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The Development of a Qur'an-Based Learning Model in Astrophysics Lectures to Internalize Religious Character Values (A Hypothetical Model for Astrophysics Lectures)

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Abstract: This research proposes a Prophetic Learning Model that integrates the religious values of the Qur'an in astrophysics learning to deepen students' scientific understanding and form religious character. The main objective of this research is to develop a model that connects scientific knowledge with spirituality and internalizes religious character values such as faith, piety, patience, gratitude, and cooperation. The method used is a qualitative literature review with an analysis of learning theory, Islamic education concepts, and relevant Qur'anic verses. The results of the study found that the Prophetic Learning Model with stages: Inviting to purify the soul by praying; Reciting verses in the form of kauliah verses with dhikr; Teaching the book in the form of kauniah verses by thinking; Teaching wisdom by thinking and dhikr; and Reflecting on learning by assessing yourself. This model improves students' scientific understanding and strengthens their religious character and social skills. Challenges in its implementation include the difficulty in connecting Qur'anic verses with scientific concepts and the readiness of lecturers and students to adopt this new approach. This model has great potential to develop a more integrative learning experience. This study recommends further trials to evaluate the effectiveness and practicality of the model in the context of higher education, particularly in physics education study programs.

Keywords: Astrophysics; Integration of science and religion; Physics learning; Prophetic learning model; Qur'an-based learning; Religious Character

Introduction

National education in Indonesia, as stipulated in the Law on the National Education System (UUSPN No. 20 of 2003), aims to develop the potential of students as a whole, including aspects of character, such as being faithful and devoted to God Almighty, noble, knowledgeable, capable, creative, independent, democratic, and responsible (Daheri et al., 2023).

However, although these goals have been formulated, the growing social phenomenon, primarily among educated people, shows that the implementation of the education system in internalizing religious and social values still faces obstacles (Farida & Sukraini, 2021; Wardi et al., 2023). This reflects the gap between education policy and its results at the practical level.

In a modern era that demands holistic characterbuilding, education that is orientated towards cognitive

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abilities and includes moral and spiritual dimensions is becoming increasingly important (Malawi, 2016). To achieve this goal, innovative approaches are needed that enable students to understand and apply religious values in their daily lives. One such approach is to integrate religious values into a science-based curriculum, primarily physics, which has great potential to reflect on God's greatness through the study of the order and complexity of the universe (Yusuf et al., 2024).

education curriculum implemented in The Indonesia is currently divided into the 2013 Curriculum and the Merdeka 2024 Curriculum. In the 2013 High School Physics Curriculum, Core Competency, which focuses on spiritual attitudes (KI)-1, is elaborated in Basic Competency: 'Increasing his faith by realizing the relationship between the order and complexity of the universe to the greatness of God who created it.' However, since the implementation of Curriculum 2013, implementation of KI-1 in physics learning is still not optimal (Latifah et al., 2022). Many teachers struggle to integrate religious values in physics learning, even though KI-1 has been listed in each Learning Implementation Plan (Santoso et al., 2023). This leads to an imbalance between teaching physics knowledge and strengthening religious character values in the context of learning.

Based on preliminary studies conducted at the Physics Education Study Program PMIPA FKIP Lambung Mangkurat University, one of the main objectives of this study program is to produce graduates with a religious character, uphold the principle of kayuh baimbai, and have pedagogical knowledge and skills in the field of physics. Although this goal has been stated in the Semester Lecture Plan, it has not been found in the Learning Implementation Plan prepared by the lecturers. Based on a survey, 100% of Physics Education Study Programme students admitted that they could not integrate physics concepts with Qur'an-based religious character values, even though most (90%) students often read the Qur'an, which contains a call to study the universe. This shows a gap between students' religious understanding and their ability to connect religious values in the context of physics learning.

In addition, the results of interviews with physics teachers who are members of the MGMP Physics in Banjarmasin City and analysis of the Learning Implementation Plans prepared by the teachers show that until now, there has been no example of RPP that integrates learning models that can internalize religious or spiritual character values by Core Competencies (KI)-1 in Curriculum 2013. This causes physics teachers to experience difficulties embedding religious character values in their learning. Although these values are listed in KI-1, their implementation in the context of physics learning is still not optimal, so teachers find it difficult to harmonize between teaching scientific concepts and strengthening students' religious character (Daheri et al., 2023; Malawi, 2016).

In contrast to previous studies that only integrate religious values in general in physics learning (Khoiri et al., 2017; Kurnia et al., 2022; Nurhasnawati et al., 2023; Purwati et al., 2018), this study offers a more specific and holistic approach by connecting religious character values directly with astrophysics concepts. The Qur'anbased learning model proposed in this study aims to improve the understanding of astrophysics and strengthen students' faith and morals by combining that combines scientific knowledge with spiritual values. In addition, this approach provides a space for students to feel the depth of the relationship between science and faith, which has often been considered separate. Therefore, this study aims to design, develop, and analyze a Qur'an-based learning model that can internalize religious character values in astrophysics learning.

Method

This research uses a descriptive qualitative method with a research and development approach. The main objective is to design and develop a Qur'an-based learning model to integrate religious character values into astrophysics lectures. The focus is on the learning model design and syntax development stages, which combine astrophysics concepts with Qur'an-based spiritual values.

The first step in this research is to conduct a needs analysis to identify existing problems in astrophysics learning in the Physics Education Study Programme, primarily related to integrating religious values. This analysis was conducted through surveys and interviews with students and lecturers, which aimed to determine how religious character values have been integrated into astrophysics learning and the challenges faced in connecting physics with spiritual values.

The next step is to conduct a literature review of relevant concepts, such as Qur'an-based education, astrophysics concepts, and learning theories that support integrating religious values in physics learning. This literature will be used as the basis for designing the syntax of the Qur'an-based learning model that suits the characteristics of the astrophysics course. The main focus of this review is on literature that includes books, journals, and documents containing Qur'anic verses relevant to the design of learning models for astrophysics, which are expected to internalize religious character values. This literature review includes several essential concepts, the concept of education in the Qur'anic perspective, human potential according to Islamic teachings, the concept of astrophysics, religious character values, and learning strategies that can be applied in context.

Based on the needs analysis and literature review results, the next step is to design the syntax of the Qur'an-based learning model for astrophysics lectures. This design includes learning steps that integrate Qur'anic verses relevant to astrophysics concepts and strategies to internalize religious character values in every stage of learning. This model is designed to encourage students to understand astrophysical concepts and internalize the spiritual values contained in the Qur'an.

The literature review began with determining the research topic, which integrates religious character values in astrophysics learning by referring to the relevance of Qur'anic verses related to the universe. Furthermore, researchers collected information related to the topic of astrophysics, the concept of Islamic education, religious character values, and learning theories. The research focus was then determined on the Qur'anic verses related to the creation of the universe and the relationship between science and faith, followed by the preparation of relevant reading materials to support the design of the learning model. In this process, the researcher also conducted an in-depth study of Qur'anic verses related to God's creation that can be related to astrophysics studies and compiled a Qur'anbased learning model design.

The data collection technique used was the documentation technique, in which researchers collected various relevant literature texts, such as books, journals, and documents. The literature was selected based on the relevance criteria the topic, quality of sources (e.g., accredited journals or books that have gone through a review process) and the diversity of sources that include relevant theories and concepts to build a learning model based on the Qur'an. Thus, the proposed learning model is expected to integrate religious character values in an effective and valid astrophysics learning context.



Figure 1. Research flow

Result and Discussion

Physics education, primarily astrophysics, is often seen as a discipline separated from spiritual and religious values (Siswati, 2017). However, in the view of Islam, science is not something that contradicts faith but rather a means to get to know Allah as God the Creator. The Qur'an emphasizes the importance of knowledge as a form of worship and reflection on the greatness of Allah, as stated in the first revelation revealed to Prophet Muhammad (QS. Al-'Alaq/96:1-5). This verse motivates Muslims to use reason and knowledge to understand the world and to remember and recognize Allah (Annisa et al., 2024). Therefore, physics education that integrates religious values is important to enrich students' scientific understanding and shape their religious character.

Astrophysics, as a branch of physics that applies the laws of physics and chemistry to study celestial objects and phenomena, provides an excellent opportunity to bring students closer to the greatness of God. In learning astrophysics, phenomena such as the birth, life, and death of stars and the regularity of natural laws, can reflect on God's greatness. This aims to enrich students' cognitive understanding and shape their religious character (Hidayat et al., 2023).

Astrophysics is a branch of space science that applies the laws of physics and chemistry to explain the birth, life, and death of stars, galaxies, planets, nebulae, and other objects in the universe (Ferrari, 2024). The term 'Astrophysics' comes from the Greek language, which consists of the words 'Astro', which means star, and 'physis', which means nature, Astrophysics is a branch of astronomy that studies the physical scope, objects, and celestial systems (Al-Ayubi, 2021). The truth of science (astrophysics) is relative, while the truth of revelation is absolute (Sutoyo, 2020).

By studying what is in the heavens and the earth through physics by Allah's words (QS. Yunus/10: 101), humans will understand that Allah has created everything based on size (QS. Al-Qamar/54: 49), and humans will understand that everything can be utilized for their benefit because Allah has subjected everything in the heavens and the earth all for those who think (QS. Al-Jaatsiyah/45: 13). Verses like this there are as many as 800 verses and are referred to as verses of the universe or verses of kauniah (Solihin et al., 2023). Thanthawi, in his tafsir Al-Jawahir, revealed that there are more than 750 kauniah verses (verses about the universe) in the Qur'an, and there are only about 150 fiqh verses. However, the scholars have written thousands of books about figh, but almost did not pay attention and wrote books about the universe and its contents (Jandra & Mz, 2018).

Table 1. Qur'an based learning model

The Qur'an-based learning model aims to develop students' cognitive abilities in understanding the phenomena of the universe and to internalize religious character values, such as faith, piety, patience, gratitude, and cooperation. The Our'an-based learning model proposed in this article, the Prophetic Model, integrates spiritual values in physics learning, primarily The Qur'an-based learning model astrophysics. proposed in this study aims to internalize religious values through physics education. This model helps students understand the phenomena of the universe through a scientific approach and shapes their religious characters, such as faith, piety, patience, gratitude, and cooperation. The learning process is designed to show that the physical laws that govern the universe are a manifestation of God's wisdom. The main objective of this model is to improve the understanding of astrophysics. Students are expected to understand the phenomena of the universe through a more holistic perspective, connecting science with spiritual values and internalizing religious character values. This learning is designed to strengthen students' religious character, such as faith, piety, patience, gratitude, and cooperation, which are the basis for the formation of noble character.

The model is built on several approaches drawn from Qur'anic principles that can enrich the learning experience. It draws on the approaches of Da'wah bil hikmah (inviting with wisdom), Tazkiyah (purifying the soul), and Ulil Albab (wise use of reason and mind). This approach creates a cognitively deep learning process and and builds students' strong moral and spiritual foundation. Several studies support the importance of spiritual in physics education to strengthen students' religious character. Integrating spiritual values in physics education improves scientific understanding and develops stronger moral attitudes in students. The research identified that students who engage in learning that connects science with spiritual values are more likely to develop positive attitudes toward science and the environment.

Syntax	Description	Related Qur'anic Verse
Syntax 1: Invite to Purify the Soul by	Purify the Soul from Arrogance: Invite learners to avoid arrogance in the learning process.	QS. Al-A'raf/ 7:146
Praying	Praying and Pious: Invites learners to pray and do istightar to cleanse their hearts and minds.	QS. Ghafir/ 40:60
	Delivering Learning Objectives: Explaining learning objectives related to understanding and practicing knowledge in everyday life.	QS. An-Nahl/ 16:78
Syntax 2: Reciting Quranic Verses with	Reciting Qur'anic Verses about the Universe: Invites learners to reflect on verses about Allah's creation in the universe.	QS. Luqman/ 31:20
Dhikr	Reciting Verses about Cooperation: Teaches the value of cooperation between human beings.	QS. Al-Maaidah/ 5:2
	Reciting Verses about Patience and Gratitude: Teaches the value of patience and gratitude in facing various challenges in life.	QS. Asy-Syura/ 47:33
Syntax 3: Teaching the <i>Kauniah</i> Scripture	Teaching Verses about the Universe: Teaches learners to think and reflect on the signs of Allah's power found in the universe.	QS. Ali-Imran/ 3:190
with Thinking	Teaching How to Learn by Observing: Teaches the importance of observation and observation as the basis of science.	QS. Yunus/10:101
	Teaching How to Learn by Thinking and Dhikr: Integrating rational thinking and dhikr to explore knowledge.	QS. Ali-Imran/ 3:192
Syntax 4: Teaching	Teaching Da'wah Bil Hikmah: Using wise methods in convey the truth.	QS. An-Nahl/ 16:125
Wisdom, Thinking, and Dhikr	Giving Examples of Dhikr and Thinking Activities: Giving concrete examples of the importance of dhikr and thinking in developing knowledge.	QS. Ali-Imran/ 3:192
	Guiding Cooperative Activities: Teaching the importance of working together to achieve common goals.	QS. Al-Maaidah/ 5:2
Syntax 5: Reflecting on Learning, Self-	Reflecting on the results of dhikr: Invite learners to reflect on the results of dhikr in daily life.	QS. An-Naml/ 27:93
Assessment	Reflecting on the Results of Thinking: Invite learners to reflect on the understanding and knowledge they have gained.	QS. Yunus/10:61
	Reflecting on the Thinking and Thinking Process: Invites learners to reflect on the thinking process and dhikr in achieve more profound understanding.	QS. Ali-Imran/ 3:191

The Qur'an-based prophetic learning model proposed in this study offers an integrative approach to learning physics, primarily astrophysics, which connects scientific understanding with the strengthening spiritual values. This approach aims to provide learning experiences that enrich students' cognitive understanding and form a strong religious character. Through this integration, physics is seen as a science that explains natural phenomena and as a means to get closer to the Creator, as illustrated in QS. Al-'Alaq/96:1-5 motivates people to use their minds to recognize God.

The first syntax of this model focuses on purifying students' souls through prayer and istighfar, which aims to foster an attitude of humility and readiness to receive knowledge. It also serves to create a spiritual atmosphere that supports the learning process. Learning that begins with prayer and *istighfar* helps to create a clean and open mental state for students. In the learning session that discussed the universe's structure, the lecturer started with the verse QS. Al-Anbiya/21:30 states that the heavens and the earth are part of Allah's creation. When discussing the star formation process, the lecturer read QS. Al-Anbiya/21:30, states that Allah created the heavens and the earth from a single unit that was then separated. Students are asked to reflect for a moment on the greatness of Allah in the creation of the universe while praying to be given the proper understanding. In physics learning, this helps students start learning with a humble attitude so that they are better prepared to understand complex physics concepts. Prayer before learning can improve focus, calmness, and understanding of the material being learned (Rassool, 2000). This stage strengthens students' spiritual foundation before they delve into physics concepts.

The second syntax involves reciting Qur'anic verses related to Allah's creation in the universe, accompanied by dhikr. This process aims to deepen the understanding of the universe as a manifestation of God's greatness and reflect on the relationship between physical phenomena and the greatness of God. Before starting the discussion of the universe's structure, the lecturer recited QS. Al-Baqarah/2:164 talks about the signs of Allah's power found in the heavens, the earth, and humans. Students are invited to reflect on how the creation of this orderly universe can strengthen their faith in Allah. Religious reflection in this learning can to deepen students' understanding of physical phenomena, while strengthening their spiritual connection with the Creator (Chanifah et al., 2021).

The third syntax invites students to think and reflect on the signs of God's power in the universe. This stage encourages students to think critically in studying the laws of physics that govern the universe. In learning astrophysics, phenomena such as stars, galaxies, and the laws of physics that govern the cosmos can be a place to reflect on the greatness of Allah's creation. The lecturer related this phenomenon to QS. Students are asked to think about how these natural laws reflect the power and greatness of Allah. Chaudhary & Kalia (2015) explains that a critical thinking approach combined with spiritual reflection strengthens scientific understanding while deepening religious experience (Suciati et al., 2022). In physics learning, critical thinking helps students understand basic principles and encourages them to reflect on the order and perfection of the universe as evidence of God's greatness. Teaching students to think using both rational and spiritual aspects helps them see science as a means to get closer to God.

In the fourth syntax, the main objective is to integrate wisdom, thinking, and dhikr in astrophysics learning. The Da'wah bil hikmah method teaches students to convey and receive knowledge wisely so that learning takes place in the cognitive realm and in the spiritual dimension. In the context of astrophysics, students learn about scientific theories and phenomena of the universe and contemplate the greatness of Allah's creation through every scientific discovery. Students are invited to synthesize the wisdom of the physics concepts studied, for example, understanding the phenomenon of the beauty of the universe, such as the formation of galaxies or the structure of stars as a manifestation of the greatness of Allah. QS. Al-Maidah/5:2 inspires students to work together in solving complex physics problems through group discussions so that they can see physics as a science that teaches the laws of nature and reinforces the values of collaboration and gratitude. When discussing planetary exploration, the lecturer linked the phenomenon of extraterrestrial life with QS. As-Sajda/32:7 talks about the creation of humans as the best creation. The lecturer reminded students to integrate gratitude for creating this amazing universe with tawadhu attitude and wise thinking.

The importance of teaching wisdom in physics education has been discussed in various studies. Physics education that integrates wisdom deepens students' understanding of the material and develops a wise attitude in looking at science and the world around (Suprapto et al., 2021). This wise thinking process can enrich the learning experience and help students see physics as a means to get closer to God (Kosim, 2024). For example, when studying universe phenomena such as star formation or the theory of relativity, students can be invited to relate these scientific discoveries to verses of the Qur'an that describe the greatness of God's creation. QS. Al-Anbiya (21:30), talks about the creation of the heavens and the earth from a single entity that Allah later separated, can be a material for reflection in learning astrophysics. It invites students to understand scientific concepts and do dhikr (remember Allah) through contemplation and awe of His creation.

The fifth syntax focuses on applying of the *da'wah bil hikmah* method in astrophysics learning. Through collaborative learning or group discussions, students are

invited to share their scientific knowledge and insights while discussing the spiritual values associated with this knowledge. This process allows them to develop a more holistic understanding from a scientific and spiritual perspective. This collaborative learning creates space for students to value cooperation between fellow human beings by the Qur'anic verse in QS. Al-Maidah (5:2), which emphasises the importance of cooperation in achieving good goals.

Collaborative learning that combines scientific and spiritual elements can strengthen students' moral and social values (Nasucha et al., 2023). This kind of collaboration develops cognitive abilities and improves students' ability to think critically, hone communication skills, and apply knowledge in the context of everyday life with full spiritual awareness.

The Prophetic Learning Model proposed in this research offers a different approach than conventional learning models. One of the main advantages of this model is its ability to enhance the connection between science and faith. It removes the dichotomy between the two and shows that science and religion can complement each other. Qur'an-based astrophysics learning allows students to see the order and beauty of the universe as evidence of Allah's greatness, thus deepening their faith. In this context, understanding of natural phenomena is based on scientific logic and on gratitude and adoration of the Creator. Thus, this model provides a more holistic and meaningful learning experience.

Another advantage is the holistic character-building of religiosity. This model focuses on the intellectual development of students and on the formation of their religious character. In every learning process, students are invited to contemplate and absorb the spiritual values of the Qur'anic verses. This can potentially increase the depth of students' spirituality by internalizing values such as faith, piety, patience, gratitude, and cooperation. Through this approach, students learn about astrophysics cognitively, but are also guided to strengthen their integrity and morality as individuals of faith.

In addition, this model also contributes to the improvement of students' social skills. Values such as gratitude, patience, and cooperation applied in Qur'anbased learning can strengthen students' social attitudes, which are very important in their professional and social lives. Learning that prioritizes positive interactions between students, both in discussions and collaborative activities, is expected to form individuals who are intellectually intelligent and noble and able to work together in a broader social context.

Although the prophetic learning model offers various advantages, some challenges need to be

considered in its implementation. One of the main challenges is integrating Qur'anic verses with scientific concepts in astrophysics. Some scientific concepts may be difficult to explain or relate directly to the Qur'anic texts. Therefore, lecturers who implement this model must have a deep understanding of scientific material and of religious texts. This understanding is very important so that the spiritual message contained in the Qur'an can be conveyed effectively in the context of physics learning, so that students can feel the complete connection between science and faith.

In addition, another challenge arises from the adjustment between objective scientific theories and more subjective spiritual values. This difference in nature can be an obstacle in the teaching process, but can be overcome with a wise approach, such as Da'wah bil Hikmah, which teaches students to link science with faith gradually. In this context - a process of cleansing the soul - plays an important role, so that students can learn with a clean heart and be open to new understandings, both in the scientific and spiritual realms. This process allows students to see physics and religion not as two separate entities, but as part of a complementary unity in deepening their understanding of the universe and its Creator.

Overall, the application of the Prophetic Learning Model in astrophysics learning shows significant potential to create learning experiences that develop students' cognitive abilities and shape their religious and social character. By integrating the spiritual values of the Qur'an in physics learning, this model successfully overcomes the dichotomy between science and religion, and enriches students' understanding of both. Although challenges in integrating scientific concepts with religious values remain, the potential benefits offered by this model make it a valuable alternative in strengthening a holistic physics education - one that covers the cognitive and the moral and spiritual aspects of students.

Conclusion

The Qur'an-based learning model proposed in this article provides a new perspective in teaching astrophysics. By integrating religious values in physics learning, students develop а deep scientific understanding and a strong religious character. This learning shows that physics and religion should not be seen as two separate things, but can complement each other to create individuals who are intellectually intelligent and virtuous. Therefore, the application of this Qur'an-based learning model can be one of the efforts to strengthen a more holistic physics education in the future. This learning model is still hypothetical, so it is recommended that it be followed up with field trials through validity tests, practicality tests, and effectiveness tests in improving astrophysics learning outcomes while strengthening religious character values.

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The authors declare no conflict of interest.

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