Jurnal Pendidikan MIPA
e-ISSN: 2685-5488 | p-ISSN: 1411-2531
URL: https://jpmipa.fkip.unila.ac.id/index.php/jpmipa
Jounal's DOI: http://doi.org/10.23960/jpmipa

Vol. 27, No. 1, 2026
Article ID: 1116
Pages: 539-561

Gamification as a Pedagogical Strategy for Religious Moderation: Evidence from a Quasi-Experiment on Generation Z Students

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Received: 15 December 2025 *Accepted: 05 March 2026* *Published: 07 April 2026*

Abstract: Religious moderation is an essential competency for Generation Z students to maintain social cohesion in the digital era. Despite this importance, students may demonstrate tolerant dispositions without strong conceptual literacy. This study examined the effectiveness of gamification in Islamic Religious Education (IRE) as a strategy to strengthen the internalization of religious moderation by improving both religious moderation knowledge (MK) and religious moderation attitude (MA). The study employed a quasi-experimental, non-equivalent control group design involving 128 undergraduate students at Universitas PGRI Pontianak (experimental group, n = 63; control group, n = 65). MK was measured using a knowledge test, and MA was assessed using an attitude questionnaire. Data were analyzed using descriptive statistics and multivariate analysis of covariance (MANCOVA), with pretest scores treated as covariates. Descriptive findings showed that MA increased from high to very high in both groups (control: M = 59.28 to 70.92; experimental: M = 58.86 to 73.43). MK also increased from very low to high (control: M = 43.08 to 71.54; experimental: M = 42.30 to 78.49). After controlling for baseline scores, the multivariate analysis indicated a significant group difference on the combined outcomes ($p < .001$) with a very large effect size (partial $ç^2 = 0.543$). Follow-up univariate tests confirmed significant effects of gamification on MK ($p < .001$; partial $ç^2 = 0.508$) and MA ($p < .001$; partial $ç^2 = 0.255$), indicating that the gamified class achieved higher posttest outcomes than the control class. These results suggest that gamification is a promising strategy for IRE learning in the digital era because it supports conceptual mastery of moderation while also strengthening moderation attitudes among Generation Z students.

Keywords: gamification, religious moderation, islamic religious education, generation Z students.

Article's DOI: https://doi.org/10.23960/jpmipa.v27i1.pp539-561

INTRODUCTION

Indonesia is a country with many religions, ethnicities, races, cultures, and social groups. These differences could cause problems between people if they are not handled properly. Therefore, continuous efforts are needed to maintain harmony and prevent conflicts arising from these differences (Mazya et al., 2024; Orazani et al., 2023). In these situations, the concept of religious moderation is an important strategy for countering extremism and radicalism (Khasanah et al., 2023; Tuna, 2024). This approach promotes respect for differences, equality, and tolerance by encouraging peaceful interaction, mutual understanding, and acceptance among diverse religious and social groups.

Religious moderation refers to a constructive way of being religious that emphasizes the middle path, justice, and balance while rejecting extremist orientations (Qoumas et al., 2024; Subchi et al., 2022). In educational contexts, it is commonly operationalized through

interrelated dimensions such as national commitment, tolerance toward different beliefs, non-violence, and accommodation of local culture (Fitri et al., 2025). Accordingly, religious moderation should be understood not only as conceptual literacy but also as an evaluative and social disposition that guides how individuals respond to differences and negotiate everyday interactions in plural settings. Therefore, learning designs aimed at strengthening religious moderation need to address both conceptual understanding and the affective domain that shapes students' attitudes and decisions.

Religious moderation can be fostered through meaningful learning in education (Hasan & Juhannis, 2024). This gives younger generations a strong foundation for protecting national identity and social cohesion. Therefore, education is very important for ensuring that students not only understand religious moderation intellectually but also adopt it in their attitudes and actions. This means that religious moderation should be taught through activities that not only help people understand but also help them internalize moderate attitudes in their religious practices.

Nevertheless, the actual state of religious moderation in higher education continues to encounter numerous challenges. Islamic Religious Education (IRE) courses, which are meant to teach religious moderation, are often taught in ways that rely on rules and doctrines, such as lectures and rote memorization. This method is less effective for Generation Z, who are digital natives and prefer visual and interactive learning (Mulyana, 2023; Siswanto, 2020). Because of this, higher education that teaches religious moderation usually fails to provide students with many opportunities to learn in a meaningful way, making it more challenging for them to apply moderate values in real life.

This challenge is also visible in empirical evidence from Indonesian higher education. A national survey conducted across Indonesian universities reported that around 30% of students showed low or very low levels of religious tolerance, indicating a sizeable subgroup that may be more susceptible to exclusivist narratives and polarization (Nisa et al., 2021). Complementing this finding, a survey of students at state Islamic higher education institutions found that approximately 20% were categorized as having low religious moderation, suggesting considerable room to strengthen moderation through instructional interventions (Subchi et al., 2022). These patterns resonate with broader evidence that students in more homogeneous educational and social environments tend to exhibit lower tolerance toward outgroups, underscoring the importance of learning designs that increase intergroup exposure and dialogical engagement.

At the same time, the digital era also amplifies the risks of spreading intolerant content and hate speech. Recent studies show that the number of incidents of intolerance is increasing and that intolerant content is becoming more common online (Ibrohim & Budi, 2023; Wijanarko et al., 2024). For many university students, social media has become a key channel for peer interaction and for obtaining and sharing information, so exposure to intolerant discourse online may also influence perceptions and interactions beyond the virtual space (Sujarwoto et al., 2023). The increase and normalization of intolerance, both online and within campus communities, can erode inclusivity in higher education, reduce students' participation in campus activities, and limit opportunities for constructive dialogue. These conditions highlight the urgent need to integrate religious moderation more effectively into education.

The challenges of strengthening religious moderation in IRE in the digital age require learning approaches that support not only conceptual understanding but also the internalization of moderation values through active, meaningful participation. One widely

adopted approach is gamification, which refers to the use of game elements such as points, badges, challenges, leaderboards, and mission narratives in learning contexts (Alsadoon et al., 2022; Christopoulos & Mystakidis, 2023; Wang et al., 2024). This approach has been shown to enhance motivation, engagement, and learning outcomes across various disciplines (Khoshnoodifar et al., 2023; L. Li et al., 2024; Zeng et al., 2024). By integrating game elements into instructional activities, gamification can create more interactive learning experiences and provide structured opportunities for students to practice and reflect on value-based decisions in IRE. Consequently, gamification can be positioned as an important strategy for reinforcing the internalization of values of religious moderation among university students.

However, the effectiveness of gamification depends greatly on how game elements are orchestrated to serve specific instructional goals and learning mechanisms. Meta-analytic evidence in formal educational settings indicates that gamification tends to improve affective and behavioral outcomes. However, the magnitude of these effects varies with specific game elements and contextual conditions (Ritzhaupt et al., 2021). The updated synthesis likewise reports overall positive impacts on learning outcomes. However, it identifies factors such as design principles, the duration of the gameful experience, and the learning environment as important moderators that can strengthen or weaken these effects (M. Li et al., 2023). More recent evidence also shows that different combinations of game elements yield different magnitudes of learning gains, reinforcing the need for goal-sensitive design rather than generic gamification (Dai et al., 2025). Therefore, when the intended outcome is value internalization, gamification should be designed beyond surface rewards by embedding structured opportunities for feedback, reflection, and decision-making in meaningful situations, so that learners can connect targeted values with concrete judgments and interactions.

Nevertheless, despite its reported benefits in education, the application of gamification in IRE, particularly to internalize religious moderation, remains very limited. Most studies that have integrated gamification into IRE have focused on improving motivation, engagement, and overall learning outcomes in Islamic knowledge (Anwar & Inayati, 2025; Kutbaniyah et al., 2025; Rosfiani et al., 2024). Other studies have yet to measure the impact of gamification on the internalization of religious values into students' attitudes and behaviors (Attarwiyah et al., 2025; Khoshnoodifar et al., 2023; Sakdiah et al., 2025; Zeng et al., 2024). Therefore, research employing a quasi-experimental design is needed to provide measurable evidence of the impact of gamification not only on knowledge improvement but also on fostering attitudes of religious moderation among Generation Z students.

According to the above explanation, this study fills two major gaps: (1) the need to improve religious moderation among Generation Z, who are becoming increasingly vulnerable to intolerant content and digital dynamics; and (2) the lack of experimental information regarding the efficacy of gamification as a strategy for internalizing religious moderation values in the context of IRE. The novelty of this study lies in the design of a value-oriented gamification model that operationalizes the internalization of religious moderation through learning activities that target both students' knowledge and attitudes, rather than merely using gamification to increase engagement. Accordingly, this study is designed as a quasi-experimental study to examine the influence of a gamification platform on students' knowledge and attitudes toward religious moderation in IRE courses. Conceptually, this study also extends prior explanations of gamification by clarifying the internalization

mechanism through motivational and experiential learning processes, which are relevant to changes in both knowledge and attitudes. The findings are expected to contribute empirical evidence to the development of religious education and produce an educational product in the form of gamified media that can be implemented in higher education. Based on these considerations, the research questions are formulated as follows:

RQ1. Does gamification-based IRE instruction have a significant simultaneous effect on the combined outcomes of religious moderation knowledge and religious moderation attitudes compared to conventional instruction?

RQ2. Does gamification-based IRE instruction significantly improve students' religious moderation knowledge compared to conventional instruction?

RQ3. Does gamification-based IRE instruction significantly improve students' religious moderation attitudes compared to conventional instruction?

METHOD

Participants

The population consisted of first-year undergraduate students enrolled in Islamic Religious Education (IRE) at Universitas PGRI Pontianak in the 2024/2025 academic year. The population was organized into 22 intact classes, and because teaching and learning activities were conducted in pre-existing classroom units, these intact classes were used as sampling clusters. Four classes were randomly selected from the 22 classes. Due to practical constraints in the classroom setting, the selected classes were assigned to the study conditions as intact groups: two classes served as the control group and two as the experimental group. The final sample comprised 65 students in the control group and 63 students in the experimental group.

Research Design and Procedures

This study employed an experimental method with a quasi-experimental design. The quasi-experimental design was selected because random assignment at the individual level within established classroom frameworks was impractical. This design allows researchers to collaborate with pre-existing groups while methodically assessing the intervention's effects (Gopalan et al., 2020). Quasi-experimental designs are considered a viable substitute when full randomization is impractical, as they employ control strategies that reduce vulnerabilities to internal validity (Capili & Anastasi, 2024; Miller et al., 2020). The Non-Equivalent Control Group Design was used. This is a common method in educational research that compares treatment and control groups while controlling for baseline differences through pretest measurement (Gopalan et al., 2020).

The intervention was conducted over a period of four weeks. During the first week, both groups took a pretest. The second and third weeks were the learning phase. The experimental group learned through gamification, while the control group learned through conventional methods without gamification. Both groups took a posttest in the fourth week. Table 1 shows the schedule for implementing the plan.

Table 1. Intervention and measurement schedule

Week	Control Group	Experimental Group
Week 1	Pretest (knowledge test and attitude questionnaire)	Pretest (knowledge test and attitude questionnaire)
Week 2–3	Conventional instruction	Gamification-based instruction
Week 4	Posttest (knowledge test and attitude questionnaire)	Posttest (knowledge test and attitude questionnaire)

The gamification treatment was designed following the six-step framework (D6) proposed by Werbach & Hunter: Define Objectives, Delineate Target Behaviors, Describe Your Players, Devise Activity Cycles, Don't Forget the Fun, and Deploy Appropriate Tools (Werbach & Hunter, 2020). In this study, the goal of gamification (Define Objectives) was to increase knowledge and encourage the internalization of attitudes toward religious moderation among students. Target behaviors (Delineate Target Behaviors) were defined as completing moderation missions or modules, participating in interactive quizzes, and engaging in narrative simulations that tested responses to diversity dilemmas. As the basis for Describe Your Players, the student character was examined using basic player profiles, such as Achievers and Explorers. Activity cycles (Devise Activity Cycles) were designed to allow participants to repeat the learning loop. In Quizizz, a live leaderboard, time limits, points, power-ups, and the Strike and Shield modes were used to create a concise competitive dynamic and provide immediate feedback during repeated quiz practice. In Strike and Shield, students earned the opportunity to use Strike or Shield after consecutive correct answers, where Strike could reduce an opponent's session score, and Shield could protect one's own score. iSpring used a branching scenario that produced several endings according to participants' choices. The experiential aspect (Don't Forget the Fun) was enhanced through campus-themed narratives and sound effects or music. For technical implementation (Deploy Appropriate Tools), Quizizz was used for interactive quizzes (timer, randomized questions, live leaderboard, power-ups, and optional anti-cheating features), and iSpring was used for branching simulations with branching score settings and final reports.

To address the goal of internalizing religious moderation, the gamified tasks in Quizizz and iSpring were developed with reference to the core indicators of religious moderation: national commitment, tolerance, anti-violence, and appreciation of local wisdom. In the Quizizz component, the use of the live leaderboard, Strike and Shield, and power-ups was intended to maintain students' attention and participation during repeated practice while encouraging accuracy, as key advantages in the game were contingent on consecutive correct answers. This design was expected to strengthen students' conceptual understanding of indicators of religious moderation as a foundation for subsequent value-based judgment. In the iSpring component, branching scenarios were designed as diversity dilemmas in which students selected responses and viewed different outcomes based on their choices, thereby supporting reflection on moderation-related decisions beyond factual recall. An example of the gamification display in this study is shown in Figure 1.

(**a**) (**b**)

Figure 1. Gamification interfaces for religious moderation (a) quizizz; (b) simulation with iSpring

Instruments

Data collection instruments consisted of (1) a religious moderation attitude questionnaire and (2) a multiple-choice test measuring religious moderation knowledge. Both instruments were developed based on indicators of religious moderation formulated by the Indonesian Ministry of Religious Affairs, namely: national commitment, tolerance, anti-violence (anti-radicalism), and appreciation of local wisdom/tradition (Badan Litbang dan Diklat Kementerian Agama RI, 2019). National commitment concerns the extent to which religious perspectives and practices remain consistent with the national consensus and citizenship principles; tolerance refers to respectful acceptance of differences and willingness to interact across boundaries; anti-violence reflects rejection of coercion and violence in the name of religion; and accommodation of local culture refers to openness toward local traditions that support harmony as long as they do not contradict core religious principles.

Religious moderation attitude was measured using a Likert-scale questionnaire representing four indicators of religious moderation. The initial questionnaire consisted of 21 statements. After a pilot test, 17 items met the item validity criteria, while four items did not and were excluded from the next stage. Construct validity was then examined using Exploratory Factor Analysis (EFA) based on pretest data. The EFA results are presented in Table 2.

Table 2. Exploratory factor analysis (EFA) results for religious moderation attitude

Item	Factor 1	Factor 2	Factor 3	Factor 4	Communality	Decision
1	0.603	—	—	—	0.366	Retained
2	—	—	—	—	0.151	Removed
3	—	—	—	0.648	0.427	Retained
4	0.344	0.427	—	—	0.372	Retained
5	—	0.406	—	—	0.307	Retained
6	—	0.814	—	—	0.665	Retained
7	—	0.592	—	—	0.369	Retained
8	0.603	—	—	—	0.366	Retained
9	—	—	—	—	0.151	Removed
10	—	—	—	0.648	0.427	Retained
11	0.344	0.427	—	—	0.372	Retained
12	—	0.406	—	—	0.307	Retained
13	—	0.814	—	—	0.665	Retained
14	—	0.592	—	—	0.369	Retained
15	0.603	—	—	—	0.366	Retained
16	—	—	—	—	0.151	Removed
17	—	—	—	0.648	0.427	Retained

As shown in Table 2, items 6, 9, 10, and 12 demonstrated inadequate psychometric performance, indicated by very low communalities ($h^2 < 0.20$) and/or the absence of salient factor loadings. Therefore, these items were removed, resulting in a final religious moderation attitude scale consisting of 13 items. The reliability of the final scale was acceptable, with a Cronbach's alpha of 0.752.

The knowledge test consisted of 40 multiple-choice items assessing students' conceptual understanding of the same four indicators. Three IRE lecturers reviewed the test blueprint and the items to ensure alignment with indicator definitions

and course learning objectives. To minimize memory effects and item dependency, two parallel 20-item sets were used for the pretest and posttest. Examples of attitude statements and knowledge items for each indicator are presented in Table 3.

Table 3. Sample items for the attitude questionnaire and knowledge test by indicator

Indicator	Example attitude questionnaire	Example knowledge test
National commitment	Maintaining national unity is more important than the interests of a particular religious group.	National commitment as an indicator of religious moderation refers to… a) prioritizing the interests of one religious group above national unity b) rejecting state regulations whenever they differ from religious norms **c) aligning religious life with national consensus and civic responsibilities** d) avoiding interaction with people of different beliefs
Tolerance	I am willing to help others regardless of their religion.	Dika politely declines his friend's invitation to worship according to a different religion. This reflects the practice of… a) Surah An-Nas 1–4 **b) Surah Al-Kafirun 1–6** c) Surah An-Nasr 1–3 d) Surah Al-Fatihah 1–4
Anti-violence	I disagree with vandalism or violence in the name of religion.	The most appropriate action when a university student shares a video that calls for violence against another group is... a) Tracking down the content creator and physically punishing them so they will stop sharing such videos b) Replying with even harsher comments to show that Muslims are strong and uncompromising c) Ignoring it completely and doing nothing because it is assumed not to affect one's faith **d) Seeking clarification (tabayyun) using evidence-based and respectful arguments, and reporting it to the relevant authorities if it violates the law**
Appreciation of local wisdom/tradition	I support local traditions as long as they do not contradict core religious teachings.	The reason Sunan Kalijaga used wayang kulit (shadow puppetry) as a medium for spreading Islam was... a) Because he changed Islamic teachings entirely to fit the traditional wayang storyline **b) Because he localized Islamic preaching by embedding monotheistic values within local cultural forms without erasing the community's cultural identity** c) Because the strategy was a political tactic to gradually force people to abandon old traditions d) Because using wayang was the only method of da'wah permitted in classical Islamic legal texts

Data Analysis

Data analysis employed descriptive statistics to portray sample characteristics, distributions of pretest and posttest scores, and mean changes for each variable. Interpretation of students' religious moderation attitude and knowledge scores in this study used a criterion-referenced approach, meaning that the results were interpreted against predetermined standards rather than relative to other students' scores (Ruiming, 2024). Criterion-referenced interpretati for the Likert-type attitude scale used ideal mean score analysis by calculating the Ideal Mean (Mi) and Ideal Standard Deviation (SDi) from the theoretical minimum and maximum scores to determine categorical cut points (Santosa et al., 2024). Meanwhile, knowledge score interpretati followed the grading guideline applied at Universitas PGRI Pontianak. The guideline for categorizing Likert attitude scores is presented in Table 4, and the resulting scoring categories used in this study are summarized in Table 5.

Table 4. Guideline for categorizing religious moderation attitude scores

Score range	Category
$X > Mi + 1.5SDi$	Very High
$Mi + 0.5SDi < X \leq Mi + 1.5SDi$	High
$Mi - 0.5SDi < X \leq Mi + 0.5SDi$	Moderate
$Mi - 1.5SDi \leq X \leq Mi - 0.5SDi$	Low
$X < Mi - 1.5SDi$	Very Low

Table 5. Scoring categories for religious moderation attitudes and knowledge

Category	Attitude Score	Knowledge Score
Very High	76 – 100	81–100
High	59 – 75	71–80
Moderate	42 – 58	61–70
Low	25 – 41	51–60
Very Low	0 – 24	0–50

In addition to descriptive analysis, this study used Multivariate Analysis of Covariance (MANCOVA) to examine the effects of gamification on knowledge and attitudes of religious moderation. MANCOVA was chosen because (a) it allows simultaneous testing of more than one dependent variable while retaining correlations among them, and (b) it enables controlling for pretest scores as covariates, thereby estimating treatment effects with reduced baseline variability (Ate^{o} et al., 2019). Prior to running MANCOVA, assumption checks were conducted, including: (1) multivariate normality to assess the distribution of dependent variables, (2) linearity to ensure linear relationships between covariates and dependent variables, (3) homogeneity of regression slopes to test whether covariate–dependent relationships were uniform across groups, (4) Box's M test for equality of covariance matrices, and (5) Levene's test for equality of residual variances across groups. If assumptions were not met, data transformations or alternative analyses (e.g., ANCOVA or separate analyses with adjustments) were planned.

■ RESULT AND DISCUSSION

Descriptive Results of Religious Moderation Attitude and Knowledge

This section presents the main findings from the study of the effect of gamification on moderation attitudes (MA) and moderation

knowledge (MK) of Generation Z students. The analysis consisted of descriptive and inferential analyses using MANCOVA.

Descriptive analysis was used to illustrate the general trends in the MA and MK data of Generation Z students before and after the intervention. The results of the descriptive analysis are presented in Table 6.

Pretest results indicate that students' attitudes toward religious moderation at

Table 6. Descriptive analysis of attitudes and knowledge of religious moderation

Var	Groups	N	Pretest				Posttest			
			Min	Max	M	SD	Min	Max	M	SD
MA	Control	65	44.24	76.93	62.17	7.73	63.47	92.31	79.30	6.04
MA	Experimental	63	48.08	78.85	61.55	7.77	69.24	98.08	82.98	6.50
MK	Control	65	20	80	43.08	13.66	45	90	71.54	11.56
MK	Experimental	63	25	70	42.30	11.94	50	100	78.49	12.04

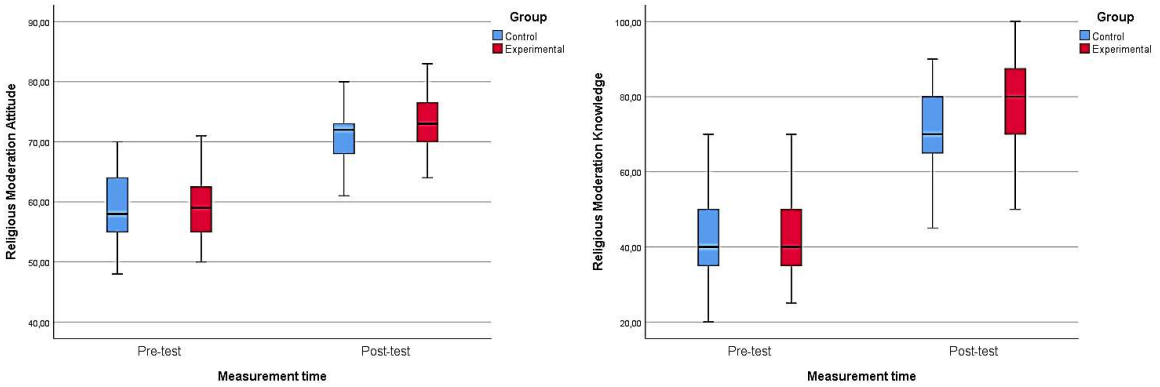

Figure 2. Boxplots of religious moderation attitude and religious moderation knowledge

Universitas PGRI Pontianak are already in the high category. This can be explained by students being accustomed to social practices that emphasize tolerance and coexistence from an early age, through their educational environment, religious traditions, and cross-group interactions (Afwadzi et al., 2024). However, a different finding was seen in the knowledge aspect of religious moderation, which fell into the very low category. This low score indicates a gap between attitudes and conceptual literacy, in which students often display tolerant behavior but do not yet fully understand the basic concepts of religious moderation in formal terms (Imamah & Lee, 2024; Latifa et al., 2022). The pretest results indicate that although students exhibit a moderate attitude, their conceptual understanding remains insufficient. Figure 2 further shows that the dispersion of moderation attitudes scores becomes slightly narrower at posttest in both groups. In contrast, knowledge scores remain relatively heterogeneous, indicating that students entered the course with varying levels of conceptual literacy.

After the learning intervention, both the control and experimental groups experienced improvements in their attitudes and knowledge of religious moderation. Students' attitudes of moderation increased from high to very high, while their knowledge of moderation increased from very low to high. This pattern reinforces the view that religious education plays a crucial role in deepening understanding and strengthening moderate religious attitudes (Junaedi et al., 2023).

Other studies have also found that systematic learning interventions that use both cognitive and affective approaches can help students learn more and practice moderation values more (Mukhibat et al., 2024). These results demonstrate that teaching Generation Z about religious moderation through education is an appropriate approach.

Multivariate Effects of Gamification on Religious Moderation Attitude and Knowledge

Before conducting MANCOVA, prerequisite tests were performed. The initial required test was multivariate normality, ensuring that the data were approximately normally distributed so that the MANCOVA results could be interpreted correctly. The test used Mahalanobis Distance, comparing the maximum distance to the critical value of the chi-square ($\div^2$) distribution at a significance level of 0.001. The results of the multivariate normality test are presented in Table 7.

Table 7. Multivariate normality test results

N	DV	Critical Poin χ^2	Max MD
128	2	13.82	11.57

The analysis showed that the highest Mahalanobis Distance value was 11.57, which is less than the critical value of $\div^2$ (2, $p < 0.001$) of 13.82. So, the data are multivariate normally distributed and meet the requirements for MANCOVA analysis.

A linearity test between the covariate (pretest score) and the dependent variable (posttest score) was also conducted as a prerequisite. This test is meant to ensure a linear relationship, which means that using covariates in MANCOVA analysis can be supported by statistical tests. Table 8 shows the results of the linearity test.

The results of the linearity test indicate that all covariates (pretest scores) are linearly related to the dependent variable (posttest scores). The coefficient of determination (R^2) values obtained ranged from 0.590 to 0.793, indicating a fairly strong linear relationship. Thus, the linearity assumption in the MANCOVA analysis was met.

Table 8. Linearity test results

Kovariat	DV	R^2	Category
(Pre) MA	(Post) MA	0.590	Linear
(Pre) MA	(Post) MK	0.793	Linear
(Pre) MK	(Post) MA	0.626	Linear
(Pre) MK	(Post) MK	0.782	Linear

The next step was to conduct a Homogeneity of Regression Slopes test to ensure that the slope of the relationship between the pretest scores (the covariates) and the posttest scores (the dependent variable) was the same across groups. This test is important because it indicates that the MANCOVA assumption is violated when there is a significant interaction between the covariates and the groups. The results of the homogeneity of slopes test are presented in Table 9.

Table 9. Results of the homogeneity of regression slopes test

Interaction	DV	F	Sig.	Category
Groups * (Pre) MA	(Post) MA	0.937	0.335	Homogeneous
Groups * (Pre) MA	(Post) MK	1.740	0.190	Homogeneous
Groups * (Pre) MK	(Post) MA	1.683	0.197	Homogeneous
Groups * (Pre) MK	(Post) MK	2.695	0.103	Homogeneous

The homogeneity-of-slopes test results indicate no significant interaction between the group and the covariate ($p > 0.05$). Consequently, the slope of the correlation between pretest and posttest scores is consistent across both groups (homogeneous). Accordingly, the assumption of homogeneity of regression slopes is met, allowing the MANCOVA analysis to proceed without the interaction term.

The next test that needs to be passed is Box's M Test. This test checks the assumption that the covariance matrix between groups is the same. This assumption is crucial for accurate MANCOVA results because large differences in the covariance matrix can reduce parameter precision. Table 10 shows the results of the Box's M test.

Table 10. Box's M test results

Box's M	F	Sig.	Category
3.390	3.390	0.343	Homogeneous

Based on Table 10, the Box's M test has a significance value of 0.343 ($p > 0.05$), indicating that there are no significant differences between the groups' covariance matrices. Therefore, the assumption of homogeneity of covariance matrices is met. Therefore, the MANCOVA analysis can proceed with multivariate statistics using Pillai's Trace, which is more robust to violations of the assumptions.

The final prerequisite test performed before the MANCOVA analysis is Levene's Test. This test aims to ensure homogeneity of variance between groups for each dependent variable. If the significance value is greater than 0.05, the assumption of homogeneity of variance is met. The results of Levene's Test are presented in Table 11.

Table 11. Levene test results

DV	F	Sig.	Category
(Post) MA	1.820	0.180	Homogeneous
(Post) MK	3.286	0.072	Homogeneous

Based on Table 11, all dependent variables have significance values greater than the required level ($p > 0.05$), thus concluding that the variance between groups is homogeneous. Therefore, the assumption of homogeneity of variance is met, and the MANCOVA analysis can proceed.

After the prerequisite MANCOVA test is met, the multivariate analysis continues using Pillai's Trace to examine the intervention's effect on the dependent variable and the covariates' effect on the dependent variable. The results of the multivariate analysis ar presented in Table 12.

Table 12. Multivariate test results (pillai's trace)

Effect	Pillai's Trace	F	Sig.	Partial η^2	Category
(Pre) MA	0.189	14.296	0.000	0.189	Significant
(Pre) MK	0.126	8.898	0.000	0.126	Significant
Group	0.543	73.164	0.000	0.543	Significant

Pillai's Trace results show that both covariates (Pre MA and Pre MK) have a significant multivariate effect on the combination of dependent variables ($p < 0.001$), indicating that pretest scores are jointly related to variation in posttest scores, so it is important to control for them in the analysis. Beyond statistical significance, the effect sizes indicate meaningful baseline contributions to the combined outcomes, with partial $ç^2 = 0.189$ for Pre MA and partial $ç^2$

= 0.126 for Pre MK. More importantly, the group effect is also multivariate significant (Pillai = 0.543; F = 73.164; p < 0.001), which indicates that after controlling for initial differences, there is a simultaneous significant difference in the combination of MA and MK between the experimental group that received the gamification intervention and the control group that did not use gamification. In terms of effect size, partial ç² = 0.543 for the group effect indicates a very large treatment effect in practice, indicating the influence of gamification on the combination of dependent variables is strong in scale.

The significant contributions of Pre MA and Pre MK suggest that students' initial affective orientation and conceptual literacy functioned as baseline resources that shaped how they processed, engaged with, and benefited from the learning experience. Prior knowledge is widely documented as a key predictor of later learning because it provides conceptual schemas that support comprehension and integration of new information, and individual differences in knowledge can remain stable across measurement occasions (Simonsmeier et al., 2022). Affective dispositions also matter because attitudes are consistently associated with learning engagement and achievement, meaning that students who begin with more favorable attitudes tend to invest more effort and persist more during learning tasks (Mao et al., 2021). At the same time, changes in attitudes are often constrained by students' starting points. They may require sustained exposure, which helps explain why baseline attitudes can continue to predict post-intervention attitudes even when instructional innovations are introduced (Wüthrich et al., 2024). In this study, students entered the course with different starting levels of moderation literacy and with relatively positive baseline moderation attitudes, so controlling Pre MK and Pre MA was necessary to isolate the unique contribution of gamification to the combined posttest outcomes

The MANCOVA results showed a significant difference after controlling for pre-test scores on a combination of religious moderation knowledge and attitude variables between classes that implemented gamification and those that did not. The findings demonstrate that the group exposed to the gamification intervention attained superior test results on both dependent variables compared to the control group. This indicates that the advantage observed in the gamified class was not merely a reflection of students' initial levels, but an additional gain attributable to the instructional design. This discovery aligns with recent reviews and meta-analyses indicating that gamification has beneficial effects on learning outcomes and academic engagement across various educational settings (Khoshnoodifar et al., 2023; M. Li et al., 2023).

Differences in knowledge and attitudes toward religious moderation are inseparable from the role of self-determination that emerges through gamification. Self-determination can grow when basic psychological needs such as competence, autonomy, and social connectedness are met, thereby triggering intrinsic motivation and increasing engagement, persistence, and learning effort (Gao, 2024; Ryan & Deci, 2000). Empirical syntheses in educational settings indicate that gamification is often associated with greater perceived autonomy and relatedness. In contrast, effects on perceived competence tend to be smaller and more variable across studies (L. Li et al., 2024). This condition is what causes differences in the knowledge and attitudes of religious moderation among Generation Z students. In gamification approaches, elements such as progressive challenges, immediate feedback, badges, and leaderboards are theoretically expected to potentially support competence and social connectedness while also promoting autonomy-supportive learning conditions.

Furthermore, gamification provides space for experiential learning, enabling deeper

internalization of values. Experiential learning emphasizes concrete experiences, reflection, conceptualization, and repeated experiments, which effectively encourage attitudinal change because participants do not simply receive theory but actually "experience" the consequences of choices and actions (David & Weinstein, 2023; Kolb, 2015). In gamification practice, such experiences can be achieved through interactive case studies, role-based tasks, or contextual simulations that require participants to make decisions, experience the consequences, and reflect on them (Dairo et al., 2024). Therefore, in addition to the quiz function, including an experiential-reflective component in gamification design is important for encouraging the internalization of attitudes and knowledge.

Effect of Gamification on Religious Moderation Knowledge

After a significant multivariate effect was established for the combined outcomes of religious MK, follow-up analyses were conducted to examine the specific effect of gamification on MK. To complement the statistical evidence, a scatter plot was used to visualize individual change patterns by mapping each student's MK. The visual distribution of MK scores in the control and experimental groups is presented in Figure 3.

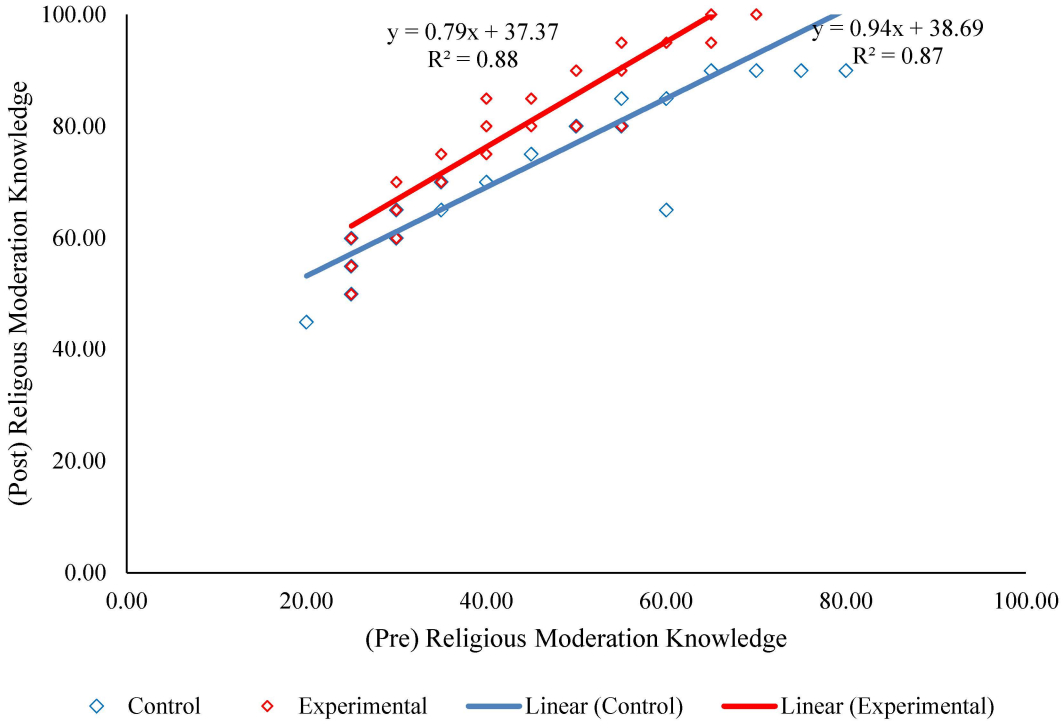

Figure 3. Scatter plot of individual pretest and posttest scores for religious moderation knowledge by group

Based on Figure 3, the pretest MK scores show an approximately linear association with posttest MK scores, indicating that students who started with higher baseline knowledge tended to obtain higher posttest knowledge. The distribution of points suggests that most students experienced gains in MK from pretest to posttest, and the experimental group appears to show a stronger upward shift than the control group. Nevertheless, visual patterns alone cannot confirm

the magnitude and statistical significance of the intervention effect. Therefore, a univariate follow-up test was conducted to examine the specific effect of gamification on Post MK after controlling for baseline scores. The results are presented in Table 13.

Table 13. Univariate test results for religious moderation knowledge

DV	F	Sig.	Partial η²	Category
(Post) MK	127.787	0.000	0.508	Significant

As shown in Table 13, the effect of gamification on moderation knowledge (Post MK) was statistically significant ($p < 0.001$) and accompanied by a large effect size (partial $ç^2 = 0.508$). This indicates that, after controlling for pretest scores, gamification accounted for a substantial proportion of variance in students' posttest moderation knowledge. To clarify the direction and magnitude of the group difference, pairwise comparisons were conducted. The results are presented in Table 14.

The pairwise comparison indicates a significant difference in Post MK between groups ($p < 0.001$). The negative mean difference

Table 14. Pairwise comparison results for religious moderation knowledge

DV	Groups	Mean Diff.	Sig.	Category
(Post) MK	Control - Experimental	−7,776	0,000	Significant

(Control-Experimental) indicates that the experimental group achieved higher posttest MK scores than the control group, with a mean difference of 7.776 points. This pattern aligns with Figure 3, where a greater proportion of students in the experimental group are positioned above the diagonal reference line, reflecting greater individual gains in moderation knowledge. This pattern is also consistent with recent synthesis evidence indicating that gamification in online or technology-mediated learning tends to yield positive effects on academic achievement, while emphasizing that the magnitude of effects depends on design decisions such as the combination of game elements and the balance between competition, cooperation, and feedback (M. Li et al., 2023; Yu et al., 2024).

The stronger performance in the gamified class may be explained by the learning mechanisms embedded in Quizizz. Gamified quizzes facilitate retrieval practice through repeated exposure to questions, while immediate feedback helps students correct misconceptions and consolidate conceptual understanding. This occurs because timely feedback helps learners correct misconceptions and strengthens memory for subsequent retrieval attempts (Agarwal et al., 2021). In the present study, repeated quiz cycles increased the number of retrieval opportunities across sessions. They encouraged students to use corrective feedback immediately after errors, which can reduce persistent misconceptions over time. Studies also suggest that integrating game mechanics with repeated practice and adaptive feedback is associated with improved academic outcomes, particularly for knowledge-oriented targets (L. Li et al., 2024; Zainuddin et al., 2020). In addition, structured competition and visible progress can increase attention and persistence during learning activities, thereby supporting knowledge acquisition and retention (Latimier et al., 2021; Meng et al., 2024). However, leaderboards should be implemented carefully, as discouraging social comparison can reduce practice and performance; they are most beneficial when kept low-stakes and secondary to mastery-focused feedback (Do et al., 2024). For this reason, the leaderboard in this study was used primarily to signal short-term progress and encourage completion of each quiz cycle. In

contrast, feedback use and answer accuracy remained the main instructional emphasis.

In this study, Quizizz features such as Strike and Shield, power-ups, and response speed were incorporated into repeated quiz activities, which may have helped sustain participation and focus on answer accuracy. Strike and Shield rewarded consecutive correct answers, so the activity's advantages depended on maintaining accurate responses rather than guessing. Response speed requirements also encouraged sustained concentration within each quiz session. Prior research suggests that gamified learning can shape learners' perceived cognitive effort and cognitive load in ways that support engagement during challenging tasks (Baah et al., 2024). In addition, studies on Quizizz-based gamified formative assessment relate students' engagement and performance to motivational internalization and the perceived value of the assessment activity (Zhang & Crawford, 2024). Together, these conditions encouraged more frequent retrieval attempts and more systematic use of feedback, contributing to greater gains in students' knowledge of religious moderation.

Beyond the quiz component, the iSpring branching scenario activities have supported MK by requiring students to apply moderation concepts to contextual choices and consequences. Importantly, the scenarios were not presented as narrative only. Key decision points were accompanied by brief explanatory feedback that linked students' choices to moderation principles, including short conceptual clarifications and supporting references, so that each branch functioned as a guided application of the targeted indicators. This positions the branching scenarios as knowledge-application tasks that reinforce conceptual understanding and transfer beyond linear instruction. Evidence from scenario-based learning evaluations also supports the view that structured scenarios can improve academic achievement and learner engagement (Mamakli et al., 2023), and broader simulation-based learning syntheses report consistent improvements in knowledge acquisition across studies (Alharbi et al., 2024).

Effect of Gamification on Religious Moderation Attitude

In addition to examining the effect of gamification on religious moderation knowledge, this study also investigated its effect on MA to determine whether the intervention influenced students' affective orientation toward moderation values. To complement the statistical evidence, a scatter plot was used to visualize individual change patterns by mapping each student's MA. The visual distribution of MA scores in the control and experimental groups is presented inFigure 4.

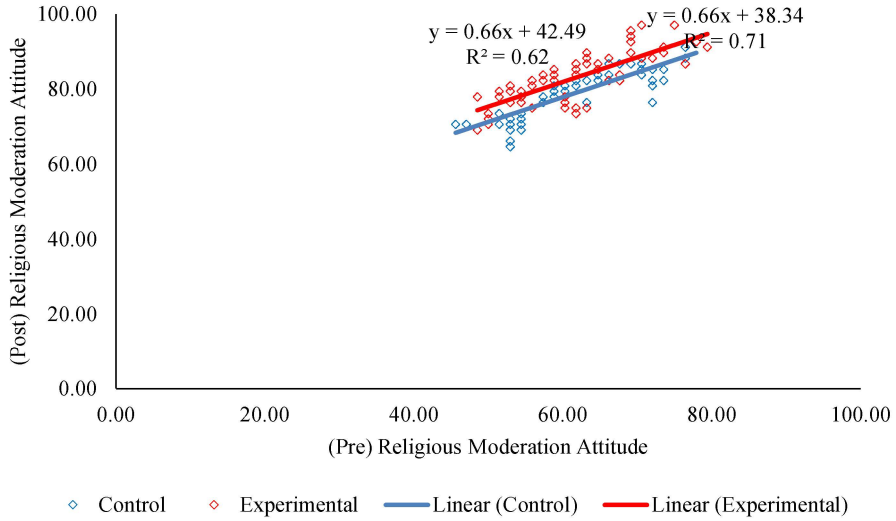

Figure 4. Scatter plot of individual pretest and posttest scores for religious moderation attitude by group

Based on Figure 4, pretest MA scores show a positive, approximately linear association with posttest MA scores, indicating that students who started with higher baseline attitudes tended to have higher posttest attitudes. The distribution of points also suggests that, at comparable pretest levels, the experimental group generally attained higher posttest MA scores than the control group. To confirm whether this difference is statistically significant after controlling for baseline scores, a univariate follow-up test was conducted. The results are presented in Table 15.

Table 15. Univariate test results for religious moderation attitude

DV	F	Sig.	Partial η^2	Category
(Post) MA	42.430	0.000	0.255	Significant

As shown in Table 15, the effect of gamification on moderation attitude (Post MA) was statistically significant ($p < 0.001$) with a large effect size (partial $ç^2 = 0.255$), indicating a meaningful practical impact on students' moderation attitudes. To clarify the direction and magnitude of the group difference, pairwise comparisons were conducted. The results are presented in Table 16.

Table 16 indicates a significant difference in Post MA between groups ($p < 0.001$). The negative mean difference (Control-Experimental)

Table 16. Pairwise comparison results for religious moderation attitude

DV	Groups	Mean Diff.	Sig.	Category
(Post) MA	Control - Experimental	−2,728	0,000	Significant

indicates that the experimental group achieved higher posttest MA scores than the control group, with a mean difference of 2.728 points. This pattern aligns with Figure 4, where a greater proportion of students in the experimental group are positioned above the diagonal reference line, reflecting greater individual gains in moderation attitudes. Although the mean difference is smaller than that observed for MK, this is plausible because attitudinal outcomes typically change more gradually and depend on repeated opportunities for interpretation, judgment, and reflection. In support of this interpretation, a recent meta-analysis indicates that narrative and interactive game-based experiences can produce measurable shifts in attitudes toward the topics they depict (Kolek et al., 2023). This supports the plausibility that MA can be influenced when learners repeatedly engage with value-relevant situations and receive feedback that helps them interpret choices and consequences.

The improvement in attitudes toward religious moderation could be related to the affective and experiential dimensions of the gamified learning design implemented in this study. Gamification can be structured to foster emotional engagement, active participation, and meaningful social interaction, which are important conditions for attitudinal development (Aura et al., 2023; Koivisto & Hamari, 2019). In this intervention, the affective and experiential pathway was operationalized primarily through simulation-based learning tasks that required students to make decisions in moderation-related situations and then reflect on the consequences of those decisions. Specifically, the iSpring branching scenarios placed students in value-laden situations, prompting them to choose responses aligned with the indicators of religious moderation, and then presented consequences that made the implications of each choice salient. This mechanism is consistent with evidence that

branching narratives can promote prosocial orientations by encouraging learners to evaluate alternatives and consider consequences rather than merely receiving normative statements (Fenici & Mosca, 2023).

Crucially, each branching path was accompanied by brief explanatory feedback that linked the decision outcomes to relevant moderation principles and supporting references, so the scenario served not only as a narrative but also as a guided reflection on values. Such simulation and reflection processes align with experiential learning principles, in which concrete experience followed by reflection supports the internalization of values and the formation of more stable attitudes (David & Weinstein, 2023; Kolb, 2015). Prior research likewise suggests that simulations can strengthen value sensitivity and social attitudes by providing experiences that resemble real-world contexts (Chernikova et al., 2020; Jallad, 2025), and scenario-based learning studies have reported attitude improvements when scenarios connect abstract principles to realistic situations and include reflective feedback (Álvarez-Nieto et al., 2022). Therefore, the gamified approach in this study could have contributed to attitudinal improvement by combining interactive participation with experiential reflection, thereby supporting the internalization of religious moderation values.

In addition, Quizizz activities played a supporting role by strengthening the knowledge base that students drew on when navigating the branching scenarios. Scenario-based tasks typically rely on learners' prior knowledge to interpret information and select appropriate responses, and prior knowledge has been shown to predict performance in complex scenario-based assessments (McCarthy et al., 2023). Thus, repeated Quizizz practice may have helped students recognize and apply moderation indicators more accurately when making scenario-based decisions, while the scenario feedback guided how those decisions were evaluated and internalized. Studies on Quizizz-based gamified formative assessment also link students' engagement and performance with motivational internalization and the perceived value of assessment activities (Zhang & Crawford, 2024), which may help explain why students continued to participate across repeated attitude-relevant learning cycles.

Limitation and Future Research

Although this study demonstrates a statistically significant effect of gamification on religious moderation knowledge and religious moderation attitude, several limitations should be considered when interpreting the findings. The first limitation concerns the participant characteristics and research context. All participants were drawn from a single institution, namely Universitas PGRI Pontianak, and the social, cultural, and educational background of these students may not reflect the diversity of university students in other regions or institutional settings. Consequently, the results are best interpreted as context-specific, and broad claims about the general effectiveness of gamification for religious moderation education should be made cautiously. Future studies should involve multi-site samples across universities and regions and explicitly consider contextual factors that may shape moderation learning, as local sociocultural dynamics and prior educational exposure.

Another limitation is the relatively short duration of the intervention. While the posttest results indicate meaningful gains, the present design does not provide evidence regarding whether the observed improvements, particularly in attitudes, are sustained over time. Follow-up measurements and longitudinal designs are needed to examine the stability of changes in moderation knowledge and to determine whether attitudinal development persists beyond the immediate instructional period.

In addition, future research may investigate how different combinations of gamification elements and experiential components influence cognitive and affective outcomes, and explore

their integration with emerging technologies, such as augmented and virtual reality, to support more immersive learning experiences. Further work could also examine proposed motivational mechanisms more directly by incorporating validated measures of basic psychological need satisfaction and motivation to test whether these constructs mediate the effect of gamification on religious moderation outcomes.

CONCLUSION

The gamification intervention, which combined interactive quizzes and simulations, proved effective in enhancing both knowledge and attitudes toward religious moderation among Generation Z students in IRE. Practically, this approach is feasible to integrate into IRE instruction, as it simultaneously strengthens cognitive engagement (knowledge retention) and supports the internalization of values (attitudinal change). Despite these promising results, the generalizability of the findings is limited by the single-institution sample and the short intervention duration. Therefore, future studies employing multi-site samples and longitudinal designs are recommended to examine the sustainability and generalizability of the effects. In sum, gamification is a promising pedagogical approach to reinforce religious moderation among students when designed to combine cognitive practice with reflective experiences.

ACKNOWLEDGEMENT

The authors would like to thank the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia for providing financial support through a research grant for this study.

DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the drafting of this manuscript, the author(s) utilized ChatGPT and Quillbot for the purpose of refining sentence structure and translating text. Following the use of this tool, the authors reviewed and revised the content as necessary and accept full responsibility for the final content of the article.

REFERENCES

Afwadzi, B., Sumbulah, U., Ali, N., & Qudsy, S. Z. (2024). Religious moderation of Islamic university students in Indonesia: Reception of religious texts. *HTS Teologiese Studies / Theological Studies*, *80*(1), 1–9. https://doi.org/10.4102/hts.v80i1.9369

Agarwal, P. K., Nunes, L. D., & Blunt, J. R. (2021). Retrieval practice consistently benefits student learning: A systematic review of applied research in schools and classrooms. *Educational Psychology Review*, *33*(4), 1409–1453. https://doi.org/10.1007/s10648-021-09595-9

Alharbi, A., Nurfianti, A., Mullen, R. F., McClure, J. D., & Miller, W. H. (2024). The effectiveness of simulation-based learning (SBL) on students' knowledge and skills in nursing programs: A systematic review. *BMC Medical Education*, *24*, 1099. https://doi.org/10.1186/s12909-024-06080-z

Alsadoon, E., Alkhawajah, A., & Suhaim, A. Bin. (2022). Effects of a gamified learning environment on students' achievement, motivations, and satisfaction. *Heliyon*, *8*(8), e10249. https://doi.org/10.1016/j.heliyon.2022.e10249

Álvarez-Nieto, C., Álvarez-García, C., Parra-Anguita, L., Sanz-Martos, S., & López-Medina, I. M. (2022). Effectiveness of scenario-based learning and augmented reality for nursing students' attitudes and awareness toward climate change and sustainability. *BMC Nursing*, *21*(1), 1–9. https://doi.org/10.1186/s12912-022-01023-9

Anwar, M. A., & Inayati, N. L. (2025). Gamification of Islamic education: Exploring the role of Wordwalls in increasing student participation in learning the Qur'an and Hadith. *Fikroh: Jurnal Pemikiran Dan Pendidikan Islam*, *18*(2), 281–291. https://doi.org/10.37812/fikroh.v18i2.1898

Ateº, C., Kaymaz, Ö., Kale, H. E., & Tekindal, M. A. (2019). Comparison of test statistics of nonnormal and unbalanced samples for multivariate analysis of variance in terms of type I error rates. *Computational and Mathematical Methods in Medicine*, *15*, 2173638. https://doi.org/10.1155/2019/2173638

Attarwiyah, N. M., Wasi'ah, I. R., & Jennah, S. N. (2025). Bridging tradition and technology: Gamification in modern Islamic boarding schools. *Journal of Social Studies and Education*, *3*(1), 97–110. https://doi.org/10.61987/jsse.v2i2.668

Aura, I., Järvelä, S., Hassan, L., & Hamari, J. (2023). Role-play experience's effect on students' 21st century skills propensity. *Journal of Educational Research*, *116*(3), 159–170. https://doi.org/10.1080/00220671.2023.2227596

Baah, C., Govender, I., & Subramaniam, P. R. (2024). Enhancing learning engagement: A study on gamification's influence on motivation and cognitive load. *Education Sciences*, *14*(10). https://doi.org/10.3390/educsci14101115

Badan Litbang dan Diklat Kementerian Agama RI. (2019). *Moderasi beragama*. Kementrian Agama RI.

Capili, B., & Anastasi, J. K. (2024). An introduction to types of quasi-experimental designs. *AJN The American Journal of Nursing*, *124*(11), 50–52. https://doi.org/10.1097/01.NAJ.0001081740.74815.20

Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T., & Fischer, F. (2020). Simulation-based learning in higher education: A meta-analysis. *Review of Educational Research*, *90*(4), 499–541. https://doi.org/10.3102/00346543209335544

Christopoulos, A., & Mystakidis, S. (2023). Gamification in education. *Encyclopedia*, *3*(4), 1223–1243. https://doi.org/10.3390/encyclopedia3040089

Dai, W.-A., Xu, W., & Xing, Q.-W. (2025). Gamified learning impact: A meta-analysis of game element combinations on students' learning outcomes. *Educational Technology Research and Development*, *73*(4), 2617–2643. https://doi.org/10.1007/s11423-025-10493-y

Dairo, Y. M., Hunter, K., & Ishaku, T. (2024). The impact of simulation-based learning on the knowledge, attitude and performance of physiotherapy students on practice placement. *BMC Medical Education*, *24*(1), 1–10. https://doi.org/10.1186/s12909-024-05718-2

David, L., & Weinstein, N. (2023). A gamified experiential learning intervention for engaging students through satisfying needs. *Journal of Educational Technology Systems*, *52*(1), 52–72. https://doi.org/10.1177/00472395231174614

Do, N., Jin, T., Priest, R., Meredith, L. N., & Landers, R. N. (2024). A longitudinal quasi-experiment of leaderboard effectiveness on learner behaviors and course performance. *Learning and Individual Differences*, *116*, 102572. https://doi.org/10.1016/j.lindif.2024.102572

Fenici, M., & Mosca, I. (2023). Gamebooks and branching narratives in education: fostering sustainability competences to promote positive social change. *Frontiers in Education*, *8*, 1335605. https://doi.org/

10.3389/feduc.2023.1335605

Fitri, A. B. M., Barizi, A., Izzuddin, A., Miftahuddin, A. H., & Huda, A. (2025). The politics and practice of religious moderation in Indonesia: A study of the Ministry of Religious Affairs, Nahdlatul Ulama, and Muhammadiyah. *Islamica: Jurnal Studi Keislaman*, *19*(2), 321–347. https://doi.org/10.15642/islamica.2025.19.2.321-347

Gao, F. (2024). Advancing gamification research and practice with three underexplored ideas in self-determination theory. *TechTrends*, *68*(4), 661–671. https://doi.org/10.1007/s11528-024-00968-9

Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of quasi-experimental research designs in education research: Growth, promise, and challenges. *Review of Research in Education*, *44*(1), 218–243. https://doi.org/10.3102/0091732X20903302

Hasan, K., & Juhannis, H. (2024). Religious education and moderation: A bibliometric analysis. *Cogent Education*, *11*(1), 2292885. https://doi.org/10.1080/2331186X.2023.2292885

Ibrohim, M. O., & Budi, I. (2023). Hate speech and abusive language detection in Indonesian social media: Progress and challenges. *Heliyon*, *9*(8), e18647. https://doi.org/10.1016/j.heliyon.2023.e18647

Imamah, F. M., & Lee, H. (2024). Bridging the gap: Exploring religious literacy as an alternative approach to religious education in Indonesia. *Analisa: Journal of Social Science and Religion*, *9*(1), 1–19. https://doi.org/10.18784/analisa.v9i1.2136

Jallad, S. T. (2025). Effectiveness of simulation-based education on educational practices of communication skills, satisfaction, and self-confidence among undergraduate nursing students. *Creative Nursing*, *31*(2), 135–143. https://doi.org/10.1177/10784535241301115

Junaedi, M., Nasikhin, Hasanah, S., & Hassan, Z. (2023). Learning patterns in influencing attitudes of religious tolerance in Indonesian universities. *Education Sciences*, *13*(3), 285. https://doi.org/10.3390/educsci13030285

Khasanah, N., Hamzani, A. I., & Aravik, H. (2023). Religious moderation in the Islamic education system in Indonesia. *QALAMUNA: Jurnal Pendidikan, Sosial, dan Agama*, *15*(1), 629–642. https://doi.org/10.37680/qalamuna.v15i1.4115

Khoshnoodifar, M., Ashouri, A., & Taheri, M. (2023). Effectiveness of gamification in enhancing learning and attitudes: A study of statistics education for health school students. *Journal of Advances in Medical Education and Professional ism*, *11*(4), 230–239. https://doi.org/10.30476/jamp.2023.98953. 1817

Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, *45*, 191–210. https://doi.org/10.1016/j.ijinfomgt.2018.10.013

Kolb, D. (2015). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Pearson Education Ltd.

Kolek, L., Ropovik, I., Šisler, V., van Oostendorp, H., & Brom, C. (2023). Video games and attitude change: A meta-analysis. *Contemporary Educational Psychology*, *75*, 102225. https://doi.org/10.1016/j.cedpsych.2023.102225

Kutbaniyah, A., Muktamiroh, R., & Bashith, A. (2025). *Gamifikasi sebagai strategi efektif dalam meningkatkan pemahaman siswa dalam pendidikan agama Islam* [Gamification as an effective strategy in increasing students' understanding of Islamic religious

education]. *MA'ALIM: Jurnal Pendidikan Islam*, *6*(1), 119–133. https://doi.org/10.21154/maalim.v6i1.10948

Latifa, R., Fahri, M., Subchi, I., & Mahida, N. F. (2022). The intention of becoming religiously moderate in Indonesian Muslims: Do knowledge and attitude interfere? *Religions*, *13*(6), 540. https://doi.org/10.3390/rel13060540

Latimier, A., Peyre, H., & Ramus, F. (2021). A meta-analytic review of the benefit of spacing out retrieval practice episodes on retention. *Educational Psychology Review*, *33*(3), 959–987. https://doi.org/10.1007/s10648-020-09572-8

Li, L., Hew, K. F., & Du, J. (2024). Gamification enhances student intrinsic motivation, perceptions of autonomy and relatedness, but has minimal impact on competency: A meta-analysis and systematic review. *Educational Technology Research and Development*, *72*(2), 765–796. https://doi.org/10.1007/s11423-023-10337-7

Li, M., Ma, S., & Shi, Y. (2023). Examining the effectiveness of gamification as a tool promoting teaching and learning in educational settings: a meta-analysis. *Frontiers in Psychology*, *14*, 1253549. https://doi.org/10.3389/fpsyg.2023.1253549

Mamakli, S., Alimoðlu, M. K., & Daloðlu, M. (2023). Scenario-based learning/ : Preliminary evaluation of the method in terms of students ' academic achievement, in-class engagement, and learner/teacher satisfaction. *Advances in Physiology Education*, *47*, 144–157. https://doi.org/10.1152/advan.00122.2022

Mao, P., Cai, Z., He, J., Chen, X., & Fan, X. (2021). The relationship between attitude toward science and academic achievement in science: A three-level meta-analysis. *Frontiers in Psychology*, *12*, 784068. https://doi.org/10.3389/fpsyg.2021.784068

Mazya, T. M., Ridho, K., & Irfani, A. (2024). Religious and cultural diversity in Indonesia: Dynamics of acceptance and conflict in a multidimensional perspective. *International Journal of Current Science Research and Review*, *07*(06), 4932–4945. https://doi.org/10.47191/ijcsrr/v7-i7-32

McCarthy, K. S., Steinberg, J., Dreier, K., O'Reilly, T., Sabatini, J., Butterfuss, R., & McNamara, D. S. (2023). The effects of prior knowledge in a scenario-based comprehension assessment: A multidimensional approach. *Learning and Individual Differences*, *103*, 102283. https://doi.org/https://doi.org/10.1016/j.lindif.2023.102283

Meng, C., Zhao, M., Pan, Z., Pan, Q., & Bonk, C. J. (2024). Investigating the impact of gamification components on online learners' engagement. *Smart Learning Environments*, *11*(47), 1–28. https://doi.org/10.1186/s40561-024-00336-3

Miller, C. J., Smith, S. N., & Pugatch, M. (2020). Experimental and quasi-experimental designs in implementation research. *Psychiatry Research*, *283*, 112452. https://doi.org/10.1016/j.psychres.2019.06.027

Mukhibat, M., Effendi, M., Setyawan, W. H., & Sutoyo, M. (2024). Development and evaluation of religious moderation education curriculum at higher education in Indonesia. *Cogent Education*, *11*(1), 2302308. https://doi.org/10.1080/2331186X.2024.2302308

Mulyana, R. (2023). Religious moderation in Islamic religious education textbook and implementation in Indonesia. *HTS Teologiese Studies/Theological Studies*, *79*(1), a8592. https://doi.org/10.4102/

hts.v79i1.8592

Nisa, Y. F., Arif, S., Frentasia, J., Istiani, C., Afrimadona, Ruswandi, B., & Faiz, F. F. (2021). *The diversity on the ivory tower: Religious tolerance in higher education*. PPIM-UIN Jakarta. https://repository.uinjkt.ac.id/dspace/bitstream/123456789/62664/1/The Diversity of Ivory Towe.pdf

Orazani, S. N., Reynolds, K. J., & Osborne, H. (2023). What works and why in interventions to strengthen social cohesion: A systematic review. *Journal of Applied Social Psychology*, *53*(10), 938–995. https://doi.org/10.1111/jasp.12990

Qoumas, Y. C., Affandi, R., & Abdul, B. (2024). The dissemination of religious moderation through the policy of the Indonesian Ministry of Religious Affairs. *Qudus International Journal of Islamic Studies (QIJIS)*, *12*(1), 147–174. https://doi.org/10.21043/qijis.v12i1.27552

Ritzhaupt, A. D., Huang, R., Sommer, M., Zhu, J., Stephen, A., Valle, N., Hampton, J., & Li, J. (2021). A meta-analysis on the influence of gamification in formal educational settings on affective and behavioral outcomes. *Educational Technology Research and Development*, *69*(5), 2493–2522. https://doi.org/10.1007/s11423-021-10036-1

Rosfiani, O., Putri, O. A., Fadhillah, M., Mauludin, A., & Sholeh, W. (2024). *Pembelajaran PAI dengan gamifikasi Quizizz: Studi kasus di SMK Khazanah* [PAI learning with Quizizz gamification: Case study at Khazanah Vocational School]. *Jurnal Review Pendidikan Dan Pengajaran*, *7*(4), 17899–17908. https://doi.org/10.31004/jrpp.v7i4.39240

Ruiming, W. (2024). Criterion-referenced evaluation. In Z. Kan (Ed.), *The ECPH encyclopedia of psychology* (pp. 353–354). Springer Nature Singapore. https://doi.org/10.1007/978-981-97-7874-4_2

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*, 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Sakdiah, Hayati, Mahmud, S., & Furqan, M. (2025). Gamification in Islamic religious education: Developing interactive learning media via Quizizz with the ADDIE model. *Edukasi: Jurnal Pendidikan Dan Pengajaran*, *12*(1), 171–191. https://doi.org/10.19109/d48tv716

Santosa, M. H., Yanti, G. A. M. T., & Adnyani, L. D. S. (2024). The integration of Google Translate as a machine translation aid in EFL students' thesis composition. *LLT Journal: A Journal on Language and Language Teaching*, *27*(1), 214–229. https://doi.org/10.24071/llt.v27i1.3734

Simonsmeier, B. A., Flaig, M., Deiglmayr, A., Schalk, L., & Schneider, M. (2022). Domain-specific prior knowledge and learning: A meta-analysis. *Educational Psychologist*, *57*(1), 31–54. https://doi.org/10.1080/00461520.2021.1939700

Siswanto. (2020). The Islamic moderation values on the Islamic education curriculum in Indonesia: A content analysis. *Jurnal Pendidikan Islam*, *8*(1), 121–152. https://doi.org/10.14421/jpi.2019.81.121-152

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

Sujarwoto, Saputri, R. A. M., & Yumarni, T. (2023). Social media addiction and mental health among university students during the COVID-19 pandemic in Indonesia. *International Journal of Mental Health*

and Addiction, *21*(1), 96–110. https://doi.org/10.1007/s11469-021-00582-3

Tuna, M. H. (2024). Fundamentals of a pluralism-fostering Islamic religious education: Navigating cultural and religious dimensions of plurality. *Religious Education*, *119*(4), 321–337. https://doi.org/10.1080/00344087.2024.2384690

Wang, Y. F., Hsu, Y. F., Fang, K. T., & Kuo, L. T. (2024). Gamification in medical education: Identifying and prioritizing key elements through Delphi method. *Medical Education Online*, *29*(1), 2302231. https://doi.org/10.1080/10872981.2024.2302231

Werbach, K., & Hunter, D. (2020). *For the win: The power of gamification and game thinking in business, education, government, and social impact (Revised & updated edition)*. Wharton School Press.

Wijanarko, M. I., Susanto, L., Pratama, P. A., Idris, I., Hong, T., & Wijaya, D. (2024). Monitoring hate speech in Indonesia: An NLP-based classification of social media text. *EMNLP 2024 - Empirical Methods in Natural Language Processing, Proceedings of System Demonstrations*, 142–152. https://doi.org/10.18653/v1/2024.emnlp-demo.15

Wüthrich, S., Lozano, C. S., Lüthi, M., & Wicki, M. (2024). Changing students' explicit and implicit attitudes toward peers with disabilities: Effects of a curriculum-based intervention programme. *Social Psychology of Education*, *27*, 935–953. https://doi.org/10.1007/s11218-023-09837-4

Yu, Q., Yu, K., & Li, B. (2024). Can gamification enhance online learning? Evidence from a meta-analysis. *Education and Information Technologies*, *29*(4), 4055–4083. https://doi.org/10.1007/s10639-023-11977-1

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers & Education*, *145*, 103729. https://doi.org/10.1016/j.compedu.2019.103729

Zeng, J., Sun, D., Looi, C. K., & Fan, A. C. W. (2024). Exploring the impact of gamification on students' academic performance: A comprehensive meta-analysis of studies from the year 2008 to 2023. *British Journal of Educational Technology*, *55*(6), 2478–2502. https://doi.org/10.1111/bjet.13471

Zhang, Z., & Crawford, J. (2024). EFL learners ' motivation in a gamified formative assessment/ : The case of Quizizz. *Education and Information Technologies*, *29*(5), 6217–6239. https://doi.org/10.1007/s10639-023-12034-7