Improving Mathematical Connection and Motivation through the Integration of Islamic Values in Geometry Teaching Materials

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ABSTRACT

This study focuses on how employing practical and proven Islamic values-integrated geometry teaching materials improves students' willingness to learn and their mathematical linkages to real-world situations. A pre-experimental design with a One-Group Pretest-Final test is used in the study. Total sampling was the method employed. 17 fourth-semester IAIN Kerinci math education majors participating in the Analytical Geometry course made up the study's sample. A learning motivation survey and a test of mathematical connection skills make up the data collection tools. N-Gain (Normalized Gain) and paired t-tests were used to analyze the data. The results show that the t-test's significance level is 0.002. Given that this number is less than 0.05, it confirms that Islamic Values-based educational resources are both effective and significant in enhancing students' ability to make mathematical connections. The N-Gain analysis shows a percentage of 76%, which falls into the "effective" category. Meanwhile, the motivation score percentage of students was 75.6%, indicating that after using Islamic principles incorporated into geometry instructional materials, students exhibited high motivation to learn mathematics. This study's conclusion is that Islamic principles must be incorporated into the way mathematics is taught materials as part of a relevant and applicable instructional strategy, which positively impacts students' mathematical connection abilities and learning motivation.

Keywords: Islamic Values, Teaching Materials, Mathematical Connection, Motivation

Introduction

Mathematics, particularly geometry, is often considered a challenging subject by many students (Nasution et al, 2021). Geometry, which involves understanding shapes, sizes, space, and relationships between objects in a particular dimension, is related to various fields of science, from architecture to engineering, and even Islamic values (Yulia & Nasution, 2024). These connections can be integrated into the curriculum to sharpen students mathematical connection ability (Andriani & Armis, 2025).

The capacity to connect and apply different mathematical concepts that have been taught is known as mathematical connection ability. both in theory and in real-life contexts (Izassmi et al, 2025). Indicators of mathematical connection ability include: 1) Utilizing connections between different mathematical concepts, 2) Using mathematics in other areas of science, and 3) Implementing mathematics in everyday situations (Al Raniri et al, 2025). For example, in geometry, a student needs to combine their understanding of analytic geometry, trigonometry, and algebra to solve problems involving distance, angles, or volume (Hershkowitz, 2020). Students will find it difficult to tackle increasingly challenging problems if they are unable to make connections between these ideas (Ristiana & Herman, 2025). Hence,

it is crucial for students to cultivate a strong ability to make mathematical connections (Ningrum et al, 2019), as this enables them to not only understand theoretical concepts but also connect various ideas (Putri & Wutsqa, 2019).

Although geometry is essential in everyday life, it is often seen as an abstract and difficult subject to understand (Yulia & Nasution, 2024). Various learning difficulties are experienced by students, from primary school to higher education, in understanding geometry (Susilo & Sutarto, 2023). Various learning difficulties are experienced by students, from primary school to higher education, in understanding geometry (Nasution et al, 2021). This is consistent with research that shows low mathematical connection levels among students when learning geometry, particularly in relating it to daily life (Anjani & Imami, 2020). This is due to students being insufficiently trained to discuss problems that integrate with everyday life or other fields of study (Dudung & Oktaviani, 2020).

Furthermore, the ability to make mathematical connections in learning can also contribute to boosting students drive to acquire knowledge (Agita et al, 2023). Conversely, Studies have shown that learning motivation and mathematics anxiety exert a considerable impact on students mathematical communication abilities (Haerudin et al, 2021). Students with good communication ability tend to have strong learning motivation, and vice versa (Sholeha et al, 2025). When students recognize the relevance of what they are learning in class to real-world situations, they become more engaged and motivated to master the material(Rahmadeni et al, 2020). Similarly, incorporating Islamic values into learning can influence students motivation (Imamuddin & Isnaniah, 2023). Integrating Islamic values into mathematics learning adds depth to the material, increasing engagement and improving learning motivation (Rahmi et al, 2023). Learning motivation increases when students find the material relevant to their lives, which is a key factor in improving learning outcomes (Deci & Ryan, 2020).

Based on the author's observations as a lecturer at IAIN Kerinci, there are indications Since pupils' proficiency with mathematical integration is still very low, especially in connecting mathematical concepts across topics. For example, students often have difficulty when asked to solve problems that require an integrated understanding of algebra, statistics, or calculus concepts. Many students solve problems procedurally without being able to explain the interrelationships between concepts, thus demonstrating limitations in critical and integrative thinking. In the context of Islamic integration, students' ability to relate mathematical concepts to Islamic values—such as the concepts of justice, zakat, sharia financial planning, or numerical interpretation in the Qur'an—is still limited. Students tend to view mathematics as a secular science separate from religious values, so that mathematics learning has not fully utilized the potential for Islamic integration.This phenomenon is reinforced by the lack of empirical research related to students' mathematical integration abilities at IAIN Kerinci, as most studies focus more on secondary school learning (Yulia & Nasution, 2022). This suggests that pupils' mathematical integration skills need to be strengthened, including the ability to connect mathematical concepts with Islamic values.

Apart from the mathematical aspect, students' learning motivation also shows significant challenges. The author's observations show that student activity in lectures is still low, participation in discussions is limited, and their commitment to completing analytical tasks is not yet optimal. The results of earlier studies, which demonstrate that psychological elements like self-confidence have little bearing on pupils' academic success in mathematics, support this (Afria & Handican, 2024). Thus, both the author's observations and empirical literature evidence indicate a double challenge for students at IAIN Kerinci regarding their weak mathematical integration skills and suboptimal learning motivation, including the capacity to incorporate Islamic principles into their understanding of mathematics. This is an important issue that needs serious attention in efforts to enhance students' education and character development on Islamic-based campuses.

Hence, it is essential for educators to create learning experiences that not only teach mathematical formulas and theories (Yulia & Nasution, 2022). but also integrate other disciplines, either in teaching or in the creation of instructional materials (Wahyuni, 2021). The creation of integrated educational resources

can enhance students mathematical connection ability and learning motivation (Wijayanti & Abadi, 2021). A key area that can be incorporated into mathematics learning is the inclusion of Islamic values within the curriculum. Incorporating Islamic values into mathematics teaching is essential because it is a way to foster students character (Mahmudah & Muqowim, 2022; Djannah & Jannati, 2025). Additionally, the integration of mathematics with Islamic values positively impacts students lives (Kusno et al, 2020).

Enhance students' education and character development on Islamic-based campuses into mathematics learning, including research by (Masamah et al, 2023) which found that geometry worksheets integrated with Islamic values were valid, practical, and effective for middle school students. Another study by (Yulia & Nasution, 2024) revealed that Quranic-based geometry materials, modified with Project-Based Learning (PjBL), were valid and feasible to use. Similarly, learning methods that link mathematics with Islamic values can enhance students mathematical abilities, especially their critical thinking (Al Ayubi et al, 2024). Other research indicates that integrating Islamic values into education improves motivation, engagement, and student performance (Tabassum et al, 2024).

Several existing studies have explored the integration of Islamic values into mathematics education. For instance, research conducted by Azzuhro & Salminawati (2023) focused on incorporating Islamic Values into mathematics instruction at the primary school stage. Similarly, Triana et al, (2023) designed mathematics problems that were embedded with Islamic Values. In the context of geometry learning, Sappari et al, (2023) developed an instructional approach whose content was validated by incorporating Islamic principles and brain-based learning principles (Kusmaryono et al, 2024). However, these studies have not explicitly integrated verses from the Qur'an as a conceptual basis in geometry material, but are still limited to the insertion of ethical and character values. In addition, previous studies generally focused on developing or validating teaching materials, without empirically testing their impact on mathematical connection skills and learning motivation, particularly in relation to geometry instruction in colleges and universities. To date, there have been few studies that implement Qur'anic verse-based geometry teaching materials and evaluate their direct influence on students mathematical concept connection and learning motivation. Therefore, this study specifically examines the implementation of geometry teaching materials integrated with verses from the Qur'an and their impact on learning motivation and mathematical connecting skills of Mathematics Education, thus clearly distinguishing it from previous studies.

At Islamic religious higher education institutions, particularly in the Mathematics Education study programs, one of the program learning outcomes highlights how Islamic principles can be used into mathematics instruction. As a result, lecturers are expected to design learning experiences or develop teaching materials that incorporate Islamic principles in order to support the achievement of these academic goals. However, students often struggle to establish significant links between mathematical ideas and practical applications. Many perceive geometry as an abstract subject, disconnected from Islamic Values, which contributes to low motivation when mathematics is taught through a procedural and formula-based approach without deeper context or relevance. Therefore, integrating Islamic Values into mathematics instruction serves as a contextualization strategy that can make learning more meaningful, particularly in geometry. In the case of analytic geometry which is inherently abstract and symbolic students are required to understand the relationships between various concepts. This demands a strong conceptual foundation and logical connections, making mathematical connection skills essential in mastering the subject. According to the description given above, the specific goal of this study is to assess the efficacy of geometry teaching resources that incorporate Islamic principles in improving students' mathematical connection skills and learning motivation.

Methods

The intention of this research is to evaluate the effectiveness of integration of Islamic principles in geometry instructional materials for the enhancement of students' ability to connect mathematical concepts and their motivation to learn. To reach this objective, the research used a pre-experimental approach with a layout similar to figure 1 shown below:
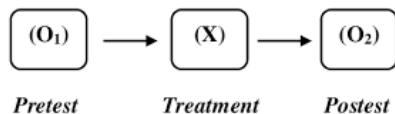
Figure 1. One grup preliminary test and final test design

This method was selected because it helps the researcher find out how the teaching materials affect students' ability to connect math concepts and their motivation to learn, both before and after using them. The research was conducted with students from the Mathematics Education program at the State Islamic Institute (IAIN) Kerinci. Total sampling was the method used, meaning that all students in the group were included as the sample for the study (Coe et al, 2021). The research sample includes 17 students who are part of the Analytical Geometry class. There are two tools used in this study: a test to check math connection skills and a survey to measure learning motivation.

The use of geometry teaching resources that included Islamic principles happened over five sessions. In the first meeting, an initial test was conducted to measure students' mathematical connection abilities before applying the integrated teaching materials. This stage aimed to obtain an initial overview of students' mathematical connection abilities as a basis for comparison. Meanwhile, student learning motivation was not assessed at the beginning of the meeting because this study only looked at student learning motivation after. The use of teaching resources that combine education with Islamic beliefs. The following three discussions concentrated on how to use geometry teaching resources that include principles. At this stage, each geometric concept was presented by explicitly linking it to relevant Islamic values, including strengthening conceptual meaning and reflecting on the relationship between mathematical concepts and Islamic values. The learning process was carried out in a structured manner in accordance with the prepared lesson plan. In the fifth meeting, a final test was conducted to see how much the students' math connection skills got better after using the new teaching materials, It also checked how motivated the students were to learn after these materials were used. The scores from the final exam were then matched up with the scores from the first exam to see how well the teaching materials that include Islamic values worked on improving math connection skills and to find out how student motivation changed after using these materials.

This test is designed to measure students ability to connect geometric concepts with other mathematical concepts (Fauziyah et al, 2023). The test is given in the form of descriptive questions and is administered to students at two points: before using the teaching materials (preliminary test) and after using the teaching materials (final test). The questionnaire is designed to measure the level of students learning motivation after engaging in lessons using integration of Islamic values in geometry teaching materials. The questionnaire consists of several statements structured on a The Likert scale, which provides responses ranging from "strongly agree" to "strongly disagree". This survey is given after the learning process using integration of Islamic Values in geometry teaching materials. The motivation score is presented as a percentage. Students are considered to have low learning motivation if their score is $\leq$ 50%, medium motivation if their score is > 50% and $\leq$ 75%, and high motivation if their score is > 75% and $\leq$ 100% (Damayanti & Rufiana, 2020).

The information from the math connection ability test will be looked at to see how much students improve after adding Islamic values into the teaching materials. To analyze how well students can make math connections, we will use a paired t-test. This test checks if there is a significant difference between the scores from the beginning (preliminary test) and the end (final test). This method is chosen because

the data includes related sets of scores (Ross et al, 2017). The guess we have in this study is that students will get better at integrating math skills after using geometry teaching materials that include Islamic values. We also think that students' motivation to learn will rise after they use these same materials. We will check this idea by using a paired t-test to see if the differences are important, and we will use N-gain to find out how much improvement happened.

Prior to carrying out the paired t-test, a normality assumption is conducted as a prerequisite using the Kolmogorov-Smirnov test. The N-Gain formula measures how much students' math connection skills improve from the preliminary test to the final test. N-Gain helps show how effective the learning method has been (Sukarelawan et al, 2024). The N-Gain score is figured out using the formula given below

$$N_{gain} = \frac{Posttest score - Pretest score}{Ideal score - Pretest score} \tag{1}$$

The N-Gain score criteria are outlined as follows:

Table 1. *Criteria for Normalized Gain*

N-Gain Value	Explanation
0.7 ≤ N-Gain ≤ 1.	Significant improvement
0.3 ≤ N-Gain <0.7	Moderate improvement
0 <N-Gain <0.3	Minimal improvement
N-Gain = 0.00	No noticeable change
-1 ≤ N-Gain < 0	A decrease was observed

Table 2. *Standards for Assessing the Level of Effectiveness*

Percentage (%)	Interpretation
< 40.0	Ineffective
40.0-55.0	Minimally impactful
56.0-75.0	Somewhat impactful
>76.0	Highly impactful

(Sukarelawan et al, 2024)

Results and Discussion

Impact Integration of Islamic Principles in Geometry Learning Resources on Mathematical Connection Ability

Before and after the students learned by including Islamic Values in their geometry lessons, the researcher gave them tests to see how well they could connect mathematical ideas. The results from these tests for both the first test and the final test are shown in Table 3 below:

Table 3. *Descriptive Data for Preliminary test and Final test of Mathematical Connection Ability Test*

No	Descriptive Data	Pretest	Posttest
1	Max	62	98
2	Min	50	80
3	Mean	54	89
4	Ideal Score	100	100
5	Standard Deviation	3,5	4,3

Grounded in the descriptive data above, it's clear that the mean value is preliminary test score was 54, while the final test score increased to 89. Before conducting the paired t-test, a normality assumption was first performed distribution with the Kolmogorov-Smirnov test. Can see the results in Table 4 below:

Table 4. *Normality assumption Results for Mathematical Connection Ability*

No	Test	Sig	α	Interpretation
1	Pretest	0,254	0,05	Normal
2	Post-test	0,316	0,05	Normal

The outcomes of the normality assumption indicate that the preliminary test and final test data, at a 5% have significant values of more than 0.05, signifies data from both the preliminary test and final test exhibits a normal distribution. After the normality assumption, which confirmed normal disposition of data point. The next step involved performing the paired t-test to assess whether a notable dissimilarity was observed among the preliminary test and final test. The outcomes of the significance test are shown in Table 5 below:

Table 5. *Paired t-test Results for Mathematical Connection Ability*

t-Test	Sig	α	Interpretation
Preliminary test& Post-test	0,002	0,05	H$_a$ Accepted

The t-test results indicate that the significance value is at the 5% significance level. Because the significance value is less than 0.05, it suggests that Islamic Values-based teaching resources are very helpful in greatly improving students' skills in understanding math concepts.

After performing a significance test to assess the progress in students' ability to make mathematical connections, it was found that there was a noticeable enhancement in students' abilities from the preliminary test to the final test following the implementation of Islamic Values-based geometry teaching materials. To quantify the extent of this improvement, the N-Gain formula was applied. The N-Gain calculation was used to measure the level of improvement in students' skills in understanding math connection skills between the preliminary test and post-test. The N-Gain results are presented in Table 6 below:

Table 6 *Overview of N-Gain Score Evaluation for Students Mathematical Connection Skills*

Student	Gain	Improvement	%Gain	Student	Gain	Improvement	%Gain
S-1	0.76	Significant	76.0	S-10	0.87	Significant	87.2
S-2	0.74	Significant	74.0	S-11	0.77	Significant	77.3
S-3	0.69	Moderate	68.8	S-12	0.86	Significant	86.0
S-4	0.76	Significant	76.2	S-14	0.72	Significant	72.3
S-5	0.67	Moderate	67.4	S-14	0.69	Moderate	69.4
S-6	0.69	Moderate	68.9	S-16	0.82	Significant	82.2
S-7	0.83	Significant	83.0	S-16	0.57	Moderate	56.5
S-8	0.72	Significant	71.7	S-17	0.95	Significant	94.7
S-9	0.73	Significant	72.5	**Average**	**0.76**	**Significant**	**76**

According to the final outcomes summarized in Table 6, it was identified that 5 out of 17 students, or 29.4%, experienced improvement in the "Moderate" category. Meanwhile, 12 out of 17 students, or 70.6%, showed improvement in the "Significant" category. In conclusion, the typical N-Gain score was 0.76, showing a "High" level of improvement. The success of including Islamic Values in geometry teaching materials to boost students' math connection skills is shown by the N-Gain percentage. The N-Gain percentage reached 76%, which is seen as effective. So, we can say that teaching geometry with Islamic Values helps students do better at making connections in math.

In the process of learning by combining Islamic values in geometry teaching materials, the researcher initially guided students thinking to explore the relationship between Islam and mathematics. They were encouraged to use various sources to discover this connection. Students found various examples of how Islam and mathematics are linked, including contributions from Islamic scholars in the field of mathematics and Quranic verses containing mathematical concepts. Out of 17 students, 10 were able to find examples that linked Islam with mathematics. Once they understood the connection, the researcher provided Integration of Islamic principles in geometry teaching materials and directed the

students to study the history of linear equations, specifically Islamic valuesic verses from Surah Al-Anfal, verses 65-66. Students were then asked to examine these verses and identify the mathematical concepts contained within them. This is illustrated in Figure 2 below:
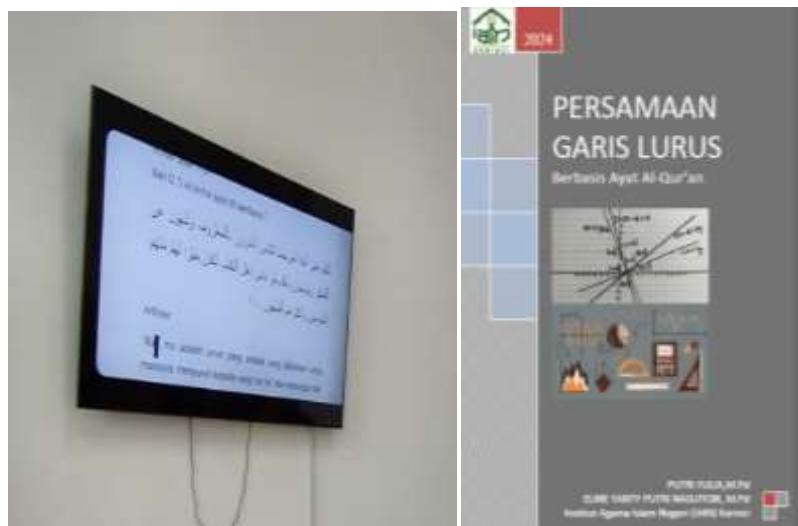
Figure 2. *Integration of Islamic principles in Geometry Teaching Materials*

After the researcher provided the materials, students had varying responses. Some were still unable to identify the correct material related to the verse, so they responded by saying they didn't know. Others linked the verse to proportionality because they saw an analogy with the comparison between the disbelievers and the believers. However, this response was incorrect because the current course was "Analytic Geometry" and did not cover proportionality. This finding aligns with research (Permatasari&Nuraeni, 2021) indicating that students with medium mathematical connection ability often struggle with applying concepts and principles. Other studies have also shown that many students face difficulties in making connections between mathematics and other fields (Retnawarti et al, 2020). Students also tend to have difficulty interpreting contextual problems or relating concepts from other fields to mathematics (Ayunani&Indriati, 2020). Furthermore, students often encounter challenges in connecting different mathematical ideas (Asfar&Asfar, 2021).

Once the researcher reminded the students of the learning objectives, they understood the connection between Islamic Valuesic verse and the concept of linear equations. They saw the comparison of the number of disbelievers and believers as points on a Cartesian coordinate system, which could then be used to plot a straight line. This finding aligns with previous research indicating that students are capable of enhance their mathematical connection skills through learning that integrates material with real-life situations (Hasbi et al, 2019). Students with strong mathematical connection ability are more likely to effectively solve mathematical problems that involve connections to other fields (Pambudi et al, 2020).

Next, the students were asked to solve problems on the worksheet from Islamic Values-based geometry teaching materials. They were instructed to engage in group discussions and then present the results of their discussions and problem-solving. The students appeared enthusiastic to step forward and present the results of their discussions, enabling them to solve the problems in the test for mathematical connection abilities. As shown in the image below:

***Figure 3**: Students Presenting Worksheet Results*

The findings from the mathematical connection ability test indicated that Islamic Values-based geometry teaching materials proved to be effective in enhancing students' math connection skills. This result is under control earlier studies, which suggest that mathematical connection ability can be enhanced through effective teaching methods. Furthermore, teaching materials that integrate STEM have been shown to further advance students mathematical connection abilities (Niam&Asikin, 2020). Likewise, learning that integrates Islamic values by linking the material to Quranic verses makes the learning process more meaningful (Abdullah et al, 2020). Other research also aligns with this finding, showing that learning integrated with real-life problems can improve students mathematical communication ability (Nurhayari et al, 2020).

Impact Integration of Islamic Principles in Geometry Learning Resources on Students Motivation

Before and after the learning session using integration of Islamic principles in geometry learning resources a motivation questionnaire was then administered to assess the students' motivation after using integration of Islamic principles in learning resources. The outcomes of the students' motivation for both the pre-survey and post-survey are presented in Table 7 below:

***Table 7.** Descriptive Data for Pre-survey and Post-survey of Student Motivation*

No	Descriptive Data	Pre-survey	Post-survey
1	Max	56	88
2	Min	44	62
3	Mean	48	80
4	Ideal Score	100	100
5	Standard Deviation	2,2	3,6

Grounded in the descriptive data above, it's clear that the mean value is pre-survey score was 56, while the post-survey score increased to 88. Before conducting the paired t-test, a normality assumption was first performed distribution with using the Kolmogorov-Smirnov test. Can see the results in Table 8 below:

***Table 8**. Normality assumption Results for Student Motivation*

No	Test	Sig	α	Interpretation
1	Pre-survey	0,186	0,05	Normal
2	Post-survey	0,265	0,05	Normal

The outcomes of the normality assumption indicate that the pre-survey and post-survey data, at a 5% have significant values of more than 0.05, significant data from both the pre-survey and post-survey

473

exhibits a normal distribution. After the normality assumption, which confirmed the normal disposition of data point. The next step involved performing the paired t-test to assess whether a notable dissimilarity was observed among the pre-survey and post-survey. The outcomes of the significance test are shown in Table 9 below:

***Table 9.** Paired t-test Results for Student Motivation*

t-Test	Sig	α	Interpretation
Pre-survey & Post-survey	0,001	0,05	H_a Accepted

The t-test results indicate that the significance value is at the 5% significance level. Because the significance value is less than 0.05, it suggests that Islamic Values-based teaching materials are effective in significantly enhancing students' motivation.

After conducting a significance test to assess student motivation, it was discovered a significant a noticeable enhancement in student learning motivation from the pre-survey to the post-survey after the implementation of Islamic principles-based geometry learning resources. To quantify the extent of this improvement, the N-Gain formula was applied. The N-Gain calculation was used to measure the level of improvement in students' motivation between the pre-survey and post-survey. The N-Gain results are presented in Table 10 below:

***Table 10** Overview of N-Gain Score Evaluation for Students Motivation*

Student	Gain	Improvement	%Gain	Student	Gain	Improvement	%Gain
S-1	0.81	Significant	81.0	S-10	0.75	Significant	75.1
S-2	0.72	Significant	71.9	S-11	0.71	Significant	71.0
S-3	0.60	Moderate	60.4	S-12	0.53	Moderate	53.0
S-4	0.62	Moderate	62.0	S-14	0.72	Significant	72.3
S-5	0.58	Moderate	58.3	S-14	0.46	Moderate	46.0
S-6	0.56	Moderate	56.0	S-16	0.51	Moderate	51.1
S-7	0.62	Moderate	62.2	S-16	0.48	Moderate	48.0
S-8	0.79	Significant	79.0	S-17	0.45	Moderate	45.0
S-9	0.45	Moderate	45.0	**Average**	**0.61**	**Moderate**	**61**

According to the final summarized in Table 10, it was identified that 11 out of 17 students, or 64.7%, experienced an increase in the "Moderate" category. Meanwhile, 6 out of 17 students, or 35.3%, showed an increase in the "Significant" category. In conclusion, the typical N-Gain score was 0.61 showing a "moderate" level of improvement. The success of including Islamic Values into geometry teaching resources in improving student learning motivation is reflected in the N-Gain percentage. The N-Gain percentage obtained is 61%, which is categorized as somewhat impactful. So, we can say that teaching geometry with Islamic Values helps students do better at making learning motivation.

Motivation is a critical determinant of learning success. In this context, intrinsic motivation (motivation that comes from within the student, such as personal interest and satisfaction in learning) and extrinsic motivation (motivation from external factors, such as rewards or external goals) both play important roles. According to the findings from the questionnaire administered for the students, it was observed that their learning motivation was categorized as high after using Islamic Values-based teaching materials. Students' motivation was noticeably high during the learning process with Islamic Values-based teaching materials, as seen in their eagerness to solve the problems on the worksheet provided. Students worked on the worksheet with their group members and discussed the solutions to the problems. This can be observed in Figure 4 below:

Figure 4: Students Working on the Worksheet

Students felt more interested and connected to the geometry material after linking these concepts with Quranic verses. This aligns with findings that intrinsic motivation is associated with increased engagement and satisfaction in learning when students feel the material is relevant to their lives (Agus et al, 2020). Furthermore, a learning model that combines different approaches is helpful in boosting students' motivation to learn. (Wawan et al, 2023). Additionally, students' extrinsic motivation increased, with many students feeling more driven to learn because they understood that the application of Integration of Islamic Values in geometry material would have a meaningful impact on their learning. This is in line with studies that highlight students motivation to learn can increase when the learning is combined with STEAM, resulting in more meaningful learning (Hsiao & Su, 2021). According to the information given, it looks like students are getting better at connecting math skills and have high motivation to learn after using teaching resources that combine Islamic values with geometry. These results show that relating geometry to important Islamic values can help students think and feel positively about learning, which matches the factors examined in this research.

Conclusion

According to the research results, the important value from the t-test for math integration skills is 0.002 and student learning motivation is 0.001. Because the t-value is less than 0.05, this shows that learning materials based on Islamic Values are helpful and important for boosting students' math connection skills and their motivation to learn. The N-Gain analysis reveals that the N-Gain percentage for math integration skills is 76%, placing it in the "effective" category. In contrast, the N-Gain percentage for student learning motivation is 61%, which is considered "Somewhat impactful" Therefore, we can say that geometry teaching materials that focus on Islamic Values are helpful and significant for enhancing students' math connection skills and their motivation to learn.

Integrating mathematical material with real-life contexts, especially those relevant to religious beliefs, can enhance the learning experience, making it more meaningful and easier to comprehend. Educators can utilize more Islamic value related to mathematical concepts to enrich the learning experience. Future researchers are encouraged to expand this study by testing the Incorporation of Islamic principles in educational resources in other mathematics subjects and with a larger sample size. The utilization of integration of Islamic principles in educational resources in geometry instruction has positive implications for innovative methods of delivering mathematical content, particularly in Islamic educational settings. Learning integrated with religious values can shape students' character and make the way we learn more significant. Also, using this teaching method can give students who have a strong faith background more important experiences.

References

Abdullah, B. M., Murtiyasa, B., & Fuadi, D. (2021). Analysis of Islamic Value in Learning Mathematics Era 4.0. *EduMa: Mathematics education learning and teaching*, *10*(1), 107-116. Doi: 10.24235/eduma.v10i1.7890.

Arfia, K., & Handican, R. (2024). Pengaruh Self Confidence & Prestasi Belajar Kalkulus: Suatu Studi Korelasional di Perguruan Tinggi. *Teorema: Teori dan Riset Matematika*, *9*(2), 305-316. Doi: http://dx.doi.org/10.25157/teorema.v9i2.13677.

Agita, W., Abidin, Z., & Ilmi, Y. I. N. (2023). Analisis Kemampuan Koneksi Matematis Ditinjau Motivasi Berprestasi Peserta Didik dalam Menyelesaikan Masalah Kontekstual pada Materi Bangun Datar Kelas VII SMP Negeri 17 Malang. *Jurnal Penelitian, Pendidikan, dan Pembelajaran*, *18*(19).

Agus, P., Nur, A., Syamsul, H., & Nita, A. (2020). The effects of the ECIRR learning model on mathematical reasoning ability in the curriculum perspective 2013: Integration on student learning motivation. *European Journal of Educational Research*, *9*(2), 675-684.

Al Ayyubi, I. I., Prayetno, E., Jamaliah, D., & Mumtazah, N. (2024). Equilibrium of Faith and Logic: Integrating Islamic Moral Values and Mathematics Education in Various Contexts. *IJEMR: International Journal of Education Management and Religion*, *1*(2), 127-144.

Al Raniri, S. N., Jaenudin, A., & Yusuf, Y. (2025). Kemampuan Koneksi Matematis Siswa SMP pada Materi Perbandingan Ditinjau dari Resiliensi Matematis. *Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika*, *8*(1), 169-178. Doi: https://doi.org/10.30605/proximal.v8i1.5001.

Andriani, S., & Armis, A. (2025). Profil kemampuan koneksi matematis mahasiswa pendidikan matematika pada awal perkuliahan trigonometri. *Jurnal Pendidik Indonesia*, *6*(1), 17-28. Doi: https://doi.org/10.61291/jpi.v6i2.28.

Anjani, D., & Imami, A. I. (2020). Analisis kemampuan koneksi matematis siswa smp pada materi geometri. *Prosiding Sesiomadika*, *2*(1a).

Asfar, A. M. I. T., & Asfar, A. M. I. A. (2021). Analisis Kemampuan Koneksi Matematis Siswa Melalui Strategi Pembelajaran Berbasis Local Wisdom. *Journal of Innovation Research and Knowledge*, *1*(5), 687-698. Doi: https://doi.org/10.53625/jirk.v1i5.461.

Ayunani, D. S., & Indriati, D. (2020, April). Analyzing mathematical connection skill in solving a contextual problem. In *Journal of Physics: Conference Series* (Vol. 1511, No. 1, p. 012095). IOP Publishing. Doi: https://10.1088/1742-6596/1511/1/012095.

Azzuhro, M., & Salminawati, S. (2023). Integration of Mathematics Learning with Islamic Values in Elementary Schools. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, *5*(2), 397-413. https://doi.org/10.37680/scaffolding.v5i2.3000.

Coe, R., Waring, M., Hedges, L. V., & Ashley, L. D. (Eds.). (2021). *Research methods and methodologies in education*. Sage.

Damayanti, F., & Rufiana, I. S. (2020). Analisis pemahaman konsep matematika pada materi bangun ruang kubus dan balok ditinjau dari motivasi belajar. *Edupedia*, *4*(2), 172-180.

Djannah, M., & Jannati, A. A. (2025, March). Integration of islamic values and mathematics as character strengthening. In *AIP Conference Proceedings* (Vol. 3142, No. 1). AIP Publishing. Doi: https://doi.org/10.1063/5.0264097.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*(4), 227-268. Doi: https://doi.org/10.1207/S15327965PLI1104_01.

Dudung, A., & Oktaviani, M. (2020). Mathematical connection ability: An analysis based on test forms. *International Journal of Advanced Science and Technology*, *29*(6), 4694-4701.

Fauziyah, N., Widiasari, E., & Khikmiyah, F. (2023, June). Profile of mathematical connection of junior high school students based on mathematical ability. In *AIP Conference Proceedings* (Vol. 2727, No. 1). AIP Publishing. Doi: https://doi.org/10.1063/5.0141783.

Haerudin, H., Anjani, D., & Ibrahi, D. (2021). Effect of Math Anxiety and Motivation Against Student Mathematical Connections Capabilities. *Hipotenusa: Journal of Mathematical Society*, *3*(1), 52-79. Doi: https://doi.org/10.18326/hipotenusa.v3i1.5096.

Hasbi, M., Lukito, A., Sulaiman, R., & Muzaini, M. (2019). Improving the mathematical connection ability of middle-school students through realistic mathematics approach. *Journal of Mathematical Pedagogy (JoMP)*, *1*(1), 37-46. Doi: https://doi.org/10.26740/jomp.v1n1.p37-46.

Hershkowitz, R. (2020). Shape and space: geometry teaching and learning. In *Encyclopedia of Mathematics Education* (pp. 774-779). Cham: Springer International Publishing. Doi: https://10.1007/978-3-030-15789-0138.

Hsiao, P. W., & Su, C. H. (2021). A study on the impact of STEAM education for sustainable development courses and its effects on student motivation and learning. *Sustainability*, *13*(7), 3772. Doi: https://doi.org/10.3390/su13073772.

Imamuddin, M., & Isnaniah, I. (2023). Peranan Integrasi Nilai-Nilai Islam dalam Pembelajaran Matematika. *Kaunia: Integration and Interconnection Islam and Science Journal*, *19*(1), 15-21. Doi: https://doi.org/10.14421/kaunia.3975.

Izassmi, F., Novitasari, D., & Hikmah, N. (2025). Profil Kemampuan Koneksi Matematis Siswa Dalam Menyelesaikan Soal Cerita Matematika. *Journal of Classroom Action Research*, *7*(SpecialIssue), 420-426. Doi: 10.29303/jcar.v7iSpecialIssue.10764.

Kusmaryono, I., Aminudin, M., & Basir, M. A. (2024). Analysis of Islamic Value-Integrated Mathematics Learning: Efforts to Form Prospective Mathematics Teacher with Religious Character. *Mosharafa: Jurnal Pendidikan Matematika*, *13*(2), 431-448. Doi: https://doi.org/10.31980/mosharafa.v13i2.2015.

Kusno, K., Marsigit, M., & Mohd Yaakob, M. F. (2020). Integration of islamic spiritual values with mathematics teaching. *International Journal of Advanced Science and Technology*, *29*(4S), 2111-2119.

Mahmudah, I., & Muqowim, M. (2022). Integration of islamic values in mathematics learning in class IV students of madrasah ibtidaiyah. *Al-Madrasah: Jurnal Ilmiah Pendidikan Madrasah Ibtidaiyah*, *6*(4), 1075-1087. Doi: http://dx.doi.org/10.35931/am.v6i4.1143.

Masamah, U., Zain, N. K., Salsabila, A., & Maulidani, M. (2023). Integrating Islam on geometry student worksheets to facilitate mathematical and religious literacy of junior high school students. *Jurnal Pengembangan Pembelajaran Matematika*, *5*(1), 17-30.

Nasution, E. Y. P., & Yulia, P. (2024). Praktikalitas Bahan Ajar Geometri Berbasis Modifikasi Model Project Based Learning (PjBL)"Kapal Nabi Nuh" untuk Mengembangkan Kemampuan Berpikir Kreatif Mahasiswa. *ARITHMETIC: Academic Journal of Math*, *6*(1), 101-118. Doi: https://doi.org/10.29240/ja.v6i1.9868.

Nasution, E. Y. P., Yulia, P., Anggraini, R. S., Putri, R., & Sari, M. (2021, February). Correlation between mathematical creative thinking ability and mathematical creative thinking disposition in geometry. In *Journal of Physics: Conference Series* (Vol. 1778, No. 1, p. 012001). IOP Publishing. Doi: https://10.1088/1742-6596/1778/1/012001.

Niam, M. A., & Asikin, M. (2020). The development of science, technology, engineering, and mathematics (STEM)-based mathematics teaching materials to increase mathematical connection ability. *MaPan: Jurnal Matematika dan Pembelajaran*, *8*(1), 153-167. Doi: https://doi.org/10.24252/mapan.2018v8n1a12.

Ningrum, H. U., Mulyono, M., Isnarto, I., & Wardono, W. (2019, February). Pentingnya Koneksi Matematika dan Self-Efficacy pada Pembelajaran Matematika SMA. In *PRISMA, Prosiding Seminar Nasional Matematika* (Vol. 2, pp. 679-686).

Nurhayati, Y., Zakiah, N. E., & Amam, A. (2020). Integrasi Contextual Teaching Learning (CTL) dengan Geogebra: Dapatkah Meningkatkan Kemampuan Koneksi Matematis Siswa?. *Teorema: Teori dan Riset Matematika*, *5*(1), 27-34. Doi: http://dx.doi.org/10.25157/teorema.v5i1.3349.

Pambudi, D. S., Budayasa, I. K., & Lukito, A. (2020). The role of mathematical connections in mathematical problem solving. *Jurnal Pendidikan Matematika*, *14*(2), 129-144. Doi: https://doi.org/10.22342/jpm.14.2.10985.129-144.

Permatasari, R., & Nuraeni, R. (2021). Kesulitan belajar siswa SMP mengenai kemampuan koneksi matematis pada materi statistika. *Plusminus: Jurnal Pendidikan Matematika*, *1*(1), 145-156. Doi: https://doi.org/10.31980/plusminus.v1i1.885.

Putri, A. G. E., & Wutsqa, D. U. (2019, October). Students mathematical connection ability in solving real-world problems. In *Journal of Physics: Conference Series* (Vol. 1320, No. 1, p. 012066). IOP Publishing. Doi: https://10.1088/1742-6596/1320/1/012066.

Rahmadeni, F., Rahmi, D., & Fitraini, D. (2020). Pengaruh penerapan model contextual teaching and learning terhadap kemampuan koneksi matematis berdasarkan motivasi belajar peserta didik madrasah tsanawiyah al-muttaqin pekanbaru. *Juring (Journal for Research in Mathematics Learning)*, *3*(3), 225-232. Doi: http://dx.doi.org/10.24014/juring.v3i3.9789.

Rahman, M. M., Tabash, M. I., Salamzadeh, A., Abduli, S., & Rahaman, M. S. (2022). Sampling techniques (probability) for quantitative social science researchers: a conceptual guidelines with examples. *Seeu Review*, *17*(1), 42-51.

Rahmi, Y., Wahyuni, C., Safitri, H., Aqsa, A. N., & Nasrullah, A. (2023). Pengaruh pembelajaran matematika terintegrasi islam terhadap motivasi belajar siswa. *Ar-Riyadhiyyat: Journal of Mathematics Education*, *4*(1), 22-31. Doi: https://doi.org/10.47766/arriyadhiyyat.v4i1.1626.

Retnawati, H., Apino, E., & Santoso, A. (2020). High school students difficulties in making mathematical connections when solving problems. *International Journal of Learning, Teaching and Educational Research*, *19*(8), 255-277. Doi: https://doi.org/10.26803/ijlter.19.8.14.

Ristiana, M. G., & Herman, T. (2025). Bagaimanakah komunikasi matematis calon guru? studi pendahuluan pada mahasiswa calon guru sekolah dasar. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *8*(1), 107-130. Doi: https://doi.org/10.22460/jpmi.v8i1.27108.

Ross, A., Willson, V. L., Ross, A., & Willson, V. L. (2017). Paired samples T-test. *Basic and advanced statistical tests: Writing results sections and creating tables and figures*, 17-19.

Sappari, S. O., Ibarra, F. P., Mukminin, A., Harto, K., Marzulina, L., Mulyono, H., & Asmendri, A. (2023). The content-validated geometry lessons in Islam observed brain-based learning. *Qubahan Academic Journal*, *3*(4), 153-168. Doi: https://doi.org/10.48161/qaj.v3n4a166 .

Septian, A. (2022). Student's mathematical connection ability through GeoGebra assisted project-based learning model. *Jurnal Elemen*, *8*(1), 89-98. Doi: https://doi.org/10.29408/jel.v8i1.4323.

Sholeha, H. H., Pujiastuti, P., & Mardati, A. (2022). Analysis of Mathematical Connection Ability to Students Learning Motivation in Advanced Mathematics Courses. *AL-ISHLAH: Jurnal Pendidikan*, *14*(2), 2065-2074. Doi: https://doi.org/10.35445/alishlah.v14i2.795.

Sukarelawan, M. I., Indratno, T. K., & Ayu, S. M. (2024). N-Gain vs Stacking. *Yogyakarta: Suryacahya*.

Susilo, B. E., & Sutarto, H. (2023). Geometri: Manfaat, Pembelajaran dan Kesulitan Belajarnya. *Bookchapter Pendidikan Universitas Negeri Semarang*, (6), 81-106. Doi: https://doi.org/10.1529/kp.v1i6.136.

Tabassum, M. F., Husnain, M., Qudus, A., & Karim, R. (2024). Fostering Academic Excellence: The Role of Religious Character and Motivation through the Integration of Islamic Values in Mathematics Education. *Journal of Computational Analysis & Applications*, *33*(2).

Triana, A. Y., Supono, A., & Aini, A. N. (2023, April). Integrating Islamic Values on Math Learning in Welcoming the Society 5.0: How It Works?. In *The 1st Annual Conference of Islamic Education* (pp. 203-211). Atlantis Press. Doi: 10.2991/978-2-38476-044-219.

Wahyuni, Y. (2021). Integration of digital technology in mathematics learning. *International Journal of Humanities Education And Social Sciences*, *1*(3). Doi: https://doi.org/10.55227/ijhess.v1i3.60.

Wawan, W., Retnawati, H., & Setyaningrum, W. (2023). An integrative learning model to improve problem-solving and creative thinking abilities, collaboration, and motivation. *Islamic Guidance and Counseling Journal*, *6*(2). Doi: https://doi.org/10.25217/0020236402400.

Wijayanti, I. K., & Abadi, A. M. (2021, March). Developing learning set with stem-pbl approach to mathematics connection ability and student's learning motivation. In *7th International Conference on Research, Implementation, and Education of Mathematics and Sciences (ICRIEMS 2020)* (pp. 352-361). Atlantis Press. Doi: 10.2991/assehr.k.210305.051.

Yulia, P., & Nasution, E. Y. P. (2024). Efektifitas bahan ajar geometri berbasis modifikasi model project based learning terhadap Kemampuan berpikir kreatif matematis. *Pythagoras: Jurnal Program Studi Pendidikan Matematika*, *13*(2), 111-122. Doi: https://doi.org/10.33373/pyth.v13i2.6686.

Yulia, P., & Nasution, E. Y. P. (2024). Geometry and Islamic Values: Validity of Teaching Materials Based on Modified Project-Based Learning Model. *Mosharafa: Jurnal Pendidikan Matematika*, *13*(1), 113-124. Doi: https://doi.org/10.31980/mosharafa.v13i1.1980.

Yulia, P., & Nasution, E. Y. P. (2022). The Students Mathematical Concept Understanding in Introductory Mathematics Course. *Edumatika: Jurnal Riset Pendidikan Matematika*, *5*(1), 59-70. Doi: https://doi.org/10.32939/ejrpm.v5i1.990.