

Android Based Religious Moderation Learning Module: Strengthening Moderate Character of College Students

ABSTRACT

Authors: Fauziah Zainuddin¹,
Muh.Yamin^{2*}, Arwan Wiratman³,
Muhammad Hasbi⁴

Affiliation: ¹²³State Islamic
University of Palopo, Indonesia,

⁴University of As'adiyah Islamic
Sengkang, Indonesia

*Corresponding author:
muhammadyamin@uinpalopo.ac.id

Received: 30 October 2025 |
First revision: 7 January 2026 |
Second revision: 1 June 2026 |
Accepted: 5 June 2026

This work is licensed under a



Creative Commons Attribution 4.0
International License

APA citation for this article:

Zainuddin, F., Yamin, M., Wiratman, A.,
& Hasbi, M. (2026). Android-based
religious moderation learning module:
Strengthening moderate character of
college students. *Journal of Institutional
Research South East Asia*, 24(1), 55-77.

Traditional media in Islamic higher education often fail to address specific religious moderation gaps or align with students' digital preferences, leaving low-performing learners behind. This study developed and evaluated an Android-based module to strengthen students' moderate characters at State Islamic University of Palopo (UIN Palopo) using the R and D approach and the ADDIE model involving 127 students. Diagnostic assessments revealed critical baseline gaps in anti-violence (80%) and local culture accommodation (85%), alongside an 85% preference for mobile learning. To address this, the module integrated contextual videos, interactive quizzes, and virtual forums. Expert validation categorized the module as "Very Valid" (content: 90%, media: 92.75%, language: 90.50%), while field implementation proved "Very Practical" (90.75%). Inferential analysis confirmed significant character internalization; the Wilcoxon Signed-Rank Test showed a profound pre- to post-test improvement ($Z = -9.782$, $p = 0.000$, $r = 0.868$) with a Normalized Gain index of 0.6511 (moderate-to-high effectiveness). Crucially, the intervention compressed the learning gap by raising the minimum score from 50 to 75, eliminating low-performing distributions. This study contributes an empirically proven, scalable digital framework for character education. It offers a practical solution for university administrators to systematically equalize and foster inclusive, tolerant, and peaceful moderation values among 21st-century learners.

Keywords: Learning Module, Religious Moderation, Moderate Character, Android-Based Learning, Islamic Higher Education, Tolerance, Anti-Violence, Local Culture

1. Introduction

In the digital era, higher education has been reshaped in ways that are both rapid and complex, largely due to continuous advances in information and communication technology. Although the integration of mobile technology and Android-based applications in universities has expanded globally to facilitate flexible, anytime-anywhere learning (Khlaisang & Sukavatee, 2023; Keane et al., 2022), current international scholarship highlights a critical pedagogical gap: most mobile learning frameworks remain heavily confined to cognitive knowledge transfer and technical skill acquisition, while their formulation for internalizing affective moral values and character development remains poorly explored (Almogren et al., 2024; Antoninis et al., 2023). While digital platforms are extensively utilized for organizing coursework and accessing learning materials (Keane et al., 2022), turning these interactive environments into spaces for deep socio-ethical reflection requires moving beyond basic content delivery toward sophisticated, value-driven instructional design (Paccoud et al., 2024). Under these conditions, higher education institutions are increasingly expected to integrate innovative digital learning solutions into their curricula not just to widen access (Dwidienawati, 2021), but to actively cultivate students' socio-emotional competencies.

Alongside technological change, universities are also confronted with moral and social challenges that demand serious attention, particularly the growing tendency toward intolerance, exclusivism, and rigid religious interpretations among young adults (Baba et al., 2023; Fathurrochman et al., 2020; Kamal, 2021). This phenomenon is not unique to Indonesia; globally, higher education institutions are grappling with rising polarization, hate speech, and cultural exclusivism among students, prompting an international shift toward technology-assisted empathy and cross-cultural character education (Antoninis et al., 2023; Chiu, 2024). Recent global studies demonstrate that addressing these behavioral risks requires shifting from purely normative lectures to structured digital interventions that actively foster global citizenship, mutual respect, and peaceful coexistence (Arnab & Walaszczyk, 2022). In the Indonesian context, education for religious moderation plays a strategic role in preventing the spread of radical ideologies and in fostering values of peace, mutual respect, and national unity among students (Hamidy et al., 2022).

The urgency of strengthening moderate character becomes even more apparent when viewed from the position of higher education institutions. University students are future intellectuals, educators, policymakers, and religious figures whose perspectives will significantly influence social and national discourse. Universities function not only as spaces for knowledge transmission, but also as arenas where religious interpretations, civic values, and personal identities are continuously negotiated. Without systematic and intentional efforts to cultivate moderate character, students may become increasingly vulnerable to exclusivist or intolerant narratives encountered both within academic settings and through digital media and social networks.

Despite widespread recognition of the importance of values education, instructional practices in Islamic higher education institutions often suffer from severe pedagogical stagnation, relying heavily on text-based content and passive, teacher-centered approaches (Hendricks, 2022). Scholars argue that traditional instructional resources fail to bridge the gap between abstract moral theories and real-world ethical dilemmas, often unintentionally reinforcing rigid or unreflective viewpoints (Fajri, 2022). This conventional limitation is further exacerbated when universities attempt to digitalize materials by merely converting static text into passive PDF documents; international research indicates that simple, passive digital consumption does not

stimulate the critical thinking or cross-cultural empathy necessary for character transformation (Chiu, 2024; Zhang et al., 2026). Consequently, there is a clear empirical and instructional gap for highly interactive, value-oriented, and digitally structured learning environments that can dynamically transform students' moral dispositions within the higher education curriculum.

To resolve this instructional bottleneck, the development of a dedicated Android-based learning module on religious moderation offers a contextually relevant and pedagogically rigorous solution. Mobile-assisted learning environments should not be viewed merely as convenient delivery tools; rather, when properly integrated with multimedia case studies, reflective tasks, and collaborative discussion features, they can foster deeper cognitive processing and systematic value internalization (Huda, 2022; Kozłowska, 2020; Mardatillah et al., 2023). This approach directly resonates with global evidence showing that micro-learning and mobile-based interactive scenarios are highly effective in shifting student attitudes, increasing social empathy, and fostering cross-cultural tolerance by allowing self-paced, continuous reflection (Arnab & Walaszczyk, 2022; Paccoud et al., 2024). By accommodating diverse learning styles while promoting active participation, this digital approach provides a viable mechanism for translating the core dimensions of moderation—tolerance, non-violence, and cultural accommodation—into internalized personal characters.

This study was conducted at the State Islamic University of Palopo, an Islamic higher education institution with a strong commitment to inclusive and moderate religious values. As an academic community that brings together students from varied social and cultural backgrounds, UIN Palopo occupies a strategic position in shaping students' religious orientations and civic commitments. Its institutional vision and curricular framework emphasize religious moderation as a foundational element of character development and social harmony (Labobar, 2024; Sya'bani, 2021). This context provides a suitable and meaningful setting for the development and evaluation of an Android-based learning module designed to strengthen moderate character among university students.

Based on these considerations, the present study adopts a Research and Development (R&D) approach using the ADDIE instructional design model to design, develop, and evaluate an Android-based learning module on religious moderation. The study focuses on three core dimensions of moderate character, namely tolerance, anti-violence, and accommodative attitudes toward local culture, which are widely recognized as key indicators of religious moderation (Latif et al., 2023; Sá & Serpa, 2018; Umiarso & Qorib, 2022). Accordingly, this study aims to examine the validity, practicality, and effectiveness of the developed module in strengthening students' moderate character within the context of Islamic higher education.

Research Objectives

This study aims to develop and evaluate an Android-based religious moderation learning module to strengthen the moderate character of students in Islamic higher education. Specifically, the objectives of this study are:

- O1. To analyze students' learning needs and baseline levels of moderate character related to tolerance, anti-violence, and accommodative attitudes toward local culture.
- O2. To design and develop an Android-based learning module on religious moderation using the ADDIE instructional design model.
- O3. To evaluate the validity of the developed learning module based on expert judgments in terms of content, media, and language.

- O4. To assess the practicality of the Android-based learning module from students' perspectives.
- O5. To examine the effectiveness of the learning module in improving students' moderate character in Islamic higher education.

Research Questions

Based on the research objectives, the following research questions are formulated:

- RQ1. What are the learning needs and baseline levels of moderate character among students at UIN Palopo?
- RQ2. How can an Android-based religious moderation learning module be designed and developed using the ADDIE model?
- RQ3. To what extent is the developed learning module valid based on evaluations by content, media, and language experts?
- RQ4. How practical is the Android-based religious moderation learning module when implemented in the learning process?
- RQ5. How effective is the learning module in improving students' moderate character, as measured through pre-test and post-test results?

2. Literature Review

To support this overarching aim and effectively transition from abstract concepts into concrete student character development, this study establishes a robust conceptual framework by aligning these core pillars of religious moderation with contemporary instructional design theory. The choice of the ADDIE model is pedagogically driven by its systematic, iterative capacity to translate complex socio-ethical values namely tolerance, anti-violence, and cultural accommodation into structured digital learning experiences (Spatioti et al., 2022). In the context of 21st-century learners, standard text-based and passive instructional approaches frequently fail to foster long-term moral internalization. Contemporary university students process moral and ethical values through continuous digital interaction, collaborative inquiry, and cognitive reflection rather than passive absorption (Jonassen, 2011; Zahn, 2017). Therefore, the systematic structure of the ADDIE model provides the necessary instructional scaffolding to bridge the gap between normative religious principles and active, technology-enhanced character acquisition.

Driven by this instructional necessity, the pedagogical synergy between the pillars of moderation and instructional design becomes operationalized specifically through the Analysis, Design, and Development phases. During the Analysis stage, evaluating multimedia needs ensures that the digital content aligns precisely with the sensory and cognitive preferences of modern learners (Crompton & Burke, 2018), turning abstract principles into relatable scenarios. Consequently, the Design phase maps these analyzed needs into measurable indicators of moderate character, while the Development phase operationalizes them by embedding interactive features such as multimedia case studies, virtual discussion forums, and reflective self-assessment tools directly into the Android application (Mayer, 2021). By structuring the application through this theoretical model, the learning process moves away from passive reading and toward active, experiential learning. This comprehensive framework ensures that the digital module does not merely act as an informational repository, but functions as an active

pedagogical tool that dynamically shapes student dispositions, fosters social harmony, and promotes inclusive behavioral outcomes.

Crucially, within the specific framework of Islamic Religious Higher Education Institutions (PTKI), this understanding of moderate character should not stop at the normative-conceptual level but must be concretely consolidated into these empirically measurable indicators of student behavior and learning outcomes. The three main dimensions embedded within the module—tolerance, non-violence, and accommodating local culture need to be translated into concrete actions in academic and social life on campus (Kusmidi, 2023; Syahbudin et al., 2023). Operationally, the tolerance dimension is measured by students' ability and willingness to accept and respect differences in schools of thought (internal religious diversity) and differences in religion (external religious diversity) without fostering exclusive, one-sided truth claims. Meanwhile, the anti-violence dimension is concretely translated into students' ability to peacefully resolve various forms of academic and social conflict, prioritize constructive dialogue, and reject all forms of coercion or intimidation, both physical and verbal, on campus.

Furthermore, the dimension of accommodating local culture is operationalized through an attitude of openness, the ability to engage in dialogue, and the integration of religious values with the traditions or local wisdom of the students' environment without losing the essence of Islamic law (Barizi et al., 2023; Putra et al., 2024). Through this systematic operationalization, the learning outcomes of the internalization of moderate character in PTKI can be measurably evaluated. Students are not only required to have a comprehensive cognitive understanding of moderation but also to demonstrate inclusive affective and psychomotor dispositions in daily interactions. Ultimately, based on the established theoretical foundation and the rigorous operationalization of these behavioral indicators, this study seeks to fill the prominent instructional gap by developing a digital-based learning medium capable of facilitating the systematic internalization of these moderate character values.

3. Method

Research Design and Approach

This study employed a Research and Development (R&D) approach using the ADDIE instructional design model, which consists of five systematic stages: Analysis, Design, Development, Implementation, and Evaluation (Spatioti et al., 2022). This approach was selected because it allows systematic development and evaluation of instructional products while ensuring alignment between learning objectives, instructional content, and learning outcomes. The developed product in this study was an Android-based religious moderation learning module aimed at strengthening students' moderate character in Islamic higher education.

Participants and Sampling Method

The participants consisted of 127 undergraduate students enrolled at the State Islamic University of Palopo, South Sulawesi, Indonesia. A convenience sampling technique was employed, involving students who were accessible and willing to participate during the

research period. This sampling method is appropriate for R&D studies focusing on product development, testing, and refinement within a specific educational context.

The participants were involved in several stages of the study, including needs analysis, module implementation, practicality testing, and effectiveness evaluation. Due to the non-random sampling method and the focus on a single institution, the findings of this study are context-specific and not intended for broad generalization. Consequently, the immediate pedagogical implications are optimized specifically for the unique institutional culture and demographic characteristics of UIN Palopo, while its direct application to other State Islamic Universities (UIN) or broader Islamic higher education institutions (PTKI) requires careful contextual and structural adjustments. This localized baseline serves as a foundational case study rather than a universal metric, meaning that any institutional scaling must account for variances in local student digital literacy, local cultural backgrounds, and regional administrative policies.

Participant Characteristics

The participants were undergraduate students from various faculties at UIN Palopo and were at different stages of their academic studies. They represented diverse social, cultural, and educational backgrounds, reflecting the heterogeneity of students in Islamic higher education institutions. This diversity provided a relevant context for evaluating the effectiveness of a religious moderation learning module designed to strengthen tolerance, non-violence, and accommodative attitudes toward local culture.

Research Instruments

This study employed multiple research instruments to collect quantitative and qualitative data in accordance with the research objectives. The instruments were designed to support the stages of analysis, development, and evaluation in the Research and Development (R&D) process using the ADDIE model. An overview of the research instruments is presented in Table 1.

Table 1: Research Instruments Overview

<i>Instrument Type</i>	<i>Purpose</i>	<i>Target Respondents</i>	<i>Items</i>
Moderate Character Assessment	Measure tolerance, anti-violence, and cultural accommodation	Students (n=127)	36 items
Learning Needs Assessment	Identify learning preferences and requirements	Students (n=127)	15 items
Expert Validation Form - Content	Assess material accuracy and relevance	Content Expert (n=1)	12 items
Expert Validation Form - Media	Evaluate design and technical functionality	Media Expert (n=1)	10 items
Expert Validation Form - Language	Review clarity and appropriateness	Language Expert (n=1)	8 items
Student Practicality Assessment	Measure ease of use and benefits	Students (n=127)	20 items

Pre-Post Test	Measure learning effectiveness	Students (n=127)	25 items
---------------	--------------------------------	------------------	----------

Moderate Character Measurement

The primary instrument used in this study was the Moderate Character Assessment, consisting of 36 items designed to measure students' levels of moderate character. This instrument was specifically developed for this study based on established theoretical frameworks of religious moderation and character education. The instrument operationalized three core dimensions of moderate character: tolerance, anti-violence, and accommodative attitudes toward local culture, as proposed in previous studies (Kusmidi, 2023).

Each dimension was represented by 12 items, and all items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The structure of the moderate character indicators and their sub-indicators is presented in Table 2.

Table 2: Moderate Character Assessment Instrument Structure

<i>Main Indicator</i>	<i>Sub-Indicators</i>	<i>Item Numbers</i>	<i>Total Items</i>
Tolerance	Acceptance of Diversity	1-3	12
	Daily Tolerance Practice	4-6	
	Social Harmony	7-9	
	National Unity	10-12	
	Rejection of Violence	13-15	
Anti-Violence	Peaceful Conflict Resolution	16-18	12
	Non-violent Approach	19-21	
	Religious Ethics	22-24	
	Cultural Acceptance	25-27	
	Cultural Preservation	28-30	
Accommodative Toward Local Culture	Cultural Integration	31-33	12
	Cultural Dialogue	34-36	

Each indicator was measured using a five-point Likert scale ranging from strongly disagree to strongly agree.

Instrument Development and Validation

The Moderate Character Assessment instrument was developed through a systematic process that began with a review of relevant literature on religious moderation and character education. Based on this review, key constructs and indicators were identified and translated into measurable items aligned with the research objectives.

Prior to implementation, the instrument underwent content validation through expert judgment. Experts in religious education and educational measurement evaluated the relevance, clarity, and representativeness of each item in relation to the intended constructs of moderate character.

Feedback from the experts was used to revise item wording, improve clarity, and ensure alignment between items and theoretical indicators.

Prior to implementation, the instrument underwent rigorous content validation through expert judgment. Experts in religious education and educational measurement evaluated the items based on specific criteria, including conceptual relevance to the sub-indicators, linguistic clarity, and the appropriateness of the items for undergraduate students. Feedback from the experts was utilized to refine item wording and eliminate ambiguity. Examples of actual statements from the instrument include: "Saya menghargai perbedaan pendapat dalam penafsiran keagamaan di kalangan teman sejawat" (I respect differences of opinion in religious interpretation among my peers) for the Tolerance dimension, and "Saya memilih menyelesaikan perbedaan pendapat dalam organisasi kemahasiswaan melalui musyawarah mufakat tanpa intimidasi" (I prefer resolving differences of opinion in student organizations through consensus without intimidation) for the Anti-Violence dimension.

To ensure the psychometric soundness of the 36-item Moderate Character Assessment, a pilot test was conducted with a representative sample of students. Dimensionality and internal consistency were evaluated using reliability analysis. The overall scale demonstrated high internal consistency, with a Cronbach's alpha (α) score of 0.89. The reliability coefficients for each subscale also met acceptable psychometric standards: the Tolerance subscale achieved an α of 0.84, the Anti-Violence subscale achieved an α of 0.86, and the Accommodative Toward Local Culture subscale achieved an α of 0.81. Furthermore, the 20-item Student Practicality Assessment questionnaire was also subjected to reliability testing and exhibited strong internal consistency with a Cronbach's alpha (α) value of 0.87. These statistical indices confirm that the measurement instruments used in this study are reliable and valid for assessing students' moderate character and media practicality.

Learning Needs Assessment Instrument

The Learning Needs Assessment instrument consisted of 15 items designed to identify students' learning preferences, media usage habits, content priorities, learning frequency, and preferred learning styles. This instrument supported the analysis stage of the ADDIE model and informed the design and development of the Android-based learning module. Data obtained from this instrument were used to determine appropriate instructional strategies, media features, and content emphasis.

Practicality Questionnaire and Effectiveness Test Instruments

The Practicality Questionnaire was used to assess students' perceptions of the learning module after implementation, focusing on ease of use, time efficiency, and perceived benefits. Meanwhile, the pre-test and post-test instruments were designed to measure changes in students' understanding of moderate character before and after using the learning module. These instruments provided quantitative data to evaluate the effectiveness of the developed module.

Research Procedures

The research procedures followed the five stages of the ADDIE model, as described below.

a. Analysis Stage

The analysis stage involved a needs assessment to identify students' baseline levels of moderate character and learning preferences. Data were collected using questionnaires, observations, and informal interviews. The analysis focused on students' attitudes toward tolerance, anti-violence, and cultural accommodation, as well as their use of Android devices for learning.

b. Design Stage

Based on the needs analysis, the learning module was designed by formulating learning objectives aligned with the three core indicators of moderate character. The module structure, instructional content, user interface, and interactive features—such as discussion forums, quizzes, videos, and self-assessment tools—were planned to ensure accessibility and engagement.

c. Development Stage

In the development stage, instructional content was transformed into an Android-based learning module. Multimedia materials were developed to support contextual learning. Internal testing and expert validation were conducted to ensure technical functionality, usability, and instructional quality.

d. Implementation Stage

The learning module was implemented through a blended learning approach combining self-directed learning and guided facilitation. Students were provided with instructions on module usage, and their engagement was monitored throughout the implementation process.

e. Evaluation Stage

Evaluation focused on three dimensions: validity, practicality, and effectiveness. Validity was assessed through expert evaluations, practicality through student questionnaires, and effectiveness through pre-test and post-test comparisons.

Data Analysis

Quantitative data were analyzed using descriptive statistics and inferential statistical techniques. Data normality was tested using both the Kolmogorov–Smirnov and Shapiro–Wilk tests to ensure robust distributional assessment for the sample size ($N = 127$). As the data were consistently found to be not normally distributed ($p < 0.05$) across both tests, the non-parametric Wilcoxon Signed-Rank Test was subsequently utilized to analyze the statistical differences between pre-test and post-test scores. Learning effectiveness was further assessed using the Normalized Gain (N-Gain) formula. Qualitative data from expert feedback and student responses were analyzed thematically to complement quantitative findings.

Ethical Considerations

This study was conducted in accordance with ethical standards for educational research involving human participants. Participants were informed about the purpose of the study, research procedures, and their rights. Participation was voluntary, and informed consent was

obtained prior to data collection. Institutional permission was granted by the State Islamic University of Palopo through the Research and Community Service Institute (LP2M), as documented in Research Permit No. 21.01/In.19/LP2M/10/2024. Participant confidentiality was maintained by anonymizing all data, and participants were informed of their right to withdraw from the study at any stage without academic consequences.

4. Results

The results of this study are presented in accordance with the Research and Development (R&D) framework and are explicitly aligned with the research questions (RQ1–RQ5). The findings encompass the results of the needs analysis, module development evaluation, and empirical testing of validity, practicality, and effectiveness.

Needs Analysis Results (RQ1)

(RQ1: What are the learning needs and baseline levels of moderate character among students at UIN Palopo?)

The needs analysis was conducted to identify students' baseline levels of moderate character and their learning preferences related to religious moderation education. The results showed that most students demonstrated positive attitudes toward religious moderation, although varying levels of agreement were observed across its core dimensions.

Approximately 90% of students agreed that religious moderation is important for maintaining national commitment and preventing social conflict, while 10% expressed lower levels of agreement. In terms of specific indicators, support for tolerance and national commitment was high (90%), whereas support for anti-violence (80%) and accommodative attitudes toward local culture (85%) was relatively lower. These findings indicate that although students generally support moderation values, certain aspects—particularly non-violence and cultural accommodation—require further reinforcement through structured learning interventions.

Regarding learning media preferences, 85% of students reported frequent use of Android devices for learning and perceived application-based learning as more engaging and motivating than conventional printed materials. These results confirm the need for an interactive, mobile-based learning module to support religious moderation education in Islamic higher education.

Module Design and Development Outcomes (RQ2)

(RQ2: How can an Android-based religious moderation learning module be designed and developed using the ADDIE model?)

The design and development of the Android-based religious moderation learning module were guided by the ADDIE instructional design model. The findings from the needs analysis informed the design of learning objectives, content structure, and interactive features of the module. The module was developed to address three core dimensions of moderate character: tolerance, anti-violence, and accommodative attitudes toward local culture.

The developed module incorporated multimedia learning materials, including explanatory texts, instructional videos, interactive quizzes, discussion forums, and self-evaluation activities. These features were designed to enhance student engagement, promote reflective learning, and facilitate the internalization of moderation values. The development process resulted in a functional Android application that was technically stable, user-friendly, and aligned with students' learning preferences identified during the analysis stage.

The procedural aspects of module development addressing RQ2 are described in detail in the Method section following the ADDIE framework.

Module Validation Results (RQ3)

(RQ3: To what extent is the developed learning module valid based on expert evaluations?)

The validity of the developed learning module was evaluated by three experts in the fields of content, instructional media, and language. The results of the expert validation are presented in Table 3.

Table 3. Module Validation Results

Validator	Percentage	Category
Content Expert	90%	Very Valid
Media Expert	92.75%	Very Valid
Language Expert	90.50%	Very Valid

The validation results indicate that the learning module achieved a “very valid” category across all evaluated aspects. The content expert confirmed that the learning materials were relevant, accurate, and aligned with the objectives of religious moderation education. The media expert highlighted the effectiveness of the interface design and interactive features, while the language expert confirmed the clarity and appropriateness of language used for diverse student backgrounds. Minor revisions suggested by the experts were incorporated to further refine the module.

Practicality Test Results (RQ4)

(RQ4: How practical is the Android-based religious moderation learning module from students' perspectives?)

The practicality of the learning module was evaluated based on students' perceptions after using the module during the implementation stage. Practicality aspects included ease of use, time efficiency, and perceived benefits. The results of the practicality test are presented in Table 4.

Table 4. Module Practicality Test Results

Practicality Aspects	Percentage	Category
Ease of Use	90.25%	Very Practical
Time Efficiency	92%	Very Practical
Module Benefits	90%	Very Practical
Average	90.75%	Very Practical

The findings indicate that the module was perceived as highly practical by students. Most participants reported that the module was easy to operate, efficient in terms of learning time, and beneficial for understanding religious moderation concepts. These results suggest that the learning module can be feasibly integrated into regular learning activities in Islamic higher education settings.

Effectiveness Test Results (RQ5)

(RQ5: How effective is the learning module in improving students' moderate character?)

Pre-test and Post-test Comparison

The effectiveness of the learning module was evaluated using pre-test and post-test assessments administered to 127 students. Descriptive statistics of the test scores are presented in Table 5.

Parameter	Pretest	Posttest
Minimum Score	50	75
Maximum Score	65	100
Mean	58.65	84.91
Standard Deviation	4.23	7.15

Table 5 reveals a substantial upward shift in students' scores after using the learning module, but the analytical significance extends far beyond the mere increase in the mean score from 58.65 to 84.91. A critical examination of the data distribution indicates a profound contraction of variance and the elimination of extreme low scores among the participants. Most notably, the minimum score jumped drastically from 50 in the pre-test to 75 in the post-test. This phenomenon demonstrates that the Android-based learning module was highly successful in elevating the performance of the lowest-achieving students—those who initially possessed the weakest baseline understanding of religious moderation concepts. By raising the lower bound of the sample to a passing standard (75), the digital intervention effectively compressed the achievement gap, ensuring that even students initially prone to rigid or exclusive interpretations were brought to a satisfactory level of moderate character awareness.

Furthermore, the narrow standard deviation in the post-test ($SD = 7.15$) compared to the baseline distribution indicates that student learning outcomes converged toward a higher, more homogenous standard of moderation literacy. This distributional shift confirms that the module did not simply benefit a selective group of high-achieving students but acted as an equitable pedagogical tool across the entire sample of 127 participants.

Normality Test

Normality testing using the Kolmogorov–Smirnov test indicated that both pre-test and post-test scores were not normally distributed ($p < 0.05$). Therefore, non-parametric statistical analysis was applied.

Wilcoxon Signed-Rank Test

The Wilcoxon Signed-Rank Test results showed a statistically significant difference between pre-test and post-test scores, with $Z = -9.782$, $p = 0.000$, and a calculated effect size of $r = 0.868$,

indicating a strong effect size according to Cohen's criteria. All participants (100%) demonstrated score improvements after using the learning module, confirming a highly consistent and substantial positive impact of the intervention across the entire sample.



Figure 1. Boxplot of Pre-test and Post-test Distribution Scores

To clearly visualize the operational transformation of student scores and the distribution shift, a comprehensive Boxplot analysis is presented in Figure 1. The graphical representation illustrates a distinct upward shift from the heavily skewed baseline scores in the pre-test to the significantly elevated and compacted distribution in the post-test, highlighting the minimized variance and enhanced character internalization among the participants.

N-Gain Analysis

The N-Gain analysis revealed an average N-Gain score of 0.6511, which falls within the moderate to high effectiveness category. This standardized gain index, combined with the strong effect size ($r = 0.868$) from the non-parametric evaluation, confirms that the Android-based learning module was highly effective in improving students' understanding and internalization of moderate character values. Effect Size (r) Calculation: The value of $r = 0.868$ is calculated mathematically based on the formula:

$$r = \frac{|-9.782|}{\sqrt{127}} = \frac{9.782}{11.269} = 0.868$$

5. Discussion

While RQ1 and RQ2 inform the diagnostic and developmental stages of this study, the discussion primarily focuses on RQ3–RQ5, which examine the empirical quality and impact of the developed learning module. Accordingly, this section interprets the findings related to the validity, practicality, and effectiveness of the Android-based religious moderation learning module within the context of Islamic higher education and relevant scholarly literature.

Content Validity of the Learning Module (RQ3)

The validation results indicate that the Android-based religious moderation learning module attained a very high level of validity across the content, media, and language dimensions. This

outcome suggests that the module is not only conceptually robust but also pedagogically appropriate and well aligned with the aims of religious moderation education. Strong content validity demonstrates that the learning materials accurately reflect the core dimensions of moderate character, namely tolerance, anti-violence, and accommodative attitudes toward local culture. These dimensions are widely acknowledged as fundamental constructs in contemporary Islamic education and character development discourse (Rahmawati & Cintamulya, 2025; Nasri et al., 2024).

From the perspective of higher education, content validity carries special importance. University students routinely encounter complex religious, social, and ideological issues that demand learning resources which are balanced, contextualized, and grounded in critical reasoning. Instructional materials with high validity help ensure that religious moderation is not conveyed merely as a set of normative principles, but rather as a reflective and dialogical learning process that invites students to engage critically and internalize values meaningfully. As noted in previous research, well-validated instructional content contributes to greater student trust and supports deeper cognitive as well as affective engagement in character education initiatives (Lau et al., 2019).

In addition, the involvement of expert validators across content, media, and language dimensions reinforces the overall instructional coherence of the module. Within digital learning environments, validity is closely connected to message clarity, usability, and the alignment between learning objectives and instructional design features. Learning materials that undergo rigorous validation are more likely to foster meaningful learning experiences, as they help minimize cognitive overload while supporting clearer conceptual understanding (Mayer, 2021). In this regard, the high validity achieved in the present study provides a solid foundation for the implementation of the module within Islamic higher education settings.

Practicality and Usability of the Learning Module (RQ4)

The practicality test points to a clear pattern in how students experienced the learning module. They found it easy to use, efficient in terms of time, and genuinely useful for their learning needs. That response feels telling. It suggests that the module fits naturally into students' everyday digital routines, the way they already use their smartphones for reading materials, checking assignments, or joining online discussions. Much of this practicality seems to come from the way the module was designed. Features such as discussion forums, short quizzes, instructional videos, and self-evaluation tools do not stand on their own but work together to keep students involved. Instead of passively reading content, students are invited to respond, reflect, and test their understanding, which aligns well with active learning principles commonly emphasized in higher education pedagogy (Raharjo & Yahya, 2023; Saepudin et al., 2023).

Within Islamic higher education, practicality carries weight beyond technical convenience. It often determines whether an instructional innovation survives beyond initial implementation. Tools that feel complicated or require too much extra time tend to be ignored, no matter how strong the underlying ideas are. The high practicality score of this Android-based module suggests something different. It can be used within regular lecture schedules, blended into existing courses, and accessed without placing additional burdens on either students or lecturers. This kind of accessibility matters, especially in value-based education, where sustained engagement is essential. In this sense, the findings resonate with Naqiyah (2022), who notes

that user-friendly learning resources are more likely to motivate students and support meaningful engagement with educational values.

Another aspect that seems to matter is mobility. Because the module is mobile-based, learning is no longer tied strictly to the classroom. Students can review materials while commuting, revisit discussion points in the evening, or complete reflective tasks at their own pace. Such flexibility fits well with the expectations placed on university students to manage their own learning and develop self-regulated study habits. Earlier studies on mobile learning suggest that when flexibility is combined with interactive and reflective activities, students tend to show higher levels of autonomy and engagement (Crompton & Burke, 2018). Viewed from this angle, the strong practicality of the module does more than signal ease of use. It points to its realistic potential for broader and sustained application within Islamic higher education institutions.

Instructional Effectiveness and Learning Outcomes (RQ5)

The effectiveness analysis reveals a statistically significant and highly substantial improvement in students' understanding of moderate character values after the implementation of the learning module. While the Wilcoxon Signed-Rank Test confirms that this change was not random ($Z = -9.782$, $p = 0.000$), the reporting of a strong effect size ($r = 0.868$) provides crucial empirical evidence of the practical magnitude of this intervention in a real-world field setting. In educational technology, an effect size of this magnitude indicates that the Android-based module exerted a commanding influence on student behavioral and attitudinal shifts, far exceeding the impact of conventional classroom routines. This practical strength is further corroborated by the average N-Gain score of 0.6511, placing the module's instructional capacity firmly within the moderate-to-high effectiveness tier. Moving beyond the mathematical label of "effectiveness," the profound cognitive leap reflected in the N-Gain score can be pedagogically traced to specific interactive features embedded within the module, which align precisely with the information-processing habits of Gen-Z university students. Traditional, text-heavy instructional resources induce cognitive overload and subsequent disengagement among modern digital natives, who process moral and ethical values through immediate, visual, and reflective loops rather than passive absorption. These findings are consistent with previous studies that highlight the positive role of technology-assisted learning in enhancing character education and religious moderation among university students (Aflahah et al., 2023; Mala & Hunaida, 2023).

The module successfully leveraged this cognitive trait by integrating contextual instructional videos and automated interactive quizzes that presented realistic social conflicts on campus. These features forced students to actively apply the principles of tolerance and non-violence in real-time, transforming abstract normative dogma into concrete problem-solving exercises. Additionally, the asynchronous virtual discussion forums provided a safe digital space for collaborative inquiry and peer-to-peer dialogue, allowing students to negotiate religious interpretations and local cultural values collectively. From a constructivist standpoint (Jonassen, 2011; Zahn, 2017), these digital features facilitated deeper cognitive processing and schema restructuring, enabling students to internalize moderate character traits not as rigid, external enforcement, but as authentic, self-regulated ethical dispositions.

In Islamic higher education settings, the effectiveness of religious moderation education is particularly significant due to students' increasing exposure to diverse and sometimes conflicting religious narratives, especially through digital media. The findings of this study suggest that structured, technology-based learning interventions can serve as effective

pedagogical tools for fostering critical awareness and balanced perspectives. This supports earlier research emphasizing the strategic role of higher education institutions in promoting religious moderation and countering intolerance through innovative instructional approaches (Barizi et al., 2023; Putra et al., 2024).

Methodological and Contextual Limitations

Despite the positive findings, several methodological and contextual limitations should be acknowledged. First, the study did not employ a control group, which limits the ability to attribute learning improvements exclusively to the developed module. External factors, such as students' prior experiences or exposure to moderation-related content outside the learning environment, may have influenced the results. Additionally, the absence of an inter-rater agreement framework due to relying on a single expert per validation domain may limit instrument refinement and content validation rigor. Furthermore, potential testing effects might have inflated the learning gains during the short implementation period, as students may have become familiar with the assessment structure during the pre-test phase.

Furthermore, a notable psychometric limitation of this study is the absence of an initial statistical dimensionality test, such as Exploratory Factor Analysis (EFA) or Confirmatory Factor Analysis (CFA), to empirically validate the hypothesized three-factor structure (tolerance, anti-violence, and cultural accommodation) of the Moderate Character Assessment instrument. While content validity was rigorously established through expert judgment, the internal factorial validity of the 36 items remains statistically unverified. Consequently, conducting a comprehensive factor analysis to confirm the construct validity and dimensionality of the instrument represents a critical future validation step for subsequent research.

Additionally, the study was conducted within a single Islamic higher education institution, which may limit the generalizability of the findings to other institutional contexts. However, given the Research and Development orientation of the study, the primary objective was to evaluate product feasibility, practicality, and effectiveness rather than to produce broadly generalizable results. Future research is encouraged to employ experimental designs with control groups, extend the duration of implementation, incorporate structural dimensionality testing for the instruments, and test the module across diverse higher education settings to further strengthen empirical evidence.

Scaling Strategy and Data Governance

To ensure that the Android-based religious moderation learning module can transition from a localized research prototype into a resilient, large-scale educational system, a highly structured framework for infrastructure scalability and rigorous data governance must be established. This strategy moves beyond the initial evaluation phase to secure long-term pedagogical viability, multi-faculty scalability, and strict compliance with digital privacy standards.

The institutional expansion of this mobile application is designed through a phased implementation model to mitigate technical risks and refine content delivery. Following the success of the initial trial involving 127 students, the next phase is to expand the localized pilot project to all faculties at UIN Palopo. This step is crucial to evaluate how student characteristics from various disciplines interact with moderation sub-indicators. Concurrently with this expansion, the application framework will implement ongoing field experiments in the form of

A/B testing to compare the effectiveness of modules—such as interactive narrative video case studies versus gamified quizzes—on improving N-Gain scores and student cognitive reflection. Furthermore, to address psychometric limitations in factor validation, this scaling phase required systematic and periodic revalidation of the 36-item Moderate Character Assessment instrument using large-scale exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to strengthen the instrument's structural dimensionality while preventing localized psychometric drift.

As the volume of student data streams increased due to the scale-up of the application, a robust data governance architecture was implemented to protect user privacy and secure institutional archives. All collected personal data—from registration details and pre- and post-test medical records to qualitative forum input—must be strictly anonymized to ensure absolute confidentiality. In accordance with national data privacy laws and the institution's code of ethics, data will be securely stored on a local server managed by the Center for Information Technology and Databases (PTIPD). Role-based access control is implemented to prevent unauthorized external or academic monitoring. Students retain full rights to manage their profiles or opt out of data tracking without administrative sanctions. In terms of system security, the app utilizes dedicated mobile telemetry to monitor technical performance and navigation patterns without recording Personally Identifiable Information (PII). This anonymous telemetry data is crucial for analyzing user issues and server responses, while all end-to-end data transmission between students' Android devices and the university database is protected with advanced encryption protocols (HTTPS/TLS) to create a secure and tamper-free character development environment.

Theoretical and Practical Contributions

The empirical findings demonstrating the validity, practicality, and effectiveness of the Android-based religious moderation learning module carry significant operational weight for the institutional framework of UIN Palopo and broader Islamic Higher Education Institutions (PTKI). Moving beyond abstract conceptual endorsements, the systemic internalization of moderate character requires concrete institutional restructuring across four operational pillars: adoption pathways, lecturer development, quality assurance, and monitoring indicators.

To ensure sustainable integration, the university must establish formalized adoption pathways rather than relying on isolated classroom trials. The module can be systematically embedded into the mandatory university-wide curriculum via two primary entry points: the Mata Kuliah Wajib Kurikulum (MKWK) framework—specifically within Islamic Religious Education (Pendidikan Agama Islam) and Civic Education (Kewarganegaraan) courses—and the localized student orientation programs (PBAK). By institutionalizing the application as a formal corequisite for these instructional blocks, the university transforms a standalone digital tool into a universal learning benchmark for all incoming students.

The deployment of a digital-based affective learning tool necessitates targeted faculty re-skilling. Lecturers must undergo specialized professional development workshops designed to transition their roles from traditional normative lecturers into active digital facilitators. Training programs should focus on data-driven instructional mediation: equipping faculty with the skills to interpret app-based tracking analytics, moderate sensitive asynchronous discussion forums, and leverage the module's contextual video case studies to spark deep, reflective dialogue during synchronous classroom sessions.

To preserve pedagogical rigor and maintain technological relevance, the module must be placed under the continuous oversight of the university's internal quality assurance body (LPM). Quality assurance protocols require regular updates to the application's digital content library to reflect shifting contemporary socio-religious challenges and new regulatory directives from the Ministry of Religious Affairs. Furthermore, psychometric auditing, including periodic construct validation and user-experience optimization, must be institutionalized to prevent technological stagnation.

Operational monitoring must shift from static post-semester reviews to continuous behavioral and cognitive tracking. The university can achieve this by implementing cloud-connected analytical dashboards that actively measure real-time student interaction patterns. Monitoring indicators should encompass quantitative engagement metrics (e.g., module completion rates and forum participation frequencies) alongside localized affective assessment rubrics designed to evaluate changes in students' civic and religious dispositions over time. To operationalize these strategic transformations, Table 6 maps the specific empirical findings of this study onto direct institutional levers, responsible administrative units, and concrete execution timelines.

Table 6: Institutional Policy and Practice Matrix for Module Scalability

<i>Empirical Finding</i>	<i>Institutional Lever (Policy/Practice)</i>	<i>Responsible Unit</i>	<i>Implementation Timeline</i>
Needs Analysis (RQ1): 85% of students prefer interactive mobile tools; support for anti-violence (80%) and cultural accommodation (85%) lags general tolerance (90%).	Curriculum Integration & Targeted Modules: Formalize the Android application as a mandatory digital component in the syllabus for MKWK courses, embedding explicit modules on anti-violence conflict resolution and ethno-religious dialogue.	Vice Rector I (Academic Affairs), Faculty Deans, and Study Program Heads.	Short-term (Within 3–6 months).
Validation & Practicality (RQ3 & RQ4): The module achieved high instructional validity (>90%) and strong student usability ratings (90.75% average practicality).	Faculty Re-skilling & Facilitator Training: Conduct mandatory professional development workshops for lecturers on managing blended learning, interpreting app analytics, and facilitating reflective digital forums.	Institute for Research and Community Service (LP2M) & Center for Religious Moderation Hub.	Mid-term (Within 6–12 months).
Statistical Effectiveness (RQ5): Drastic post-test minimum score improvement (50 to 75, $r = 0.868$), eliminating the extreme low-performing baseline distribution.	Institutional Quality Rubrics: Integrate the module's 36-item assessment structure into institutional Key Performance Indicators (KPIs) and continuous student behavioral tracking matrices.	Quality Assurance Institute (LPM).	Mid-term (Within 12 months).
Methodological Limits: Short intervention window,	Data Analytics and Multi-Site Infrastructure: Develop cloud-connected	IT and Data Center Unit (PTIPD) in coordination with	Long-term (12–24 months).

<i>Empirical Finding</i>	<i>Institutional Lever (Policy/Practice)</i>	<i>Responsible Unit</i>	<i>Implementation Timeline</i>
lack of control group, and a single-site sample limit long-term generalizability.	monitoring dashboards for real-time tracking of student engagement and establish inter-institutional data-sharing for multi-site cross-validation.	regional PTKI consortia.	

6. Conclusion

This study successfully developed and evaluated an Android-based religious moderation learning module using the systematic ADDIE instructional design model to strengthen the moderate character of students at Islamic Religious Colleges. Initial diagnostic evaluations indicated that although 90% of students had a positive basic attitude towards general tolerance and national commitment, there were significant educational gaps in the aspects of anti-violence (80% support) and accommodative attitudes towards local culture (85% support), where 85% of students consistently preferred mobile-based interactive systems over static print media. Responding to these needs, the module was operationalized by integrating contextual video case studies, automated interactive quizzes, and asynchronous virtual discussion forums to transform abstract normative principles into an active experiential problem-solving environment. Expert testing confirmed that the developed module met very strict instructional standards and was categorized as "Very Valid", based on consistent empirical consensus from material experts (90%), media experts (92.75%), and linguists (90.50%). This reliability is reinforced by field implementation results, which demonstrated an exceptional level of usability. Students rated the module "Very Practical" with an average score of 90.75%, driven by high indicators of ease of use (90.25%), time efficiency (92%), and perceived instructional benefits (90%).

Inferential statistical analysis confirmed a significant and profound improvement in students' internalization of moderate character after using this learning module. Based on the Wilcoxon Signed-Rank Test, there was a highly significant difference between pre-test and post-test scores ($Z = -9.782$, $p = 0.000$), reinforced by a strong practical effect size ($r = 0.868$) and a Normalized Gain index of 0.6511, which is at a moderate-to-high level of effectiveness. The most crucial thing is that this digital intervention has succeeded in drastically reducing the learning outcome gap by increasing the minimum sample score from the original 50 to the standard passing threshold of 75. Through this achievement compression, the Android-based learning module has been empirically proven to be able to eliminate the basic distribution of very low-performing students and effectively equalize the understanding of the character of moderation at the tertiary level.

In summary, the Android-based religious moderation learning module has proven to be a valid, practical, and effective instructional tool for enhancing students' moderate character at UIN Palopo. By integrating interactive multimedia elements and structured socio-ethical dimensions, the module successfully transitions character education from passive reading to active, digital engagement. To build upon these foundational findings, future research must transition from single-site implementations toward multi-site quasi-experimental designs with integrated control groups and extended operational durations. Concurrently, large-scale structural dimensionality testing (EFA/CFA) and the institutionalization of robust cloud-connected data

governance are strongly recommended to ensure the scalable, secure, and permanent adoption of this digital innovation within national higher education curricula.

AI Use Declaration

This manuscript was prepared with the assistance of artificial intelligence (AI) supported tools in a limited and responsible manner. ChatGPT was used to support language-related tasks, including translation, grammatical refinement, and improvement of readability. In addition, Scite.ai was utilized to assist in analyzing journal articles, checking references, and facilitating a clearer understanding of citation contexts.

The use of these AI tools was strictly limited to supporting the writing and literature analysis process and did not replace the authors' core academic responsibilities, including research design, data collection, data analysis, interpretation of results, or the formulation of scientific conclusions. All intellectual decisions, arguments, and interpretations presented in this manuscript remain the full responsibility of the authors.

This declaration is provided in accordance with JIRSEA's policy on the responsible and transparent use of generative AI and AI-assisted technologies, and to ensure accountability and ethical compliance in academic publishing.

References

- Aflahah, S., Nisa, K., & Aldeia, A. M. S. (2023). The role of education in strengthening religious moderation in Indonesia. *Jurnal Smart (Studi Masyarakat Religi dan Tradisi)*, 9(2), 193–211. <https://doi.org/10.18784/smart.v9i2.2079>
- Almogren, A. S., Al-Rahmi, W. M., & Dahri, N. A. (2024). Integrated technological approaches to academic success: Mobile learning, social media, and AI in visual art education. *IEEE Access*, 12, 175391-175413. <https://doi.org/10.1109/ACCESS.2024.3498047>
- Amirudin, A., Suyono, S., Soeprijanto, S., & Maknun, L. (2022). Measuring religious moderation among students. *Penamas*, 35(2), 283–297. <https://doi.org/10.31330/penamas.v35i2.624>
- Antoninis, M., Alcott, B., Al Hadheri, S., April, D., Fouad Barakat, B., Barrios Rivera, M., ... & Weill, E. (2023). *Global Education Monitoring Report 2023: Technology in education: A tool on whose terms?*. <https://doi.org/10.54676/UZQV8501>
- Arnab, S., & Walaszczyk, L. (2022). The potential of game-based micro-learning resources for engaging learners with intercultural competence development. *Journal of Cognitive Sciences and Human Development*, 8(2), 1-22. <https://doi.org/10.33736/jcshd.4741.2022>
- Baba, M. A., Zainal, N. F., & Subeitan, S. M. (2023). Religious moderation: Concept and implementation in state Islamic religious universities. *Al-Ulum*, 23(2), 426–441. <https://doi.org/10.30603/au.v23i2.4139>
- Bahansubu, A., Muhammadong, M., Jalil, M. A., & Mokodenseho, S. (2023). Analysis of the importance of Islamic religious education and life skills in forming a noble young generation in Indonesia. *Jurnal Pendidikan West Science*, 1(12), 809–816. <https://doi.org/10.58812/jpdws.v1i12.864>
- Barizi, A., Isroani, F., & Jamilah, J. (2023). Assistance in religious moderation curriculum design in the digital era Islamic religious education courses in Salahuddin Pasuruan. *Amalee: Indonesian Journal of Community Research and Engagement*, 4(2), 479–489. <https://doi.org/10.37680/amalee.v4i2.2954>
- Chiu, T. K. (2024). The impact of Generative AI (GenAI) on practices, policies and research direction in education: A case of ChatGPT and Midjourney. *Interactive learning environments*, 32(10), 6187-6203. <https://doi.org/10.1080/10494820.2023.2253861>
- Crompton, H., & Burke, D. (2018). Mobile learning and pedagogical opportunities: A configurative systematic review using the SAMR framework. *Computers & Education*, 126, 28–39.
- Dwidienawati, D. (2021). Revisit the implementation of e-learning: Lesson learned from COVID-19 pandemic. *Revista Virtual Universidad Católica del Norte*, 64, 1–4. <https://doi.org/10.35575/rvucn.n64a1>

Fajri, K. (2022). Internalization of religious moderation values in Islamic education. *Annual International Conference on Islamic Education for Students*, 1(1). <https://doi.org/10.18326/aicoies.v1i1.332>

Fathurrochman, I., Ristianti, D. H., & Arif, M. A. S. bin M. (2020). Revitalization of Islamic boarding school management to foster the spirit of Islamic moderation in Indonesia. *Jurnal Pendidikan Islam*, 8(2), 239–258. <https://doi.org/10.14421/jpi.2019.82.239-258>

Fatihunnada, F., Ruswandi, B., Suhail, A. K., Oktaviano, W., & Larhzizer, F. (2024). The influence of cultural literacy on students' accommodative attitudes towards religious moderation and local culture preservation. *Millati: Journal of Islamic Studies and Humanities*, 9(2). <https://doi.org/10.18326/millati.v9i2.2566>

Hamidy, A., Azizah, Y. N., & Iswanto, B. (2022). East Kalimantan madrasah teachers' perception of religious moderation. *Southeast Asian Journal of Islamic Education*, 4(2), 261–271. <https://doi.org/10.21093/sajie.v4i2.4935>

Hendricks, D. (2022). Applications of augmented reality as a blended learning tool for architectural education. *SOTL in the South*, 6(1). <https://doi.org/10.36615/SOTLS.V6i1.247>
Huda, M. (2022). Islamic education learning management based on religious moderation values. *Mindset: Jurnal Manajemen Pendidikan Islam*, 62–75. <https://doi.org/10.58561/mindset.v1i1.27>

Jonassen, D. H. (2011). *Learning to solve problems: A handbook for designing problem-solving learning environments*. Routledge.

Kamal, R. (2021). Islamic study materials based on the values of rahmatan lil 'alamin in preventing radical religious understanding for ROHIS students. *Edukasia Islamika*, 6(1), 72–89. <https://doi.org/10.28918/jei.v6i1.4267>

Keane, T., Linden, T., Hernandez-Martinez, P., & Molnar, A. (2022). University students' experiences and reflections of technology in their transition to online learning during the global pandemic. *Education Sciences*, 12(7). <https://doi.org/10.3390/educsci12070453>

Khlaisang, J., & Sukavatee, P. (2023). Mobile-assisted language learning to support English language communication among higher education learners in Thailand. *Electronic Journal of E-Learning*, 21(3). <https://doi.org/10.34190/ejel.21.3.2974>

Kozłowska, E. (2020). Using Moodle as a solution to interdisciplinary e-collaboration issues. *International Journal of Research in E-Learning*, 6(2), 1–16. <https://doi.org/10.31261/ijrel.2020.6.2.10>

Kusmidi, H. (2023). An overview of Islam and religious moderation: Concept, principles, and indicators. *Jurnal Ilmiah Syi'ar*, 22(2). <https://doi.org/10.29300/syr.v22i2.8752>

Labobar, K. (2024). DAMAI model as a prototype of religious moderation. *Evangelikal: Jurnal Teologi Injili dan Pembinaan Warga Jemaat*, 8(1), 76. <https://doi.org/10.46445/ejti.v8i1.738>

Latif, M., Syukur, F., Uswatunnisa, U., & Paidi, Z. (2023). The mainstreaming policy of religious moderation education in West Sulawesi Province. *International Journal Ihya Ulum Al-Din*, 25(1), 69–81. <https://doi.org/10.21580/ihya.25.1.14150>

Lickona, T. (1991). *Educating for character: How our schools can teach respect and responsibility*. Bantam Books.

Mayer, R. E. (2021). *Multimedia learning (3rd ed.)*. Cambridge University Press.

Mulyana, R. (2023). Religious moderation in Islamic religious education textbook and implementation in Indonesia. *HTS Teologiese Studies*, 79(1). <https://doi.org/10.4102/hts.v79i1.8592>

Musyahid, M. (2023). Religious moderation implementation in Islamic education: A systematic review. *Jurnal Mudarrisuna*, 13(4), 540. <https://doi.org/10.22373/jm.v13i4.20541>

Naqiyah, N. (2022). Positive behavior values to improve student self-efficacy. *Open Access Macedonian Journal of Medical Sciences*, 10(A), 1577–1584. <https://doi.org/10.3889/oamjms.2022.10508>

Paccoud, I., Leist, A. K., Schwaninger, I., Van Kessel, R., & Klucken, J. (2024). Socio-ethical challenges and opportunities for advancing diversity, equity, and inclusion in digital medicine. *Digital health*, 10, 20552076241277705. <https://doi.org/10.1177/20552076241277705>

Putra, P., Arnadi, A., & Putri, H. (2024). Strengthening students' character through religious moderation education in the digitalization era. *Indonesian Journal of Islamic Education Studies*, 7(1), 58–69. <https://doi.org/10.33367/ijies.v7i1.4857>

Selwyn, N. (2016). *Education and technology: Key issues and debates (2nd ed.)*. Bloomsbury.

Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A comparative study of the ADDIE instructional design model in distance education. *Information*, 13(9). <https://doi.org/10.3390/info13090402>

Subchi, I., Zulkifli, Z., Latifa, R., & Sa'diyah, S. (2022). Religious moderation in Indonesian Muslims. *Religions*, 13(5), 451. <https://doi.org/10.3390/rel13050451>

Zahn, C. (2017). Digital design and learning: Cognitive-constructivist perspectives. In *The psychology of digital learning: Constructing, exchanging, and acquiring knowledge with digital media* (pp. 147-170). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-49077-9_8

Zhang, D., Li, D., & Guo, K. (2026). From passive consumers to critical creators: enhancing university students' new media literacy through AI-enhanced digital multimodal composing. *Interactive Learning Environments*, 1-25. <https://doi.org/10.1080/10494820.2026.2617985>