



Model of integration of Islamic education with science to improve student competence at State Madrasah Tsanawiyah in Palu city

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Abstract

This study aims to describe the treatment within the integration model of Islamic education and science and to analyze its implementation in the learning process at a state junior Islamic school in Palu City. The research employed a quantitative approach with a one-group experimental design. The subjects were eighth-grade students of a state Islamic junior high school. Data were collected through a pre-test and a post-test, then analyzed using paired-sample t-tests and linear regression to determine the significance of improvement and the influence of the integration model on students' competence. The findings indicate that the treatment was implemented through pre-test, the application of integrative learning combining objectives, materials, methods, media, and evaluation systematically, and post-test as the final measurement. The model was implemented in a structured and consistent manner by contextualizing scientific concepts with Islamic values. Empirically, the average pre-test score of 35.8% increased to 74.9% in the post-test. Linear regression analysis showed R values ranging from 0.749 to 0.877 and R Square between 70.2% and 85.0%, with a significance level of <0.05 , indicating that the integration model significantly influences the improvement of students' competence in terms of knowledge, skills, and attitude. The implication of this study confirms that the Integration Model of Islamic Education and Science is feasible to be developed as a learning strategy in madrasahs. The model not only improves academic achievement but also strengthens religious character formation and scientific thinking skills in a balanced, contextual, and sustainable manner in classroom practice.

Keywords: Knowledge integration, Science, Islamic education, Student competence, Madrasah

Introduction

Madrasahs, as Islamic educational institutions, hold a strategic position in realizing this integration of knowledge (Sabki & Hardaker, 2013) [26]. Madrasahs serve not only as institutions for transmitting Islamic values but also as platforms for developing science and technology. Therefore, the potential for Madrasahs to integrate Islamic education and science is an important indicator of the quality of Islamic education in Indonesia. Various educational evaluations indicate that learning in Madrasahs tends to be partial. Islamic religious education is often taught in a text- and norm-based manner, while science learning focuses on mastering concepts and formulas without linking them to Islamic values (Daun & Arjmand, 2005) [6]. This situation impacts students' low ability to integrate religious and scientific knowledge into everyday life.

Verse 28 of Surah Fatir emphasizes that the diversity of Allah SWT's creation, whether in humans, living creatures, or livestock, is a sign of His greatness and power, observable through natural phenomena. The differences in color, shape, and characteristics among living creatures indicate the existence of natural laws structured in an orderly and wise manner. The Qur'an, through this verse, encourages humans to engage in observation, research, and reflection on the universe as a means of acquiring knowledge. Thus, scientific activities such as observation and scientific study are actually part of the effort to understand the signs of Allah's power. This verse

emphasizes that the feeling of *khasyah* (fear accompanied by deep awareness and respect for Allah) is possessed only by those who truly understand the nature of His creation. Shihab explains that the term *ulama* is not limited to experts in jurisprudence or theology, but includes anyone who possesses profound knowledge that leads to an understanding of Allah's greatness. In other words, the more a person understands the secrets and laws of nature, the more he realizes his limitations, and the stronger his fear of and submission to Allah become.

The Tafsir Al-Mishbah explains that the mention of the diversity of colors and types of living creatures in this verse is not merely biological information, but rather a methodological cue for humans to use their reason and senses to examine empirical reality (Anwar, 2017) [3]. This diversity demonstrates the existence of a highly ordered system that does not occur by chance. From this arises both scientific and theological awareness. Thus, science, from the perspective of the Qur'an, has a spiritual dimension, not merely a rational one. The verse emphasizes that those who fear God most are scholars, namely those who possess profound knowledge of His creation. The term "*ulama*" in this context refers not only to religious scholars but also includes individuals who understand the laws of nature through science. The broader one's knowledge of the order and complexity of nature, the greater one's spiritual awareness and sense of submission to the Creator (Buijs & Elands, 2013; Kauffman, 1990) [5, 8]. This demonstrates that science and faith are not contradictory, but rather mutually reinforcing in shaping human religious consciousness.

From an educational perspective, QS. Fatir: 28 provides a theological foundation for integrating Islamic education and science into the learning process. Science learning not only aims to develop students' cognitive abilities but also fosters a spiritual attitude, a sense of awe for God's creation, and moral responsibility in the use of science (Syed Hassan, 2018) ^[29]. Therefore, studying natural phenomena through a scientific approach can be an effective means of building students' competencies holistically, namely by integrating aspects of knowledge and scientific skills, and by strengthening faith in a meaningful learning environment (Littledyke, 2008) ^[16]. At the regional level, Madrasah education in Central Sulawesi province faces challenges not much different from the national situation. Madrasahs in this region have great potential to develop contextual Islamic education, given the community's strong religious and cultural values. However, this potential has not been fully realized in learning practices, particularly in integrating Islamic education with science.

Initial observations of the learning process in several Islamic schools (Madrasah) indicate that learning remains solely focused on academic achievement. Students' competency is primarily measured through cognitive aspects, while scientific thinking skills and the internalization of Islamic values have received inadequate attention. Furthermore, the integration of religion and science remains conceptual in curriculum documents but has not been systematically implemented in the classroom. As the capital of Central Sulawesi Province, Palu City plays a strategic role in the development of Islamic school education. Several state Islamic junior high schools (Madrasah Tsanawiyah) in Palu City serve as references for implementing educational policies and teaching innovations. However, the reality on the ground shows that the integration of Islamic education and science still faces various obstacles. Religious and science instruction in Palu City Islamic schools generally still proceeds separately. Religious and science teachers deliver instruction in their respective subject areas without structured, integrative planning. As a result, students struggle to see the connection between scientific concepts and the Islamic values they learn in religious studies.

The impact of this condition is evident in students' suboptimal competence. Students possess sufficient conceptual knowledge but are unable to connect it to religious attitudes and critical thinking skills in the 21st century. This demonstrates the need for an integrative learning model capable of bridging the gap between Islamic education and science operationally. Madrasah Tsanawiyah is one of the leading state madrasahs with adequate human resources and learning facilities. This madrasa has competent religious and science teachers, as well as students with heterogeneous academic backgrounds. However, based on initial observations and school documentation, integrative learning between Islamic education and science has not been systematically implemented.

Religious education tends to emphasize cognitive and affective normative aspects, such as understanding Islamic concepts and developing general religious attitudes (Buchanan & Hyde, 2008) ^[4]. Meanwhile, science education tends to focus more on mastering concepts, theories, and formulas without linking

them to Islamic values (Rossiter, 1988) ^[22]. Integration remains incidental and dependent on individual teacher initiative. Learning evaluation results indicate that student competencies do not yet reflect a balance between mastery of scientific knowledge and internalization of Islamic values (van der Zee, Hermans, & Aarnoutse, 2008) ^[31]. Students can answer cognitive questions (knowledge) but have not yet demonstrated critical and applied thinking skills that integrate religious and scientific values. This situation indicates a gap between the objectives of Madrasah education and the reality of classroom learning.

Literature review

Definition and objectives of Islamic education

Islamic education is a learning process that aims to shape individuals who possess a balance among spiritual, intellectual, and moral aspects, grounded in Islamic teachings (Nurdin, 2022; Palinge, Nurdin, & Rusdin, 2022) ^[17,20]. Etymologically, the word "education" in Islam is often associated with the terms *tarbiyah*, *ta'lim*, and *ta'dib*. *Tarbiyah* refers to the process of the growth and development of human potential; *ta'lim* emphasizes the transfer of knowledge; while *ta'dib* emphasizes the formation of character and manners in accordance with Islamic values. These three concepts demonstrate that Islamic education is not only oriented towards cognitive aspects, but also towards the formation of individual morals and ethics. Conceptually, Islamic education has characteristics that differ from secular education. In Islam, education aims not only to acquire worldly knowledge, but also to achieve happiness in the afterlife. Islamic education teaches that knowledge must be applied as a means of drawing closer to Allah SWT. Therefore, every piece of knowledge learned must be related to the values of monotheism, so that students can understand the essence of creation and the purpose of their lives in this world.

The primary goal of Islamic education is to develop a complete human being, a person who possesses a balance between spiritual, intellectual, social, and emotional aspects (Rahmawati, Nurdin, & Pettalongi, 2022; Rustina *et al.*, 2026) ^[21,25]. This aligns with the Islamic concept of the perfect human being, which describes a person who is perfect in morals, knowledge, and good deeds. Thus, Islamic education serves as a means of developing individuals who are aware of their responsibilities to God, their fellow human beings, and the universe. In Islamic education, the development of knowledge must also be aligned with moral and ethical values. Knowledge without morals can be misused, which is detrimental to humanity. Therefore, Islamic education emphasizes the importance of integrating knowledge and faith, in which every acquisition of knowledge must be viewed as an act of worship to God. In this way, students not only possess intellectual intelligence but also possess balanced spiritual and emotional intelligence.

Islamic education aims to shape the character of individuals who possess noble morals (Alhamuddin, Eko, & Revan Dwi, 2022) ^[2]. This is based on the teachings of the Prophet Muhammad (peace be upon him), who stated that the primary purpose of his being sent to the world was to perfect human

morals. Therefore, Islamic education must instill values such as honesty, responsibility, discipline, and respect for others. By developing strong character, students can become individuals who benefit society and contribute to the development of Islamic civilization. The goals of Islamic education also encompass social aspects, namely developing individuals who are aware of the importance of *ukhuwah Islamiyah* (Islamic brotherhood) and social responsibility. In this context, Islamic education is not only oriented towards academic success, but also towards developing individuals who care about society and can contribute to creating a harmonious and just environment. Islamic education instills the values of *amar ma'ruf nahi munkar*, which teach students always to do good and prevent evil in social life.

Science from an Islamic perspective

Science is a discipline that seeks to understand the universe through systematic scientific methods (Agazzi, 1991; Shapere, 1991) [1, 27]. Science comes from the Latin word *scientia*, meaning knowledge. Over the course of its development, science has become the primary means for humans to objectively explain natural phenomena based on empirical evidence. The scientific process involves observation, experimentation, analysis, and theory formulation, aimed at discovering patterns and laws of nature that can be repeatedly tested and verified. The essence of science can be understood through three main aspects: ontology, epistemology, and axiology. The ontology of science concerns the objects of scientific study, including all natural entities, both concrete and abstract. The epistemology of science concerns the scientific methods used to acquire knowledge, from observation and hypothesis formulation to experimentation and theory development.19 Meanwhile, the axiology of science discusses the benefits and impacts of science on human life, both in terms of technology, ethics, and social policy.

One of the main characteristics of science is its empirical and objective nature. Empirical means that knowledge in science is obtained through direct experience or observation that can be tested in real life. Objectivity in science refers to the principle that research results must be free from subjective bias so that they can be accepted by the scientific community. Therefore, scientific methods must be replicable by other researchers to ensure the validity and reliability of a finding. The scope of science is very broad and includes various branches that can be categorized into three main groups: natural sciences, social sciences, and formal sciences. Natural sciences include fields such as physics, chemistry, biology, and astronomy, which aim to understand the laws of nature. Social sciences study human interactions and social structures, encompassing fields such as sociology, economics, and anthropology. Meanwhile, formal sciences such as mathematics and logic form the basis for the development of theories and analytical methods in various other branches of science.

Science focuses not only on theoretical aspects but also on practical applications. For example, in technology, science enables various innovations such as renewable energy, artificial intelligence, and genetic engineering, which

contribute to the advancement of civilization. In health, science plays a role in discovering vaccines, treating diseases, and improving the quality of human life. Therefore, science plays a strategic role in solving various global challenges, including climate change and food security.

The relationship between science and Islamic values

Science and Islamic values have a close and complementary relationship (Taşkın, 2014) [30]. Islam encourages its followers to seek knowledge as part of an obligation commanded by Allah SWT. The Quran contains numerous verses that encourage humans to contemplate the universe and understand the laws that govern life. This shows that Islam not only values science but also considers it a means of recognizing the greatness of Allah. One of the main connections between science and Islam is in epistemology, namely how knowledge is acquired and developed. In Islam, the primary sources of knowledge are God's revelation in the Quran and the Hadith. Meanwhile, science develops through observation and experimentation. Although the methods used are different, both aim to seek the truth. Islam does not reject the scientific method, but rather encourages its followers to think critically and rationally in understanding natural phenomena.

Islam also teaches that science must be used for the good and benefit of humanity (Ghamari-Tabrizi, 1996) [7]. Throughout the history of Islamic civilization, many Muslim scientists, such as Al-Farabi, Ibn Sina, and Al-Khawarizmi, developed science based on Islamic principles. They not only contributed to medicine, mathematics, and astronomy, but also ensured that the sciences they developed were aligned with Islamic values, such as honesty, justice, and the welfare of humanity. Science in Islam is not simply a tool for understanding nature but also a form of worship. When a Muslim studies science with the intention of seeking the truth and drawing closer to God, such activity has the value of worship. Therefore, scientific research in Islam must be based on good intentions and conducted ethically and responsibly. Many concepts in science align with Islamic teachings. For example, in medicine, Islam taught the importance of maintaining health and hygiene long before the development of modern science. The concept of water as a source of life in the Quran also aligns with scientific research on its importance in the survival of living things. This shows that Islam and science are not in conflict, but rather mutually supportive in discovering the truth. However, the relationship between science and Islam also faces challenges, particularly in the modern era, which often separates science from spiritual values. The secularization of science, which eliminates religion's role, can cause science to lose its moral direction. Therefore, Muslims must develop an integrative approach that combines science with Islamic values so that science remains meaningful and beneficial to humanity.

In education, the relationship between science and Islam can be implemented through a science-integrated curriculum. This approach enables students to understand that science is not only about natural laws but also has a spiritual dimension. In this way, students not only gain a strong scientific understanding but also develop an awareness of the moral and ethical

responsibilities in using knowledge. Collaboration between Muslim scientists and Islamic scholars is also crucial in developing science in line with Islamic values. Through dialogue between science and religion, Muslims can create innovations and technologies that are not only sophisticated but also beneficial to humanity. This approach will strengthen Islam's role in global scientific development and make a greater contribution to world civilization.

Methodology

This study uses quantitative methods. In quantitative research, theory serves as a guide for data gathering and analysis (Nurdin & Pettalongi, 2022; Nurdin, Stockdale, & Scheepers, 2016) [18, 19]. The data were collected through a classroom experiment involving eight classes of eighth-grade madrasah students at the research site (Rusli, Hasyim, & Nurdin, 2021; Rusli & Nurdin, 2022) [23, 24]. The research was conducted within one state Islamic junior high school in Palu City, Indonesia. The researcher chose the schools based on the assumption that the schools have implemented the integration of science and Islamic values in the teaching process. The results of this study can later serve as a reference and guideline for integrating local language into the teaching of the Islamic religion and for making schools a model for other educational institutions. Data were collected through a pre-test and post-test implemented after treatments were given. The experiment involved eight classes of grade eight students in the school. The experiment was conducted by the researchers for three months and then followed by a post-test. The data analysis used a deductive approach, which can be interpreted as a research procedure that produces deductive data from interviews and field notes. Data analysis was conducted using thematic analysis from Strauss and Corbin (1998) [28]. The analysis started with open, axial, and selective coding. The final result of the data analysis is the set of themes identified from the data.

Results and Discussion

Student competencies before implementing the integration model

Based on the pre-test results, which showed an average initial competency of 35.8% among students, this condition can be analyzed through the perspective of the integration-interconnection theory proposed by Amin Abdullah. This low achievement indicates that the previous learning process was still dichotomous, namely separating Islamic Religious Education and science. Within Amin Abdullah's theoretical framework, this separation causes fragmentation of knowledge, where students are unable to establish a complete connection between religious concepts and scientific phenomena. The relatively homogeneous pre-test results across classes, with scores ranging from 34.6% to 36.6%, indicate that this condition not only occurs in certain individuals but is a systemic phenomenon in the learning process. From an integration-interconnection perspective, this homogeneity indicates that all students follow the same learning pattern: learning that lacks interdisciplinary connections. This strengthens the assumption that the previous learning system

has not provided space for comprehensive scientific integration.

The students' low initial competency also indicates a lack of integrative thinking skills. According to Amin Abdullah, integrative thinking skills result from a learning process that connects religious knowledge, the social sciences, and science into a unified whole. However, in the initial conditions of this study, students still only partially understood science, thus being unable to connect scientific concepts deeply with Islamic values. Students' limitations in linking scientific phenomena with Islamic values can also be understood as a weakness in the interconnectedness dimension of learning. In Amin Abdullah's theory, interconnectedness requires a dialogue between revelation, reason, and reality. However, pre-test results showed that students were unable to view natural phenomena as signs of Allah SWT's greatness. This indicates that prior learning has not been optimally integrated across cognitive, spiritual, and contextual aspects. The students' low initial competency can be understood as a consequence of the failure to implement the integration-interconnection paradigm in learning. Amin Abdullah's theoretical perspective explains that without scientific integration, the learning process will result in partial and less meaningful understanding. Therefore, the results of this pre-test provide a strong basis for demonstrating the importance of implementing an integrated model of Islamic education with science to holistically improve student competency.

Learning conditions before implementing the integration model

The learning environment before the implementation of the integrated model of Islamic Education with science in Madrasahs demonstrated a clear separation between Islamic Religious Education and science subjects. From the perspective of the integration-interconnection theory proposed by Amin Abdullah, this situation reflects the persistence of a dichotomous paradigm within the education system. Religious education focuses more on normative and textual aspects, while science learning tends to be empirical and rational without being linked to Islamic values. As a result, students perceive the two fields of knowledge as separate and unrelated entities. In terms of material, the learning process remains partial and unintegrated. Islamic Religious Education material is presented through memorization and text comprehension, while science material focuses on theoretical concepts without any attempt to link it to spiritual values. From Amin Abdullah's perspective, this situation demonstrates the absence of an interconnected scientific approach that connects revelation, reason, and reality. This unintegrated learning makes it difficult for students to grasp the broader meaning of the knowledge they are learning.

From a methodological perspective, learning tends to be teacher-centered, with the teacher being the primary source of information and students passively receiving knowledge. The lecture method is more dominant than active and participatory methods. In the integration-interconnection theory, this approach does not support the formation of scientific dialogue.

It does not provide space for students to develop critical thinking skills and connect various concepts in an integrative manner. These learning conditions also impact students' limited ability to connect science to real life. Students are not yet accustomed to viewing natural phenomena as signs of the greatness of Allah SWT, as emphasized within the perspective of scientific integration. This indicates that prior learning has not succeeded in establishing connections among cognitive, spiritual, and contextual aspects, so students' understanding tends to be theoretical and less applicable. The learning conditions prior to the implementation of the integration model reflect the failure to implement the integration-interconnection paradigm proposed by Amin Abdullah. Learning that remains dichotomous, partial, and teacher-centered results in low student competence in understanding the relationship between science and Islamic values. Therefore, a learning model is needed that integrates various disciplines holistically, making the learning process more meaningful and contextual.

Implementation of the integration model of Islamic education with science

The implementation of the integrated model of Islamic education with science in the learning process demonstrates a shift in the learning paradigm from a dichotomous one to an integrative and interconnected one. From the perspective of the integration-interconnection theory proposed by Amin Abdullah, learning that connects various disciplines is a strategic step in overcoming the fragmentation of knowledge. The applied integration model links scientific concepts to Islamic values, enabling students to understand the material not only partially but also holistically and meaningfully. In the planning stage, teachers develop learning tools oriented towards scientific integration, including objectives, materials, methods, media, and evaluation. From Amin Abdullah's perspective, integrative planning is an important part of building a connection between revelation, reason, and reality. Learning objectives are designed not only to develop cognitive aspects but also to shape religious attitudes and scientific thinking skills. This indicates that learning has moved towards a multidisciplinary approach, which is a key characteristic of the integration-interconnection paradigm.

In the implementation phase, learning begins by linking scientific concepts to relevant verses from the Quran. This approach aligns with Amin Abdullah's idea of the importance of dialogue between religious and scientific knowledge. Students are encouraged to understand that natural phenomena are signs of Allah SWT's greatness. Therefore, learning is not merely cognitive but also spiritual. This demonstrates that the learning process has integrated normative and empirical aspects into a cohesive whole. The learning process takes place actively, involving students in various activities, such as group discussions, observations, and problem-solving. From an integration-interconnection perspective, these activities reflect interactions across disciplines, enabling students to construct understanding independently and in context. Active student involvement also demonstrates that learning has shifted from teacher-centered to student-centered, thus providing space for the development of critical and collaborative thinking skills.

In the reflection stage, students are guided to understand the religious meaning of the scientific concepts they have learned. This reflection is an important part of the integration-interconnection paradigm because it helps students connect scientific knowledge with spiritual values. Through this process, students not only acquire knowledge but also internalize Islamic values in their daily lives. This demonstrates that learning has successfully integrated cognitive, affective, and psychomotor aspects in a balanced manner. The integration of Islamic education with science in the learning process can be understood as a concrete application of Amin Abdullah's theory of integration-interconnection. This model not only connects various disciplines but also creates holistic, contextual, and meaningful learning. The success of this model is reflected in the increased engagement of students and their ability to connect scientific concepts with Islamic values more deeply.

Integration of learning objectives, materials, methods, media, and evaluation

The integration of objectives, materials, methods, media, and evaluation in implementing the integrated model of Islamic Education with science at MTsN 1 Palu City is a key factor in achieving holistic and meaningful learning. From the perspective of the integration-interconnection theory proposed by Amin Abdullah, the success of learning is determined not by a single component but by the integration of all learning elements that are interconnected and supportive. This integration of components enables dialogue among normative (religion), empirical (science), and contextual (real life) aspects, so that students gain a more comprehensive understanding. The integration of learning objectives is evident in the formulation of objectives that are not only oriented towards mastering scientific concepts but also towards strengthening Islamic values and shaping students' religious attitudes. From Amin Abdullah's perspective, integrative learning objectives reflect the integration of cognitive, affective, and psychomotor dimensions. This shows that learning is not only aimed at producing intellectually intelligent students but also at fostering spiritual awareness and social responsibility.

In terms of material, integration is achieved by presenting scientific concepts linked to Islamic values thematically. The material is no longer presented separately, but rather as a complementary whole. Within the framework of integration and interconnection, this reflects the relationship between revelation and empirical reality. Students not only understand scientific concepts theoretically but also grasp the religious meaning within them, thus making learning more meaningful and contextual. The integration of learning methods is demonstrated through the use of student-centered approaches, such as discussion, observation, and problem-solving. From Amin Abdullah's perspective, dialogic and interactive learning methods are crucial in building scientific interconnections. Through these methods, students not only receive information but also actively construct knowledge and integrate various concepts.

In terms of media, the use of contextual and relevant learning media to students' lives contributes to the success of integrated learning. Media such as images, videos, and natural phenomena linked to verses from the Quran help students understand the material more concretely. From an integration-interconnection perspective, media serves as a bridge connecting scientific concepts and Islamic values, making learning more engaging and easier to understand. Within Amin Abdullah's theoretical framework, integrative evaluation is crucial in ensuring that learning achieves its objectives holistically.

Improvement of student competence after implementing the integration model

A comparison of pre-test and post-test results shows a significant increase in student competency after the implementation of the integrated model of Islamic Education with science. Based on data obtained from eight eighth-grade classes, the average percentage of pre-test results was 35.8%, while the average percentage of post-test results increased to 74.9%. This increase indicates that implementing the integrated model positively impacts overall student competency. When viewed based on the achievements of each class, all classes showed an increase in learning outcomes after the implementation of the integrated model of Islamic Education with science. Class VIII A experienced an increase from 36.6% in the pre-test to 82.6% in the post-test, class VIII B from 35.2% to 83.8%, class VIII C from 36.2% to 83.5%, and class VIII E from 34.6% to 84.5%. A relatively high increase also occurred in class VIII G, namely from 36.1% in the pre-test to 85.1% in the post-test. These data indicate that most classes have reached the high category after the implementation of the integrated model. From the perspective of the theory of integration-interconnection of science, this increase reflects the success of learning in connecting various scientific disciplines in a complete manner, so that students are able to understand scientific concepts and relate them to Islamic values in a more comprehensive manner.

There was variation in the level of improvement between classes. Class VIII D experienced an increase from 35.4% to 57.7%, class VIII F from 36.1% to 61.1%, and class VIII H from 36.0% to 60.8%. Although the increase in these classes was not as high as the other classes, the post-test results still showed a significant increase compared to the initial conditions. From Amin Abdullah's perspective, this variation can be understood as part of the dynamics of the scientific integration process, which is influenced by various factors, such as student readiness, teacher learning strategies, and classroom interactions. This shows that the implementation of integration-interconnection does not always yield uniform outcomes, but it still has a positive impact on overall student competency. The improvement data across all classes confirm that the model integrating Islamic Education with science can change the learning pattern from a partial to an integrative one. Students are beginning to demonstrate the ability to connect scientific concepts with Islamic values, albeit at varying levels of achievement. Within the framework of integration-

interconnection theory, this shows that learning has moved towards creating holistic, contextual, and meaningful understanding for students.

Improvement of knowledge, skills, and attitude competence

The implementation of the integrated model of Islamic Education with science has a positive impact on students' competencies, encompassing knowledge, skills, and attitudes. This improvement is reflected in the comparison of pretest and posttest results, which show a significant increase in scores across all eighth graders in the madrasah. This indicates that integrative learning not only improves students' cognitive understanding but also develops thinking skills and religious attitudes in the learning process. The improvement in student competency after the implementation of the integrated model of Islamic Education with science is clearly visible in the aspects of knowledge, skills, and attitude. From the perspective of the integration-interconnection theory proposed by Amin Abdullah, this improvement demonstrates the success of learning in connecting the dimensions of knowledge, values, and learning experiences into a unified whole. Learning not only increases knowledge but also shapes students' skills and attitudes holistically.

In terms of knowledge, students demonstrated an increased understanding of scientific concepts integrated with Islamic educational values. This was evident in the improved post-test scores compared to the pre-test, indicating that students not only understood the concepts theoretically but were also able to relate them to Quranic verses and Islamic values. From Amin Abdullah's perspective, this reflects the interconnection between revelation and reason, where scientific knowledge does not stand alone but is connected to Islamic values, resulting in a more comprehensive understanding. In terms of skills, increased competence was evident in students' active involvement in learning activities, including discussions, observations, and problem-solving. Students were able to observe scientific phenomena, ask questions, analyze, and draw conclusions linked to Islamic values. Within the framework of integration-interconnection theory, this demonstrates that learning has encouraged students to develop critical and collaborative thinking skills through interdisciplinary interactions. These skills are essential in building students' ability to understand reality holistically.

In terms of attitude, improvements are evident in the formation of religious attitudes and students' sense of responsibility during the learning process. Students demonstrate an awareness that knowledge is part of the effort to understand the greatness of Allah SWT and demonstrate positive attitudes such as discipline, curiosity, and responsibility in learning. From Amin Abdullah's perspective, this reflects the successful integration of the cognitive and spiritual dimensions, where learning not only produces knowledge but also shapes students' character and morals. Improvements in these three aspects demonstrate that integrative learning can overcome the separation between knowledge, skills, and attitudes that occurs in conventional learning. In the theory of integration and interconnection, these three aspects must be developed

simultaneously to produce comprehensive competencies. This is evident in students' ability not only to understand concepts but also to apply and interpret them in their daily lives. Improvements in knowledge, skills, and attitudes demonstrate that the integrated model of Islamic education with science can foster holistic and meaningful learning. From the perspective of Amin Abdullah's theory, this success is proof that the integration of knowledge not only improves academic achievement but also shapes students who balance intellectual intelligence, skills, and spiritual awareness in life.

The influence of the integration model on student competence

The results of the linear regression analysis across all classes indicate that the Integration Model of Islamic Education with Science has a significant influence on student competency. This is indicated by the correlation coefficient (R) value, which is in the strong to very strong category, and a significance value smaller than 0.05. From the perspective of the integration-interconnection theory proposed by Amin Abdullah, this finding confirms that the connection between religious knowledge and science in the learning process makes a real contribution to improving the overall quality of student competency. The R-squared value, which is in the high range, indicates that most of the variation in student competency can be explained by the application of the integration model. Within the framework of the integration-interconnection theory, this suggests that learning that connects various disciplines can have a greater influence than partial learning. The integration of normative (religion), empirical (science), and contextual (life) aspects allows students to build a more comprehensive understanding, thereby directly improving their competency.

The ANOVA results, which showed the regression model was significant, indicated that the integration model is suitable for explaining the relationship between learning variables and student competencies. From Amin Abdullah's perspective, this shows that the integration-interconnection approach is not only conceptual but also empirically proven to be effective in learning practices. Thus, the integration theory is not only theoretically relevant but also has strong explanatory power for phenomena occurring in the field. The results of the coefficients test, which show that the integration model variables have a significant effect on student competencies, reinforce that the improvements observed are not coincidental but rather the result of implementing structured and integrative learning. In the integration-interconnection theory, this reflects the success of building relationships among various scientific dimensions, enabling students to develop knowledge, skills, and attitudes simultaneously.

The results of this linear regression are also consistent with the results of the paired t-test, which showed a significant difference between the pre-test and post-test. If the t-test indicates an increase in competency, the regression analysis provides evidence that the application of the integration model influences this increase. From Amin Abdullah's perspective, this indicates that integrative learning plays a strategic role in

changing learning patterns from dichotomous to interconnected. The results of the linear regression analysis provide strong empirical evidence that the Integration Model of Islamic Education with Science has a significant influence on student competency. From the perspective of the integration-interconnection theory, this influence indicates that integrating religious knowledge and science is a crucial factor in creating effective, holistic, and meaningful learning, thereby optimally improving student competency.

Conclusion

The results of the study indicate that the Integration Model of Islamic Education with Science significantly increases student competency, as evidenced by the difference between pre-test and post-test scores and statistical tests with a significance value (Sig.) <0.05 . This confirms that integrative learning is not only conceptually effective, but also empirically and quantitatively proven. The practical implications of these findings require teachers to systematically integrate Islamic values with scientific concepts across every component of learning. Teachers need to develop active and contextual learning strategies, such as discussions and problem-based learning, which have been proven to increase student engagement while significantly improving competency. In addition, the learning tools developed must include integrated evaluations of cognitive, affective, and psychomotor aspects, so that improvements in competency can be measured comprehensively. For students, the implementation of this model has been shown to have a significant positive impact, particularly on the affective dimension, as evidenced by increased religious attitudes, responsibility, and scientific awareness. This shows that integrative learning is able to shape students who are not only academically superior but also have strong character. At the madrasah level, the results of this study provide an empirical basis for promoting curriculum development policies based on integrated science. Support in the form of teacher training, the provision of learning resources, and an integrated evaluation system is crucial, given that research shows this model has a positive and significant impact on students' holistic competency.

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