

Visual auditory kinesthetic learning model as a strategy to enhance senior high school students' learning motivation in Islamic education

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Abstract: Learning motivation remains a significant challenge in Islamic education and character education, where teacher-centred instruction often limits students' engagement and participation. Although the visual auditory kinesthetic (VAK) learning model has been widely implemented, its role as a motivational pedagogical framework has received limited empirical attention. This study aimed to examine the effectiveness of the VAK learning model in enhancing senior high school students' learning motivation by conceptualising it as a multimodal instructional strategy integrating visual, auditory, and kinesthetic learning experiences. A quantitative quasi-experimental design with a non-equivalent control group was employed. The participants comprised 53 Grade XI students from a public senior high school in Riau, Indonesia, including 27 students in the experimental group and 26 students in the control group. Data were collected using a validated learning motivation questionnaire administered before and after the intervention and analysed using descriptive statistics and ANCOVA. The findings indicated that students receiving VAK-based instruction demonstrated significantly higher post-test motivation than those receiving conventional instruction, with an adjusted mean difference of 18.06 points and a large practical effect. The study's novelty lies in reconceptualising VAK as a motivational framework that promotes competence, relatedness, and autonomy through multimodal learning. However, the findings are limited by the small sample from a single school and the use of short-term self-reported motivation measures. The results suggest that structured multimodal instruction can foster more engaging, learner-centred Islamic Education classrooms.

Keywords: Islamic education, learning motivation, quasi-experimental study, senior high school students, visual auditory kinesthetic learning model.

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Introduction

Islamic education and character education at the senior high school level is expected to do more than transmit religious knowledge; it is also responsible for shaping students' moral awareness, character formation, reflective attitudes, and commitment to religious values in daily life (Amalia et al., 2026). However, these aims are difficult to achieve when classroom learning remains dominated by one-way explanation, note-taking, and routine assignments that position students as passive recipients of information. This issue was also found in a preliminary observation conducted in Islamic education and character education classes at a public senior high school in Riau, Indonesia, where students' learning motivation was reported to be low,

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particularly during afternoon lessons. Only about 30% of the observed students showed active participation, while many others appeared passive, bored, sleepy, or less responsive to the teacher's explanation. This classroom condition indicates that the central problem is not merely students' lack of discipline, but the limited capacity of conventional instruction to create active, meaningful, and motivating learning experiences.

Learning motivation is a critical psychological factor because it influences students' persistence, attention, engagement, and willingness to invest effort in learning tasks. From the perspective of self-determination theory, students are more likely to develop autonomous motivation when the learning environment supports their needs for autonomy, competence, and relatedness (Guay, 2022; Baihaqi et al., 2026). A meta-analysis by Howard et al., involving 344 samples and more than 223,000 participants, also showed that intrinsic motivation and identified regulation are positively associated with student success, well-being, and persistence (Howard et al., 2021). In Islamic education, the role of motivation becomes even more important because the subject requires not only cognitive understanding, but also internalization of values, personal meaning, and active participation in moral-reflective learning activities. Sholeh et al. also emphasized that teachers' instructional roles and classroom strategies are central in strengthening students' motivation in Islamic religious education (Sholeh et al., 2024; Putra et al., 2026; Tambak & Sukenti, 2024).

Recent educational research has increasingly shown that student-centered and active learning strategies are more relevant for improving students' motivation than teacher-centered approaches. Wijnia et al., through a meta-analysis of problem-based, project-based, and case-based learning, argued that student-centered, problem-driven methods are theoretically and empirically important for understanding students' motivation compared with lecture-based instruction (Wijnia et al., 2024). Similarly, the ARCS motivation model literature shows that instructional design should intentionally address attention, relevance, confidence, and satisfaction to sustain learners' motivation (Fang et al., 2024). In this context, the Visual-Auditory-Kinesthetic learning model offers a relevant instructional strategy because it integrates visual representation, verbal interaction, listening activities, movement, and direct learning experience into a single learning process.

The VAK learning model has been examined in several recent studies. Rahmah et al. (2024) found that the visual auditory kinesthetic model significantly improved junior high school students' learning motivation in social studies learning, with significant differences between experimental and control groups. Dahliana et al. reported that the VAK model improved students' motivation and learning outcomes in Islamic elementary education, with post-test scores increasing after the intervention (Dahliana et al., 2023). Setiawati et al. also found that visual, auditory, and kinesthetic learning styles were significantly related to students' learning interest at the junior high school level (Setiawati et al., 2023). These findings suggest that learning activities involving multiple sensory and participatory channels can make classroom learning more attractive, interactive, and responsive to students' learning needs. However, most previous studies have treated VAK mainly as an instructional treatment whose effectiveness is measured through learning outcomes or motivation scores, while the motivational mechanisms through which visual, auditory, and kinesthetic activities support students' engagement have received less attention.

Nevertheless, the current study does not treat VAK as a rigid "learning style matching" approach. Contemporary literature warns that the assumption that students learn best only when instruction is matched to their preferred learning style remains scientifically problematic. Newton and Salvi found that belief in matching instruction to learning styles remains widespread among educators despite the lack of strong evidence supporting the matching hypothesis (Newton & Salvi, 2020). More recently, Hattie and O'Leary argued that the literature should move away from simplistic learning-style matching and toward adaptive learning strategies that align with task complexity, learning goals, and meaningful engagement (Hattie & O'Leary, 2025). Therefore, this study positions VAK not as a diagnostic tool for labeling students as visual, auditory, or kinesthetic learners, but as a multimodal instructional strategy designed to create richer learning experiences through visual, verbal, social, and physical engagement.

Despite the growing number of studies on VAK-based instruction, several gaps remain. *First*, many existing VAK studies focus on learning outcomes, learning interest, or elementary and junior high school contexts, while empirical evidence on senior high school students' learning motivation in Islamic education remains limited. *Second*, some studies on VAK in Islamic education have used one-group pretest-posttest designs, making it difficult to compare VAK-based instruction with conventional instruction. *Third*, previous studies have rarely explained the mechanisms through which VAK may influence students' motivation. This is important because motivation is not only affected by instructional variation, but also by whether students feel competent, socially connected, and meaningfully involved in learning activities. Therefore, the present study does not only ask whether VAK is effective, but also frames VAK as a multimodal instructional strategy that may support students' basic psychological needs.

The main independent variable in this study is the VAK learning model, while the dependent variable is students' learning motivation. The conceptual relationship between the two variables is built on self-determination theory, which explains that students' motivation is strengthened when the learning environment supports competence, relatedness, and autonomy (Bureau et al., 2022; Miratunisa et al., 2026; Tambak & Sukenti, 2026; Guay, 2022; Howard et al., 2021). Visual activities are expected to support students' sense of competence because pictures, diagrams, videos, and visual demonstrations can make abstract religious concepts clearer and easier to understand. Auditory activities are expected to strengthen relatedness because teacher explanation, classroom discussion, questioning, and oral reflection create interaction between students, peers, and teachers. Kinesthetic activities are expected to support autonomy because students are given space to participate directly through practice, simulation, movement, and demonstration. When these three components are integrated into one structured learning process, students are expected to become more attentive, confident, involved, and motivated to learn Islamic Education.

Accordingly, this study aims to examine the VAK learning model as a strategy to enhance senior high school students' learning motivation in Islamic education and character education. The study uses a quasi-experimental design involving an experimental class taught using the VAK model and a control class taught using conventional instruction. Unlike previous studies that primarily evaluated VAK in terms of learning outcomes or treated it as a learning-style matching approach, this study conceptualises VAK as a multimodal instructional strategy that integrates visual representation, auditory interaction, and kinesthetic participation to create more engaging and psychologically supportive learning experiences. Drawing upon self-determination theory, the study examines whether these multimodal learning experiences foster students' motivation by supporting their basic psychological needs for competence, relatedness, and autonomy. Based on the research data, the analyzed participants consisted of 53 Grade XI students: 27 students in the experimental class and 26 students in the control class. The study addresses the following research questions: How does students' learning motivation change in the control class taught through conventional instruction? How does students' learning motivation change in the experimental class taught through the VAK model? After controlling for students' initial motivation, does the VAK model produce higher post-test learning motivation than conventional instruction?

This study is expected to contribute theoretically and practically. Theoretically, it extends the discussion of self-determination theory by showing how a multimodal instructional strategy may support students' competence, relatedness, and autonomy in classroom learning. It also contributes to instructional design research by reframing VAK as a motivational learning mechanism rather than a learning-style labeling system. This position responds to contemporary criticism of the learning-style matching hypothesis while still recognizing the value of varied visual, verbal, and physical learning activities. Practically, the study provides empirical evidence for Islamic education teachers who seek to reduce monotonous instruction and design more active, engaging, and student-centered learning activities.

Literature review

Visual auditory kinesthetic learning model

The visual auditory kinesthetic learning model refers to an instructional strategy that integrates visual, auditory, and kinesthetic learning activities into one classroom process. In this model, visual learning is represented through pictures, diagrams, videos, slides, written keywords, and other forms of visual representation that help students organize abstract ideas into concrete information. Auditory learning is developed through explanation, listening, discussion, questioning, oral presentation, and verbal interaction between teachers and students. Kinesthetic learning emphasizes movement, demonstration, simulation, practice, role play, and direct involvement in learning activities. In the context of Islamic Education, these three modes are relevant because religious and moral concepts often require not only explanation, but also visualization, discussion, reflection, and practical demonstration. Therefore, VAK should be understood as a multimodal instructional model that enriches students' learning experiences, not as a rigid classification that labels students as only visual, auditory, or kinesthetic learners. This position is important because recent literature has criticized the simplistic "learning style matching" assumption and recommends the use of flexible learning strategies that are aligned with learning objectives, task characteristics, and meaningful engagement (Hattie & O'Leary, 2025; Tambak & Sukenti, 2025; Newton & Salvi, 2020).

Evaluatively, the VAK learning model can be categorized as an active and multimodal learning strategy because it requires students to see, listen, speak, move, discuss, and participate in the learning process. Its visual aspect helps students focus attention and recognize the structure of learning materials. Its auditory aspect strengthens teacher-student interaction, peer communication, and verbal reasoning. Its kinesthetic aspect provides opportunities for students to experience learning directly through movement, practice, and collaborative activities. Empirical studies have shown that VAK-based instruction can improve students' motivation, learning activities, and learning outcomes in different educational contexts. Rahmah et al. (2024), for example, found that the VAK model significantly improved students' motivation in social studies learning through a quasi-experimental design. Dahliana et al. (2023) also reported that VAK increased motivation and learning outcomes among Islamic elementary school students, although their study used a one-group pretest-posttest design. These findings suggest that VAK has potential as an instructional strategy, but further evidence is still needed at the senior high school level, especially in Islamic education and character education classes where students' motivation is closely related to value internalization and classroom participation.

Students' learning motivation

Students' learning motivation is commonly understood as an internal and external drive that initiates, directs, and sustains students' learning behavior. In educational settings, motivation determines whether students are willing to pay attention, ask questions, complete assignments, persist when facing difficulties, and participate actively in classroom activities. Motivation is not merely a personal trait; it is also shaped by instructional design, classroom climate, teacher support, peer interaction, and students' perception of the relevance of learning materials. In Islamic Education, learning motivation has a specific importance because the subject aims to develop knowledge, attitudes, moral awareness, and religious practice. Students who are motivated are more likely to engage with Islamic values meaningfully rather than memorizing concepts only for academic assessment. Howard et al. (2021), through a meta-analysis based on self-determination theory, showed that more autonomous forms of motivation are positively associated with better academic and psychological outcomes. This means that motivation becomes stronger when students learn because they understand the value of the activity, feel interested in it, and experience a sense of personal involvement.

From an evaluative perspective, learning motivation can be categorized into intrinsic motivation, extrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation. Intrinsic motivation appears when students learn because the activity itself is enjoyable or meaningful. Identified regulation occurs when students learn because they recognize the importance of the material for their personal goals or future life. External regulation is driven by reward, punishment, grades, or pressure from outside the learner. In classroom practice,

students' motivation can be observed through several aspects, such as desire to succeed, learning needs, persistence, interest in learning activities, and response to a supportive learning environment. These aspects are consistent with the indicators used in the present study, where students' motivation is measured through a questionnaire before and after the instructional treatment. In Islamic Education, teacher strategy also plays a decisive role because students' motivation is influenced by how the teacher explains religious concepts, creates interaction, gives appreciation, and connects learning materials with students' daily lives. Sholeh et al. emphasized that teachers' instructional roles and strategies are central to increasing students' learning motivation in Islamic religious education (Tambak et al., 2026; Sholeh et al., 2024; Saputra et al., 2026).

Self-determination theory as a conceptual foundation

Self-determination theory is a motivational theory that explains how social and instructional environments influence the quality of human motivation. The theory argues that students' autonomous motivation grows when three basic psychological needs are supported: autonomy, competence, and relatedness. Autonomy refers to students' sense that they have meaningful involvement and personal agency in learning activities. Competence refers to students' belief that they are capable of understanding materials, completing tasks, and achieving learning goals. Relatedness refers to students' feeling of connection with teachers, classmates, and the learning environment. In education, these three needs are important because students are more likely to engage deeply when they feel respected, capable, and socially connected. Guay (2022) explains that Self-Determination Theory is useful in education because it connects types of motivation, psychological needs, and autonomy-supportive teaching behaviors. Bureau et al. (2022) also found that antecedents of motivation are closely related to the development of autonomous and controlled motivation in students.

Evaluatively, self-determination theory provides a strong conceptual basis for explaining why the VAK learning model may enhance students' learning motivation. The visual component can support competence because students receive structured and concrete representations of learning materials. The auditory component can support relatedness because students participate in explanation, discussion, questioning, and social interaction. The kinesthetic component can support autonomy and competence because students become directly involved in learning activities rather than only listening to teacher explanation. In this sense, VAK is not only a technical variation of classroom method, but also a motivational strategy that can create a more supportive learning environment. This logic is also consistent with the ARCS model, which states that learning motivation can be strengthened when instruction attracts attention, shows relevance, builds confidence, and creates satisfaction. Fang et al. (2024) found that the ARCS model has been widely applied in instructional design, theoretical frameworks, and measurement tools to support motivation-oriented learning. Therefore, combining VAK with a Self-Determination Theory perspective allows this study to explain not only whether students' motivation increases, but also why multimodal learning may create more motivating conditions for Islamic education students.

Method

Research design

This study used a quantitative approach with a quasi-experimental non-equivalent control group design. This design was selected because the research was conducted in a natural classroom setting where students had already been organized into existing classes by the school. Therefore, individual random assignment was not possible. In educational research, a quasi-experimental design is commonly used when researchers compare treatment and control groups in authentic classroom contexts where full randomization cannot be applied (Creswell & Creswell, 2023; Johnson & Christensen, 2024). The study involved two intact *Grade XI* classes. One class was assigned as the experimental group and received instruction through the VAK learning model, while the other class served as the control group and received conventional instruction. Both groups completed a pre-test before the intervention and a post-test after the intervention. The

pre-test was used to identify students' initial learning motivation and to control baseline differences between groups in the final analysis.

Participants and research setting

The study was conducted in a public senior high school in Riau, Indonesia, during the 2025/2026 academic year. The population consisted of all students who were enrolled in Islamic education and character education. The total population comprised 420 students distributed across 12 classes. The participants were selected using *intact classroom sampling* at the class level (Fraenkel et al., 2022; Creswell & Creswell, 2023). This technique was adopted because the intervention had to be implemented within existing classroom groups and regular school schedules. Individual randomization was not feasible because it would have disrupted the school's class organization and instructional timetable, a common limitation in school-based quasi-experimental research (Campbell & Stanley, 1963; Shadish et al., 2002). Two classes were selected because they were at the same grade level, followed the same Islamic education and character education curriculum, studied within the same school context, and were available during the research period (Fraenkel et al., 2022). The initial selected sample consisted of 69 students. However, the final analysis included only students who completed both the pre-test and post-test and provided complete questionnaire responses. Students who were absent during one of the measurement sessions or submitted incomplete responses were excluded from the final dataset in accordance with standard participant screening procedures (Lohr, 2022; Taherdoost, 2022). The final analyzable sample consisted of 53 students: 27 students in the experimental group and 26 students in the control group.

Research procedure

The research procedure was conducted in three main stages: preparation, implementation, and post-intervention measurement (Fraenkel et al., 2022; Creswell & Creswell, 2023). In the preparation stage, the researchers prepared the lesson plan, learning materials, VAK-based learning activities, and learning motivation questionnaire. The instructional materials for the experimental and control groups were aligned with the same Islamic education and character education topic, learning objectives, and allocated learning time (Shadish et al., 2002). This was done to ensure that the main difference between the two groups was the instructional model used. In the first implementation stage, both the experimental and control groups completed a pre-test using the learning motivation questionnaire (Creswell & Creswell, 2023). The pre-test was administered to measure students' initial learning motivation before the instructional treatment and to provide baseline data for the statistical analysis. In the second stage, the experimental group received instruction using the VAK learning model, while the control group received conventional instruction. The VAK model was implemented through three connected learning components (Mayer, 2021). The visual component involved the use of pictures, diagrams, videos, written keywords, and visual demonstrations to help students understand the learning material. The auditory component involved teacher explanation, listening activities, question-and-answer sessions, classroom discussion, and oral reflection (Richards & Rodgers, 2022). The kinesthetic component involved direct practice, simulation, demonstration, and physical learning activities that encouraged students to participate actively in the lesson (Barrett & Moore, 2021).

The control group learned the same subject content through conventional instruction. Learning activities in the control group mainly consisted of teacher explanation, note-taking, question-and-answer activities, and individual assignments (O'Donnell, 2021). The control class did not receive the structured combination of visual, auditory, and kinesthetic activities used in the experimental class. Treatment fidelity was monitored during the implementation stage. The researchers used an implementation checklist to ensure that each meeting in the experimental group included visual, auditory, and kinesthetic activities as planned (Shadish et al., 2002). The checklist was used to record whether the main components of the VAK model were implemented during the lesson. This procedure was intended to reduce treatment contamination between the experimental and control groups. Finally stage, both groups completed the post-test using the same learning motivation questionnaire. The post-test was administered to measure students'

learning motivation after the instructional process. The pre-test and post-test scores were then matched for each student before being analyzed (Creswell & Creswell, 2023).

Instruments and data collection

The main instrument used in this study was a learning motivation questionnaire designed to measure students' motivation in Islamic education and character education. The questionnaire was developed based on five indicators of learning motivation: desire and effort to succeed, learning needs, persistence in learning, interest in learning activities, and a supportive learning environment, which are consistent with contemporary motivational theory emphasizing learners' psychological engagement and intrinsic motivation (Ryan & Deci, 2024). These indicators were translated into positive and negative statements using a five-point Likert scale (Likert, 1932). The response options consisted of strongly agree, agree, undecided, disagree, and strongly disagree. Positive items were scored from 5 to 1, while negative items were scored in reverse order, following standard questionnaire construction procedures (DeVellis & Thorpe, 2022). The questionnaire was administered twice, before and after the instructional treatment.

The instrument development process followed established procedures for educational scale development (Boateng et al., 2021; DeVellis & Thorpe, 2022). *First*, the indicators of learning motivation were identified from relevant motivational theories and the instructional context of Islamic Education. *Second*, questionnaire items were developed to represent each indicator. *Third*, the wording of the items was reviewed to ensure clarity, readability, and contextual appropriateness for senior high school students (Boateng et al., 2021). Fourth, the questionnaire was piloted with 25 students outside the research sample. The learning motivation questionnaire initially consisted of 60 items. After item validity analysis, 43 items met the required item-total correlation criteria and were retained, while 17 items were removed to improve the psychometric quality of the instrument (Hair et al., 2022; Field, 2024). Reliability analysis yielded a Cronbach's Alpha coefficient of 0.942, indicating excellent internal consistency (Taber, 2022; Nunnally & Bernstein, 1994). A VAK implementation questionnaire was also administered to the experimental class to support the treatment implementation data. This questionnaire initially consisted of 24 items representing the visual, auditory, and kinesthetic dimensions of the instructional model. Following item validity testing, six items met the required validity criteria and were retained, whereas eighteen items were removed (Hair et al., 2022). Because the questionnaire served only as supporting implementation evidence rather than the primary outcome measure, only the valid items were analyzed. The retained items produced a Cronbach's Alpha coefficient of 0.836, indicating good internal consistency and acceptable reliability for implementation monitoring (Taber, 2022).

Data analysis

The data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to summarize students' learning motivation scores, including minimum score, maximum score, mean, standard deviation, and mean gain. Assumption testing was conducted before inferential analysis (Field, 2024). The Shapiro-Wilk test was used to examine normality because each group consisted of fewer than 50 participant (Kim, 2022; Shapiro & Wilk, 1965). Levene's test was used to examine the homogeneity of variance between groups. The level of significance was set at 0.05 (Field, 2024). Because this study used intact classes and the pre-test mean scores between the experimental and control groups were not identical, the main between-group analysis was conducted using Analysis of Covariance (ANCOVA) (Hair et al., 2022; Liu & Yuan, 2021; Maxwell et al., 2023). In the ANCOVA model, the post-test learning motivation score was treated as the dependent variable, the instructional group was treated as the fixed factor, and the pre-test learning motivation score was treated as the covariate. ANCOVA was used to determine whether the VAK learning model produced a significant difference in students' post-test motivation after controlling for their initial motivation (Cohen, 1988; Lakens, 2022; Richardson, 2023).

Within-group changes from pre-test to post-test were also examined descriptively to show the direction of change in each group (Field, 2024). Paired sample t-tests were used only as supplementary analysis to describe whether students' motivation changed significantly within

each group. The independent sample t-test was not used as the main analysis because it does not control for baseline differences in pre-test motivation. The standardized effect size was recalculated to verify the magnitude of the difference between groups. Cohen's *d* was reported based on the post-test mean difference and pooled standard deviation, while Hedges' *g* was also considered to provide a more cautious estimate for a relatively small sample. The effect size was interpreted carefully because the study involved two intact classes and measured short-term self-reported motivation (Cohen, 1988; Lakens, 2022; Richardson, 2023).

Results

This section presents the findings of the study by comparing students' learning motivation in the control and experimental groups before and after instruction. The analysis was conducted in three steps. *First*, descriptive statistics were used to examine the pattern of students' motivation scores. *Second*, assumption testing was conducted to determine the suitability of parametric analysis. *Third*, ANCOVA was used as the main between-group analysis, with pre-test motivation as the covariate, to examine whether the VAK learning model produced higher post-test motivation after controlling for students' initial motivation.

Table 1. Descriptive statistics of students' learning motivation

Group	Test	N	Minimum	Maximum	Mean	SD	Mean Gain
Control class	Pre-test	26	130	151	141.54	5.812	14.46
Control class	Post-test	26	144	166	156.00	5.607	
Experimental class	Pre-test	27	133	156	145.48	5.957	32.11
Experimental class	Post-test	27	168	188	177.59	5.033	

The descriptive statistics show that both groups experienced an increase in learning motivation after the instructional process. The control class increased from a pre-test mean of 141.54 to a post-test mean of 156.00, with a mean gain of 14.46 points. The experimental class increased from a pre-test mean of 145.48 to a post-test mean of 177.59, with a mean gain of 32.11 points. Although both groups improved, the increase in the experimental group was more than twice the increase found in the control group. The experimental group also started with a slightly higher pre-test mean than the control group. For this reason, the final comparison between groups was not based only on the post-test mean difference. ANCOVA was used to adjust the post-test comparison by controlling students' initial motivation scores.

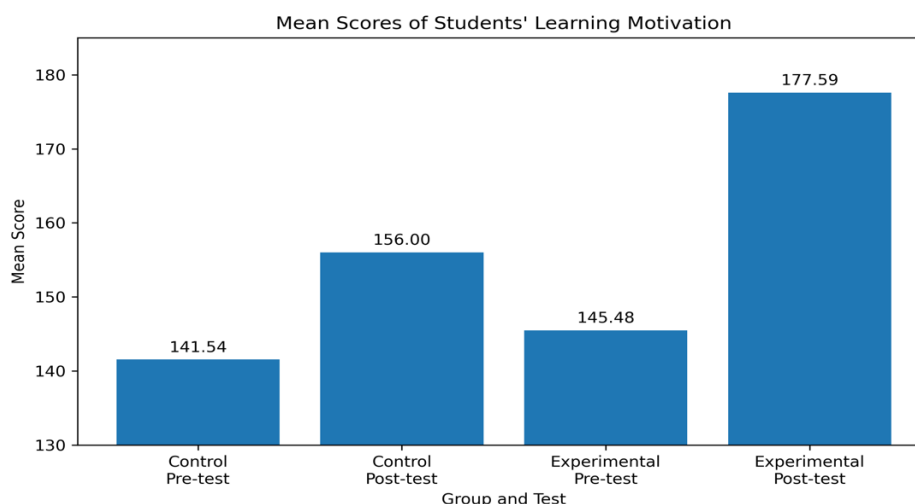


Figure 1. Mean Scores of Students' Learning Motivation

Figure 1 confirms the pattern shown in Table 1. The experimental class started with a slightly higher pre-test mean than the control class, but the difference became much larger after the treatment. The control class also improved after learning, yet the increase was smaller. The largest numerical change occurred in the experimental class after the implementation of the VAK learning model. Before conducting ANCOVA, assumption testing was performed. The Shapiro-Wilk test showed that the pre-test and post-test scores in both groups were normally distributed because all significance values were higher than 0.05. Levene's test also showed that the variance between groups was homogeneous.

Table 2. Assumption testing

Data Set	N	Statistic/Test	Sig.	Decision
Control Group pre-test	26	Shapiro-Wilk	.724	Normal
Control Group post-test	26	Shapiro-Wilk	.851	Normal
Experimental Group pre-test	27	Shapiro-Wilk	.819	Normal
Experimental Group post-test	27	Shapiro-Wilk	.837	Normal
Homogeneity of variance	53	Levene's test	.656	Homogeneous
ANCOVA residual normality	53	Shapiro-Wilk	.867	Normal

These results indicate that the data met the basic assumptions for parametric analysis. The residual normality test also supported the use of ANCOVA because the residuals were normally distributed. The homogeneity of regression slopes was also examined to ensure that the relationship between pre-test and post-test motivation did not differ substantially between the experimental and control groups. The pre-test and post-test comparison showed that students' learning motivation increased in both groups. In the control group, the mean score increased by 14.46 points. In the experimental group, the mean score increased by 32.11 points. This pattern indicates that conventional instruction was followed by some improvement in students' learning motivation, but the improvement was much stronger in the class taught through the Visual-Auditory-Kinesthetic learning model.

Table 3. Within-group changes in learning motivation

Group	Pre-test Mean	Post-test Mean	Mean Gain	Interpretation
Control group	141.54	156.00	14.46	Motivation increased after conventional instruction
Experimental group	145.48	177.59	32.11	Motivation increased more strongly after VAK instruction

The larger gain in the experimental group suggests that the VAK learning model created a more active and engaging classroom experience than conventional instruction. However, because the two groups did not begin from exactly the same pre-test level, the main comparison was conducted using ANCOVA. ANCOVA was conducted with post-test learning motivation as the dependent variable, instructional group as the fixed factor, and pre-test learning motivation as the covariate. The result showed that pre-test motivation significantly predicted post-test motivation, indicating that students' initial motivation was related to their motivation after instruction. More importantly, after controlling for pre-test motivation, the instructional group still had a significant effect on post-test motivation.

Table 4. ANCOVA results for post-test learning motivation

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test motivation	1420.321	1	1420.321	2934.866	< .001	.983
Instructional group	3868.255	1	3868.255	7993.128	< .001	.994
Error	24.197	50	0.484			

The ANCOVA result confirms that the difference between the experimental and control groups remained statistically significant after students' initial motivation was controlled. This means that the higher post-test motivation in the experimental group cannot be explained only by the group's slightly higher pre-test score. The instructional model itself contributed to the difference in post-test motivation. After controlling for pre-test motivation, the adjusted mean of the experimental group was 175.86, while the adjusted mean of the control group was 157.80. The adjusted mean difference was 18.06 points. This result shows that students who learned through the VAK model had higher learning motivation than students who learned through conventional instruction, even after baseline motivation was taken into account. Table 5 presents the adjusted post-test means after controlling for pre-test motivation.

Table 5. Adjusted post-test means

Group	Adjusted Mean	SE	95% CI Lower	95% CI Upper
Control group	157.80	.140	157.52	158.08
Experimental group	175.86	.138	175.58	176.14

The standardized effect size was recalculated to respond to reviewer concern regarding the previously reported Cohen's *d* value. Based on the post-test mean difference between the experimental and control groups and the pooled standard deviation, Cohen's *d* was 4.057. Hedges' *g* was also calculated as a small-sample correction and produced a value of 3.997.

Table 6. Effect size verification

Effect Size	Value	Interpretation
Cohen's <i>d</i>	4.057	Very large
Hedges' <i>g</i>	3.997	Very large, small-sample corrected

The recalculation confirms that the previously reported Cohen's *d* value was mathematically correct. However, this effect size should be interpreted carefully. The large value reflects the substantial post-test difference between groups, the relatively small within-group variability, and the use of two intact classroom groups. Therefore, the effect size indicates a strong difference in this research context, but it should not be generalized without caution. Overall, the results show that the Visual-Auditory-Kinesthetic learning model produced a stronger increase in students' learning motivation than conventional instruction. Both groups improved after instruction, but the experimental group showed a much larger gain. The ANCOVA result further confirmed that the experimental group maintained higher post-test motivation after controlling for pre-test motivation. These findings support the conclusion that VAK-based instruction can serve as an effective multimodal strategy for enhancing students' learning motivation in Islamic education and character education.

Table 7 summarizes the main findings of the hypothesis testing. The descriptive results indicated that both the experimental and control groups experienced improvements in learning motivation from pre-test to post-test; however, the magnitude of improvement was substantially greater in the experimental group. More importantly, the ANCOVA results confirmed that students

who received instruction through the Visual–Auditory–Kinesthetic (VAK) learning model achieved significantly higher post-test learning motivation than those who received conventional instruction after controlling for their initial motivation. The estimated effect size was very large, suggesting that the intervention had substantial practical significance, although this finding should be interpreted cautiously because the study involved only two intact classes and measured short-term self-reported motivation. These findings demonstrate that the observed improvement cannot be attributed solely to students' initial motivational differences but is associated with the instructional approach implemented during the intervention. Furthermore, the results provide empirical support for the proposition that structured multimodal learning experiences are more effective than conventional teacher-centred instruction in fostering students' motivational engagement in Islamic education and character education. Overall, the statistical evidence strengthens the argument that integrating visual, auditory, and kinesthetic learning activities creates a more supportive learning environment that encourages sustained participation, greater learning interest, and higher motivational development among senior high school students.

Table 7. Summary of hypothesis testing

Hypothesis / Analysis	Statistical Result	Decision	Interpretation
Students' motivation increases after conventional instruction	Mean gain = 14.46	Supported descriptively	The control group showed an increase in learning motivation after instruction.
Students' motivation increases after VAK-based instruction	Mean gain = 32.11	Supported descriptively	The experimental group showed a stronger increase in learning motivation after VAK instruction.
VAK-based instruction produces higher post-test motivation after controlling for pre-test motivation	ANCOVA, $F = 7993.128$, $p < .001$	Supported	The experimental group had significantly higher adjusted post-test motivation than the control group.
The treatment effect is substantial	Cohen's $d = 4.057$; Hedges' $g = 3.997$	Supported, with caution	The effect size was very large, but should be interpreted carefully because the study used intact classes and short-term self-report data.

Discussion

The findings show that students who learned through the visual auditory kinesthetic model demonstrated stronger learning motivation than students who learned through conventional instruction. Descriptively, both groups improved after instruction, but the increase in the experimental group was much larger than that in the control group. The control group increased by 14.46 points, while the experimental group increased by 32.11 points. More importantly, the ANCOVA result confirmed that this difference remained significant after students' initial motivation was controlled. The adjusted post-test mean of the experimental group was 175.86, while the adjusted mean of the control group was 157.80, with an adjusted mean difference of 18.06 points. This result indicates that the higher motivation in the experimental group was not merely due to its slightly higher pre-test score, but was related to the VAK-based instructional treatment.

One way to read this result is through self-determination theory. In this theory, students' motivation grows when the learning environment supports autonomy, competence, and relatedness. The VAK model appears to support these three psychological needs at the same time. Visual activities help students understand abstract religious concepts through concrete representations, which may strengthen their sense of competence. Auditory activities create space for explanation, questioning, and dialogue, which may build relatedness in the classroom. Kinesthetic activities give students direct involvement in learning tasks, which may support

autonomy because students are not only listening but also participating. In this sense, the increase in motivation was not simply caused by the use of varied media, but by the shift from passive reception to more active and meaningful participation. This interpretation is consistent with studies showing that autonomy-supportive teaching and psychological need satisfaction are closely related to students' autonomous motivation and academic engagement (Bureau et al., 2022; Howard et al., 2021; Abdullah et al., 2025). The same pattern can be seen in the motivation indicators used in this study. Students' learning motivation was reflected through their desire to succeed, learning needs, persistence, interest in learning activities, and response to a supportive learning environment. The improvement in the experimental class suggests that VAK-based instruction gave students more room to experience learning as meaningful, understandable, and socially engaging (Chapakiya et al., 2025). This is important in Islamic Education because the subject does not only demand cognitive mastery, but also value awareness, moral reflection, and willingness to participate in learning activities.

The findings also support previous empirical studies on VAK-based learning. Dahliana et al. (2023) found that the VAK model improved students' motivation and learning outcomes in Islamic elementary education, although their study used a one-group pretest-posttest design. Rahmah et al. (2024) also reported that the VAK model significantly improved students' learning motivation in social studies learning. The present study extends those findings by testing VAK in senior high school Islamic education and character education using a quasi-experimental design with experimental and control classes. This gives the study a stronger comparative basis because the improvement in the experimental class can be read against the performance of the control class, not merely as a before-and-after change within one group.

The improvement observed in the control class should not be ignored. Students who received conventional instruction also showed an increase in learning motivation, although the gain was smaller than that of the experimental class. This suggests that teacher explanation, structured materials, and classroom routines may still contribute to students' motivation. However, the smaller gain indicates that conventional instruction may have limited capacity to sustain attention and participation when students are positioned mainly as listeners. This point is relevant to the preliminary classroom problem, where students' low motivation was associated with teacher-centered learning, monotonous explanation, limited collaboration, and weak student initiative. From the perspective of student-centered learning, the stronger improvement in the experimental class is understandable. Wijnia et al. (2024) found that problem-based, project-based, and case-based learning have been widely studied as alternatives to teacher-centered learning because they offer more active and problem-driven learning experiences. Although VAK is not identical to those models, it shares a similar instructional orientation: students are expected to interact with learning materials, peers, and classroom tasks more actively. The present finding therefore supports a broader pedagogical argument that motivation is more likely to grow when students are not only exposed to content but are also invited to process, discuss, demonstrate, and experience it.

The VAK model may also be interpreted through the ARCS motivational design framework. The visual component can attract attention through images, diagrams, videos, or visual cues. The auditory component can build relevance through explanation, storytelling, questioning, and discussion (Muhajir et al., 2025; Sukenti et al., 2026). The kinesthetic component can build confidence because students are given opportunities to practice and demonstrate understanding. Satisfaction may emerge when students feel that they are able to complete learning tasks and participate successfully. Fang et al. (2024) showed that the ARCS model has been widely applied in instructional design to strengthen learners' motivation. In this study, VAK worked in a similar direction by creating instructional conditions that were more varied, participatory, and responsive to students' learning engagement.

Another useful explanation comes from multimedia learning, cognitive load theory, and embodied cognition. The visual and auditory components of VAK may help students organize information when images, keywords, explanation, and discussion are connected clearly to the lesson objective. Still, using several modes in one lesson does not automatically make learning better. If visual materials, verbal explanation, and activities are not well sequenced, they may distract students or increase unnecessary cognitive load. Therefore, the strength of VAK depends

on how carefully the teacher connects visual, auditory, and kinesthetic activities with the learning goal. The kinesthetic component is also important because bodily participation can make moral and religious concepts more concrete through demonstration, simulation, or direct practice. This supports the view that learning is not only a verbal process, but can also involve action and embodied engagement (Castro-Alonso et al., 2024; Mayer, 2024; Tambak et al., 2026; Sepp et al., 2019).

However, the VAK model in this article should not be interpreted as proof that students must be taught according to fixed learning-style labels. The stronger motivation in the experimental class does not mean that each student learned better only because instruction matched a personal style. Rather, the result shows that a multimodal and active learning environment can increase students' involvement. This distinction is crucial. Newton and Salvi (2020) found that belief in learning-style matching remains widespread among educators, although the empirical support for matching instruction to fixed learning styles is weak. Hattie and O'Leary (2025) also argued that the field should move away from rigid learning-style claims and toward more flexible learning strategies, preferences, and task-sensitive approaches. For this reason, the VAK model is better positioned in this study as a multimodal learning strategy, not as a labeling system for students.

In Islamic education and character education, this distinction has practical value. Religious and moral learning requires students to understand concepts, listen to explanations, reflect on values, discuss examples, and connect lessons with everyday behavior (Tambak et al., 2026). A purely verbal lecture may be efficient for delivering content, but it may not be sufficient to build sustained motivation and classroom involvement. The VAK model gives teachers a more flexible structure: visual materials can clarify concepts, oral discussion can open moral reasoning, and kinesthetic tasks can turn values into observable classroom practice. This makes Islamic education more concrete and dialogical, especially for students who tend to lose attention during monotonous instruction (Newton & Salvi, 2020). Theoretically, this study contributes to the use of self-determination theory in Islamic education by showing that students' motivation can be strengthened through instructional design that supports competence, relatedness, autonomy, and active participation. It also refines the position of VAK in current educational debates. Instead of defending VAK as a learning-style-matching model, this study places it within the broader discussion of multimodal learning, motivational support, and instructional design (Castro-Alonso et al., 2024; Mayer, 2024; Sepp et al., 2019). In this way, the study bridges classroom-level Islamic education practice with contemporary motivation theory and offers a contribution that is relevant beyond one subject area.

Practically, the findings suggest that Islamic education teachers should not rely only on lecture-based explanation, especially when students show signs of boredom, low attention, and limited participation. Teachers can begin by redesigning one lesson topic into three linked activities: a visual trigger such as a picture, short video, or concept map; an auditory task such as guided discussion or oral reflection; and a kinesthetic task such as role play, simulation, card sorting, demonstration, or group movement-based activity (Castro-Alonso et al., 2024; Mayer, 2024). These activities do not need to be complicated, but they must be aligned with the lesson objective and the moral value being taught. For school leaders, the implication is that improving motivation in Islamic education requires support for instructional variation, not only evaluation of students' discipline or achievement (Tambak et al., 2026; Yasin et al., 2025). Schools can provide lesson-study forums, peer observation, and simple media support so teachers can design more engaging learning activities. Since the study was conducted in a regular school setting using existing classes, the intervention is realistic for classroom application. The large effect size also suggests that even relatively simple instructional variation can produce meaningful motivational gains when it is planned and implemented consistently. The very large effect size should also be interpreted carefully. The recalculated Cohen's *d* of 4.057 shows that the difference between the experimental and control groups was very strong in this dataset (Rahmah et al., 2024; Castro-Alonso et al., 2024; Mayer, 2024). This value is understandable because the post-test mean difference was large and the variability within each group was relatively small. However, it should not be read as a universal estimate of the effect of VAK in all Islamic Education classrooms. The study involved two intact classes, a relatively small sample, and short-term self-reported

motivation. Thus, the effect size is best understood as evidence of a strong treatment difference in the present classroom context.

Conclusion

The visual auditory kinesthetic learning model helped increase senior high school students' learning motivation in Islamic education and character education. Students in the experimental class showed a stronger improvement than those in the control class. After initial motivation was controlled, the experimental class still had a higher adjusted post-test motivation score. This indicates that the difference was not only caused by students' starting level of motivation, but was also related to the learning experience created through the VAK model. This result should not be read as evidence that students must be grouped into fixed visual, auditory, or kinesthetic learning styles. The main point is that students' motivation can grow when classroom instruction gives them more ways to engage with the lesson. Students need opportunities to see examples, listen to explanations, ask questions, discuss ideas, practice, and take part directly in learning activities. In Islamic Education, this is important because the subject involves not only understanding religious concepts, but also reflecting on values and connecting them with everyday behavior.

The study also suggests that VAK can be understood as a motivational strategy. Visual activities may help students feel more capable because the material becomes clearer. Auditory activities may strengthen interaction and relatedness through explanation, questioning, and discussion. Kinesthetic activities may give students more space to participate directly, which can support autonomy and active engagement. Through these mechanisms, the findings strengthen the relevance of self-determination theory in explaining how classroom instruction can shape students' learning motivation. For classroom practice, Islamic education teachers can use VAK by combining simple visual materials, oral interaction, and direct learning activities in one structured lesson. The model does not require complicated media. A picture, short video, concept map, guided discussion, role play, simulation, or demonstration can already make learning more varied and participatory when it is connected to the lesson objective. Schools can support this by encouraging teachers to share learning strategies and develop simple multimodal teaching materials. The study was limited to two intact classes in one senior high school, and students' motivation was measured through a questionnaire within a short intervention period. The findings should therefore be generalized carefully. Future studies may involve more schools, larger samples, and longer instructional periods. Further research may also examine whether increased motivation through VAK-based instruction contributes to learning outcomes, religious understanding, character formation, or long-term engagement in Islamic education.

Declarations

Author contribution statement

Elbina Mamla Saidah, supervised the development of the research design, reviewed the suitability of the instruments, guided the data analysis process, and contributed to the interpretation of the findings. Eka Aprilia Pratiwi contributed to the initial research design, field data collection, administration of the pre-test and post-test questionnaires, implementation of the visual auditory kinesthetic learning model in the experimental class, data tabulation, and preliminary statistical analysis. Hendro Lisa and Suhada Suhada, implementation of the visual auditory kinesthetic learning model in the experimental class, data tabulation, and preliminary statistical analysis. Efni Ramli, Contribute to data tabulation, and preliminary statistical analysis. All authors contributed to drafting the manuscript, revising the introduction, method, results, discussion, and conclusion sections, and approving the final version of the manuscript for submission. .

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Data availability statement

The data supporting the findings of this study are not publicly available because they contain student questionnaire responses and are subject to privacy and confidentiality considerations. The data may be made available from the corresponding author upon reasonable request and with permission from the school.

Declaration of interests statement

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Declaration of use artificial intelligence

The authors declare that artificial intelligence tools were used only for language refinement, grammar checking, and manuscript formatting assistance. The research design, data collection, statistical analysis, interpretation of findings, and final academic responsibility remain entirely with the authors..

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