabling higher-order thinking to emerge in a holistic and sustained manner. This integrated interpretation provides a coherent foundation for the subsequent discussion of the study's theoretical implications and pedagogical contributions.

DISCUSSION

This study provides empirical evidence that the development of Higher-Order Thinking Skills (HOTS) in Qur'anic studies is best understood as a multidimensional learning process that emerges from the interaction of cognitive, psychomotor, and affective domains within authentic assessment practices. The regression analysis demonstrated that these three domains collectively explained **69.1%** of the variance in students' HOTS, indicating that authentic assessment contributes substantially to students' higher-order thinking while still allowing room for other educational and individual factors to influence learning outcomes. This finding reinforces the growing body of literature suggesting that HOTS cannot be adequately explained through cognitive achievement alone but instead develops through the integration of knowledge, action, and reflective engagement (Binti Misrom et al., 2020; Hamdan et al., 2024). Rather than merely serving as an evaluation tool, authentic assessment appears to function as a pedagogical process that encourages students to construct, demonstrate, and refine their understanding through meaningful learning experiences.

The overall contribution of the three learning domains supports previous research indicating that holistic learning environments are more effective at promoting higher-order thinking than instructional approaches that emphasize conceptual mastery alone (Alafnan, 2025; Crawford & Smith, 2014). Authentic assessment creates opportunities for students not only to acquire knowledge but also to apply, communicate, and evaluate that knowledge within realistic academic contexts. Consequently, learning becomes an active process in which thinking, performance, and reflection continuously interact. This finding further strengthens the argument that assessment

should be viewed as an integral component of learning rather than as a final stage for measuring achievement.

One of the most significant findings of this study is that the psychomotor domain emerged as the strongest predictor of HOTS, even though the affective domain recorded the highest average score among the participants. This finding deserves particular attention because it departs from the common expectation that students with stronger motivation or higher conceptual understanding would automatically demonstrate superior higher-order thinking. Instead, the present results suggest that students develop HOTS most effectively when they are required to actively perform intellectual tasks rather than to understand concepts or demonstrate positive learning attitudes. Performance-based learning activities such as presentations, academic writing, interpretative discussions, and collaborative problem-solving appear to provide the conditions through which conceptual understanding is transformed into analytical reasoning, evaluative judgment, and creative interpretation.

This interpretation is consistent with previous studies highlighting the important role of performance-based and task-oriented learning in activating higher-order cognitive processes (Ismail et al., 2023; Nikolic et al., 2024). From a constructivist perspective, learning activities that require students to explain, defend, and revise their interpretations encourage them to reorganize existing knowledge into more sophisticated cognitive structures (Jarutkamolpong & Kwangmuang, 2025). The qualitative findings reinforce this explanation. Students consistently reported that preparing presentations, writing academic papers, and responding to questions during classroom discussions required them to analyze evidence, justify interpretations, and synthesize multiple viewpoints before reaching conclusions. These learning experiences closely reflect the evaluation (C5) and creation (C6) levels of Bloom's revised taxonomy (Krathwohl, 2002) and support findings from inquiry-based and project-based learning research demonstrating that higher-order thinking develops through active knowledge construction rather than passive knowledge acquisition (Baloyi, 2023; Wu et al., 2024).

The findings also reaffirm the essential role of the cognitive domain in supporting the development of HOTS. Students with stronger conceptual understanding of Qur'anic interpretation were generally better prepared to compare interpretative approaches, evaluate arguments, and formulate coherent explanations. This finding is consistent with earlier research showing that analytical and evaluative thinking depends upon mastery of disciplinary concepts and methodological principles (Ismail et al., 2023; Wakifah et al., 2023). Nevertheless, the present study also demonstrates that conceptual understanding alone is insufficient to explain variations in HOTS. Students themselves acknowledged in the interviews that theoretical knowledge became meaningful only when applied through authentic academic activities. This finding provides additional support for previous critiques of traditional assessment practices that rely predominantly on memorization and comprehension, thereby limiting opportunities for students to demonstrate higher-order thinking (Alanazi et al., 2024; Narimo et al., 2025).

Although the affective domain did not emerge as the strongest statistical predictor, it remained a significant contributor to HOTS and should not be interpreted as less important. Interestingly, the descriptive analysis revealed that the affective domain had the highest average score among all variables, indicating that students generally had positive learning attitudes, strong motivation, and openness to the learning process. However, the regression analysis suggests that these favorable dispositions contribute to HOTS only when accompanied by opportunities for active intellectual engagement. This distinction between the level of achievement and predictive contribution represents one of the important insights of the present study. Positive attitudes appear to provide the psychological foundation for higher-order thinking, whereas authentic performance-based activities serve as the mechanism by which these attitudes translate into observable cognitive performance. This interpretation aligns with educational psychology research highlighting the reciprocal relationship between affective engagement and deep learning (Naseer et al., 2024; Pearlin

& Gandhi, 2024). Within the context of Qur'anic education, where interpretation requires ethical sensitivity as well as intellectual reasoning, affective engagement also encourages students to appreciate diverse perspectives and engage more thoughtfully with contemporary issues (Qithrotun Nida Aulia et al., 2025).

Another aspect that deserves consideration is the explanatory power of the regression model. Although the cognitive, psychomotor, and affective domains jointly explained a substantial proportion of the variance in HOTS ($R^2 = 0.691$), approximately one-third of the variance remained unexplained. This finding indicates that higher-order thinking is influenced by additional factors beyond authentic assessment, including prior knowledge, self-regulated learning, metacognitive awareness, instructional quality, collaborative learning experiences, and individual learning strategies. Therefore, the present findings should be interpreted as demonstrating the substantial contribution of multidimensional authentic assessment rather than suggesting that authentic assessment alone determines students' higher-order thinking. This interpretation also addresses the possibility of conceptual proximity between authentic assessment domains and HOTS by acknowledging that higher-order thinking develops within a broader educational ecosystem rather than through a single instructional component.

Taken together, the quantitative and qualitative findings provide a coherent explanation of how authentic assessment supports the development of HOTS in Qur'anic studies. The quantitative analysis identifies the relative contribution of each learning domain, whereas the qualitative findings explain the learning processes through which these contributions occur. This integration illustrates the strength of the sequential explanatory mixed-methods design, enabling statistical relationships to be interpreted through students' lived learning experiences. Consequently, authentic assessment should be understood not simply as an assessment framework but as a comprehensive pedagogical approach that integrates conceptual understanding, active performance, and reflective engagement into a unified learning experience. This perspective extends previous models of authentic assessment by demonstrating their applicability within the epistemological and pedagogical context of Islamic higher education (Oroh et al., 2025).

From a theoretical perspective, this study contributes to the literature by strengthening the multidimensional perspective of authentic assessment and positioning assessment as a transformative component of learning rather than merely an instrument for measuring achievement. This perspective is consistent with holistic educational philosophies in Islamic education that emphasize integrating knowledge ('ilm), practice ('amal), and moral values (akhlaq) to develop intellectually capable and ethically responsible individuals. Practically, the findings suggest that lecturers in Islamic higher education should design assessment activities that combine conceptual analysis, authentic performance, reflective dialogue, and collaborative learning experiences. Such an approach not only strengthens students' Higher-Order Thinking Skills but also preserves the epistemological and ethical characteristics of Qur'anic learning while responding to contemporary demands for critical, analytical, and reflective graduates.

CONCLUSION

The present study demonstrates that authentic assessment substantially contributes to the development of Higher-Order Thinking Skills (HOTS) in Qur'anic studies through the integrated interaction among the cognitive, psychomotor, and affective learning domains. The most significant finding is that the psychomotor domain emerged as the strongest predictor of HOTS, despite the affective domain recording the highest average score among students. This finding suggests that higher-order thinking is developed not only through conceptual understanding or positive learning attitudes but, more importantly, through active intellectual performance. Learning activities such as presentations, academic writing, interpretative discussions, and collaborative inquiry provide meaningful opportunities for students to analyze, evaluate, defend, and refine their

understanding of Qur'anic texts. These findings indicate that authentic assessment functions not merely as a means of measuring learning outcomes but also as an instructional approach that actively promotes higher-order thinking.

From a theoretical perspective, this study extends previous research on authentic assessment by demonstrating that HOTS in Qur'anic studies emerges from the dynamic interaction among conceptual understanding, active performance, and reflective engagement rather than from cognitive achievement alone. The integration of quantitative and qualitative findings provides empirical support for a multidimensional framework for authentic assessment, particularly relevant to Islamic higher education. Unlike many previous studies that have examined cognitive, affective, and psychomotor domains separately, this study highlights how these domains complement one another within authentic learning environments. Consequently, the study contributes to both assessment theory and Qur'anic pedagogy by repositioning authentic assessment as a transformative component of learning that simultaneously develops intellectual competence, practical engagement, and ethical reflection.

This study is subject to several limitations. First, the participants were drawn from a single course at a single Islamic higher education institution, which may limit the generalisability of the findings to other educational contexts. Second, the qualitative phase involved a relatively small number of interview participants, reflecting the explanatory purpose of the mixed-methods design rather than broad representation. Third, although the regression model explained a substantial proportion of the variance in HOTS, other potentially influential variables—such as self-regulated learning, metacognitive awareness, prior knowledge, instructional quality, and collaborative learning experiences—were beyond the scope of the present investigation. Future research should therefore examine multidimensional authentic assessment across multiple institutions and educational levels, employ longitudinal or comparative research designs, and incorporate additional cognitive and motivational variables to provide a more comprehensive understanding of how higher-order thinking develops in Qur'anic education and other disciplines within Islamic higher education.

REFERENCES

- Akker, J. van den, Bannan, B., Kelly, A. E., Plomp, Tjeerd, & Nieveen, Nienke. (2013). *Educational design research. Part A: an introduction*. SLO.
- Alafnan, M. A. (2025). Enhancing educational outcomes using Alafnan taxonomy: integrating cognitive, affective, and psychomotor domains. *International Journal of Evaluation and Research in Education*, 14(3), 2419–2437. <https://doi.org/10.11591/ijere.v14i3.33147>
- Alanazi, A. A., Osman, K., & Halim, L. (2024). Integrating Digital Assessment in Physics Education: Enhancing Higher-Order Thinking and Problem-Solving Skills of Students in Technical Colleges in the Kingdom of Saudi Arabia. In *Lecture Notes in Educational Technology: Part F3676* (pp. 327–347). https://doi.org/10.1007/978-981-97-6136-4_15
- Anderson, L. W., K. D. R. (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Addison Wesley Longman, Inc.
- Baloyi, O. B. (2023). Development of higher-order thinking skills in nursing students through online problem-based assessment. *Health SA Gesondheid*, 28. <https://doi.org/10.4102/hsag.v28i0.2423>
- Binti Misrom, N. S., Muhammad, A. S., Abdullah, A. H., Osman, S., Hamzah, M. H., & Fauzan, A. (2020). Enhancing Students' Higher-Order Thinking Skills (HOTS) Through an Inductive Reasoning Strategy Using GeoGebra. *International Journal of Emerging Technologies in Learning (IJET)*, 15(03), 156. <https://doi.org/10.3991/ijet.v15i03.9839>

- Chasokela, D., & Hlongwane, J. (2024). Assessing Higher-Order and Critical Skills in the Era of Artificial Intelligence. In *Educational Assessments in the Age of Generative AI* (pp. 285–314). <https://doi.org/10.4018/979-8-3693-6351-5.ch010>
- Coffman, A. L., & Kittur, J. (2024). Engineering Students' Perceptions of Psychomotor Domain of Learning: A Qualitative Investigation. *2024 IEEE International Conference on Teaching, Assessment and Learning for Engineering, TALE 2024 - Proceedings*, 1–8. <https://doi.org/10.1109/TALE62452.2024.10834385>
- Crawford, C. M., & Smith, M. S. (2014). Rethinking Bloom's taxonomy: Implicit cognitive vulnerability as an impetus towards higher-order thinking skills. In *Exploring Implicit Cognition: Learning, Memory, and Social Cognitive Processes* (pp. 86–103). <https://doi.org/10.4018/978-1-4666-6599-6.ch004>
- Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (M. Karen, Ed.; 4th ed.). Pearson.
- Foo, S. Y. (2025). Investigating gifted students' higher-order thinking skills in a differentiated learning environment: A case study. *Gifted Education International*, 41(2), 236–259. <https://doi.org/10.1177/02614294241305766>
- Halimah, S. (2021). Implementasi Pendekatan HOTS (Higher Order Thinking Skills) dalam Pembelajaran PAI. *Evaluasi: Jurnal Manajemen Pendidikan Islam*, 5(2), 342–362. <https://doi.org/10.32478/evaluasi.v5i2.762>
- Hamdan, N., Heong, Y. M., Masran, S. H., Kiong, T. T., Sutadji, E., & Fuada, S. (2024). Exploring Marzano Higher-Order Thinking Skills: Demographic Disparities Among Technical Students. *Journal of Technical Education and Training*, 16(2), 103–118. <https://doi.org/10.30880/JTET.2024.16.02.009>
- Ismail, R., Erawadi, E., & Zulhammi, Z. (2023). Implementasi Penilaian Autentik pada Mata Pelajaran Al-Qur'an Hadis di MAN 1 Tapanuli Tengah. *ISLAMIKA*, 5(3), 3683–3702.
- Jarutkamolpong, S., & Kwangmuang, P. (2025). Enhancing undergraduate creative thinking through a constructivist mobile learning application: Design, development, and evaluation. *Thinking Skills and Creativity*, 57, 101866. <https://doi.org/10.1016/j.tsc.2025.101866>
- Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. In *Theory into Practice* (Vol. 41, Number 4, pp. 212–218). https://doi.org/10.1207/s15430421tip4104_2
- Murtonen, M., & Balloo, K. (2019). Redefining scientific thinking for higher education: Higher-Order Thinking, evidence-based reasoning, and research skills. In M. Murtonen & K. Balloo (Eds.), *Redefining Scientific Thinking for Higher Education: Higher-Order Thinking, Evidence-Based Reasoning and Research Skills*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-24215-2>
- Narimo, S., Sulistyanto, H., Prayitno, H. J., Wulandari, M. D., Setyabudi, D. P., Sumardjoko, B., Anif, S., & Awaludin, A. (2025). An empirical study in Indonesia: Is adaptive inquiry learning effective for improving higher-order thinking skills of elementary school students? *International Journal of Innovation and Learning*, 37(2), 179–194. <https://doi.org/10.1504/IJIL.2025.144198>
- Naseer, F., Khan, M. N., Tahir, M., Addas, A., & Aejaaz, S. M. M. H. (2024). Integrating deep learning techniques for personalized learning pathways in higher education. *Heliyon*, 10(11), e32628. <https://doi.org/10.1016/j.heliyon.2024.e32628>
- Nikolic, S., Suesse, T. F., Grundy, S., Haque, R., Lyden, S., Hassan, G. M., Daniel, S., Belkina, M., & Lal, S. (2024). Laboratory learning objectives: ranking objectives across the cognitive, psychomotor, and affective domains within engineering. *European Journal of Engineering Education*, 49(3), 454–473. <https://doi.org/10.1080/03043797.2023.2248042>
- Oroh, E. Z., Ali, M. I., Pelenkahu, N., Usman, H., & Rorintulus, O. A. (2025). Authentic Assessment in Higher Education to Increase Critical Thinking and Develop Metacognitive Awareness. *Studies in English Language and Education*, 12(2), 827–844. <https://doi.org/10.24815/siele.v12i2.45077>

- Pearlin, E., & Gandhi, S. M. G. (2024). Enhancing User Behavior Analysis in Mobile Language Learning Apps Through Gamification and AI Integration: A Transformer-Based Deep Learning Approach. *2nd IEEE International Conference on Data Science and Network Security, ICDSNS 2024*, 1–6. <https://doi.org/10.1109/ICDSNS62112.2024.10690955>
- Piaw, C. Y., Ying, L. F., & Chiat, L. F. (2025). Unveiling key e-learning ingredients for enhancing higher-order thinking skills. *Discover Education*, 4(1), 202. <https://doi.org/10.1007/s44217-025-00600-9>
- Pratiwi, M. F. A., & Amalia, E. R. (2021). The Comparison of Boarding School Students' Capability in Solving HOTS Questions of the Islamic History Subject. *Nazbruna: Jurnal Pendidikan Islam*, 4(1), 60–73. <https://doi.org/10.31538/nzh.v4i1.998>
- Qithrotun Nida Aulia, Sholahuddin Al Ayubi, & Salim Rosyadi. (2025). Critical Thinking Dalam Al-Qur'an: Studi Tafsir Tematik dan Implementasinya di Era Digital. *Al-Fahmu: Jurnal Ilmu Al-Qur'an dan Tafsir*, 4(1), 131–149. <https://doi.org/10.58363/alfahmu.v4i1.473>
- Qodir, Z., Nashir, H., & Hefner, R. W. (2023). Muhammadiyah is making Indonesia's Islamic moderation based on maqāsid sharī'ah. *Ijtihad: Jurnal Wacana Hukum Islam Dan Kemanusiaan*, 23(1), 77–92. <https://doi.org/10.18326/IJTIHAD.V23I1.77-92>
- Sutadji, E., Susilo, H., Wibawa, A. P., Jabari, N. A. M., & Rohmad, S. N. (2021). Authentic assessment implementation in natural and social science. *Education Sciences*, 11(9), 534. <https://doi.org/10.3390/educsci11090534>
- Wakifah, W., Fatimah, F., & Sulistiawati, M. (2023). Optimization of Higher-Order Thinking Skills (HOTS) in Islamic Education towards the Era of Society 5.0. *Didaktika: Jurnal Kependidikan*, 17(2), 55–63. <https://doi.org/10.30863/didaktika.v17i2.5750>
- Wiggins, G. (1993). *Assessing Student Performance: Authentic Assessment for Better Teaching and Learning*. Jossey-Bass.
- Wu, T. T., Silitonga, L. M., & Murti, A. T. (2024). Enhancing English writing and higher-order thinking skills through computational thinking. *Computers and Education*, 213, 105012. <https://doi.org/10.1016/j.compedu.2024.105012>
- Yusuf, I., Widyaningsih, S. W., Prasetyo, Z. K., & Istiyono, E. (2021). The evaluation of the use of e-learning media to improve HOTS through authentic and holistic assessments. *Journal of Physics: Conference Series*, 1806(1), 012014. <https://doi.org/10.1088/1742-6596/1806/1/012014>