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ANALYSIS AND DESIGN OF KNOWLEDGE INTEGRATION TEST INSTRUMENTS (SCIENCE-ISLAM) ON THE SUBJECT OF THE CREATION OF THE UNIVERSE AND SOLAR SYSTEM

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Abstract

The Islamic conception of knowledge does not limit knowledge about reality to that obtained through experimentation and theoretical reasoning only. Natural knowledge that is understood does not just answer human desires if we can accommodate revelation and intuition, including the spiritual and physical aspects of humans and the cosmos. Understanding the integration of Islamic values in natural science (science) learning is implied in the Qur'an. The Koran does not conflict between science and religion. In fact, in many of His verses it is emphasized that humans should always think about events in nature to strengthen their religious beliefs. Science in this case is also not a separate part of religion. Science is an integral part of the Islamic religion. The Koran states that science, like the science of human life, is an integral part of religion. Science teaches humans how to manage nature, carry out various processes, and produce things for life's needs. Meanwhile, religion teaches humans about value systems. Religion teaches the value of piety towards the Khaliq and the value of kindness towards others.

Keywords: Integration, Islamic Science, Creation of the Universe, Solar System

INTRODUCTION

The emergence of the era of globalization, which is marked by advances in science and technology, plus the development of people's living standards, requires all parties in various fields and development sectors to increase their competence (Mostofa & Islam, 2023). National education as one

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part of the national development sector to make the nation's life more intelligent also needs to improve its quality so that it is commensurate with the rapid development of the times. National education itself has a vision of realizing strong and authoritative education to empower all Indonesian citizens to become quality human beings. Education is directed at producing quality people who are able to compete, besides knowledge, they also have good character and morals as the identity of the Indonesian nation (Lugaro et al., 2022). Because education is also an effort to improve human resources physically, mentally and spiritually.

There are two main bases for incorporating religious values into education. First, the 1945 Constitution (Amendment version), Article 31, paragraph 3 (Paidimukkala et al., 2022) states, "The government seeks and implements a national education system, which increases faith and piety as well as noble morals in order to educate the life of the nation, which is regulated with the law." Second, article 31, paragraph 5 which states, "The government advances science and technology by upholding religious values and national unity for the advancement of civilization and the welfare of humanity." These two laws indicate the integration of religious values in learning. This constitutional mandate proves that the aim of education in Indonesia is not only to develop potential and educate people but also to form people with religious character.

Looking at this description, it can be said that the changes in the 2013 curriculum in accordance with those mandated in the law indicate the need for a synergy between science and religious knowledge to form a quality and dignified national character. Internalization or integrating values in education will have a positive impact on the formation of students' attitudes. The relationship between science and religion has always been one of thought provoking human knowledge. Science and religion can be seen as supporting each other and their relationship is complementary. In the process of knowledge, the integration of science and religion plays a role that determines the results of theoretical knowledge and natural practical experience about the oneness of God in the world and our lives (Belov et al., 2022).

In the end, hope emerged that would enable an effort to connect science and religion in the learning process, one of which was through integration methods. Abdullah (Wu et al., 2023) offers an idea of unifying or reintegrating scientific epistemologies known as integration-interconnection. Integration here is the integration of revelation with evidence found in the

universe, while interconnection is the linkage of one knowledge with other knowledge due to mutually influencing relationships.

The interconnection integration learning model assumes that each lesson material will imply religious values. This means that these values do not have to be framed within the context of religious studies, but can also be integrated into other subjects. This can be done in the physics learning process, namely by integrating and interconnecting physics material with verses from the Koran (Linderfalk, 2022).

The Islamic conception of knowledge does not limit knowledge about reality to that obtained through experimentation and theoretical reasoning only. Natural knowledge that is understood does not just answer human desires if we can accommodate revelation and intuition, including the spiritual and physical aspects of humans and the cosmos (Apriliana & Wulandari, 2022).

Science viewed from an ontological perspective is a science that is studied by demonstrating various beautiful natural phenomena, namely diversity and order, so that humans feel attracted to the state of nature and glorify its creator. This is the religious value that science contributes to students (Wang et al., 2022) . Through science education we encourage students to increase their faith and devotion to Allah Almighty as a form of gratitude for His creation.

RESEARCH METHOD

The study in this research is qualitative with literature. The literature study research method is a research approach that involves the analysis and synthesis of information from various literature sources that are relevant to a particular research topic. Documents taken from literature research are journals, books and references related to the discussion you want to research (Earley, M.A. 2014; Snyder, H. 2019).

RESULT AND DISCUSSION

Concept of Integration of Science and Islam

Linguistically, integration, which means "unification", is opposed in meaning to "separation"; an attitude that places each area of life in different boxes, but the inherent nature of religion and science is a necessity, even taking place on a massive scale and tends to be antagonistic (Huringiin et al., 2022). Integration according to M. Amin Abdullah is a scientific paradigm which assumes that one is merged and dissolved into another, either by

completely merging the normative-sacred side of diversity into the area of "historicity-profanity" or vice versa (Shokoohy, 2023).

Integration efforts cannot be separated from efforts to internalize values that are intertwined with knowledge, namely valueization. What is meant here is that in the learning process there is not only an exchange of information and knowledge but also a transfer of the values contained in the learning process (Panakkal, 2024). The concept of integration is actually in the form of integration-interconnection. Integration is a necessity or necessity. Meanwhile, interconnection is a scientific approach that cannot stand alone. So integration-interconnection is an approach that seeks or emphasizes that all scientific fields are interconnected.

This interrelationship is what is called a necessity considering that something that is targeted by a scientific discipline can have the same material object even though the formal object is different, meaning the material object (the object that is the target of the research investigation), the formal object (the point of view aimed at by the research). For example, someone who wants to research human behavior (material objects) then examines these humans from the point of view of economics, psychology, anatomy, etc. (formal objects). The same thing happens in the world of education so that the learning process regarding natural sciences can be studied using a religious science approach. and social, this shows that every science is interconnected (Saumantri et al., 2024).

Islamic Values in Science Learning

At a conceptual level, the integration of values in science learning refers to the understanding that any knowledge, including natural science, is a means to God, if humans realize from an early age that life in this world is basically to achieve life in the afterlife. In the end, all kinds of knowledge that provide goodness in this world and the afterlife are important to learn. Al-Ghazali emphasized the need for humans to prioritize education by placing religious knowledge in the most important position (Mardatillah et al., 2023). However, the Islamic education curriculum is still faced with difficulties in integrating the two poles of scientific fields, namely general science and religious science. On the one hand, it has to deal with 'secular subjects', and on the other hand, with 'religious subjects'. Subjects that are considered secular usually consist of general types of science such as mathematics, physics, biology, medicine, sociology, economics, politics, botany, zoology,

and so on. Meanwhile, religious subjects consist of types of revealed science such as the Koran, al-hadith, fiqh, theology, Sufism, monotheism, and the like.

From the dichotomy above, the general education curriculum and the Islamic education curriculum are still in their respective areas, so that the learning process is partial and fragmented between divinely revealed science and natural sciences. In fact, according to the terminology of Islamic philosophy, God revealed His Al-Quran in the form of: a written Al-Quran (recorded Qur'an), namely the revelation written in the pages of a book that is read by Muslims every day and the Al-Quran which is spread out (created Quran), namely the universe, universe or cosmology (Hassan & Rehema, 2022). Therefore, this dichotomy is actually inappropriate.

Starting from an integrative mindset, namely uniting the meaning of worldly life and the hereafter, general education is essentially religious education too, science education is religious education too, and vice versa, religious education is also general education, religious education is science education. Ideally there is no need for ambivalence and dichotomy issues in educational orientation (Efrizal, 2022).

Understanding the integration of Islamic values in natural science (science) learning is implied in the Qur'an. The Koran does not conflict between science and religion. In fact, in many of His verses it is emphasized that humans should always think about events in nature to strengthen their religious beliefs (Q.S. alAnbiyaa). Science in this case is also not a separate part of religion. Science is an integral part of the Islamic religion. The Koran states that science, like the science of human life, is an integral part of religion. Science teaches humans how to manage nature, carry out various processes, and produce things for life's needs (Ulum & Latipah, 2022). Meanwhile, religion teaches humans about value systems. Religion teaches the value of piety towards the Khaliq and the value of kindness towards others.

The thing that must receive attention is the statement that the Holy Qur'an comes from Allah who has absolute truth. This absolute truth causes the Koran to be used as a tool to test the truth of scientific principles. If scientific discoveries contradict the Qur'an then this is because there are still very limited investigative methods that can be developed by humans. Support for this statement was expressed by Lawson (Melinda, 2022), who stated that there are two essential differences in approach between science and religion. Religion believes something based on faith, while science believes something based on evaluating facts and reasoning. However, truth in religion is eternal while truth in science is only tentative (temporary). Therefore, in fact, religion

and natural science are not two poles that cannot be reconciled. It could even be said that they are intertwined and very close. Religion with an approach through belief means that the truth conveyed is absolute, the truth is clear. Thus, science has the task of testing this truth, or actually matching the results with that truth. This means that there is something that can actually be met.

Concept of Creation of the Universe and Solar System from a Scientific Perspective

Edwin Hubble's BIGBANG theory (Chen, 2023). All objects in the universe were originally one form, and then separated. The universe was formed through the explosion of a single point with zero volume. And this explosion is what is called the Big Bang or giant explosion from a single point, and formed the present universe by separating one from another.

The movements of the sun, moon and earth take place without the slightest contact with our lives. The moon rotates on its axis in outer space for a time equivalent to the time it takes to circle the earth, namely 29.5 days. So what we see is always the same month. The sun rotates on its axis for approximately 25 days (Akita & Yamaguchi, 2022). The sun rotates on its axis while also moving in a certain direction, the earth on the other hand, has some movement; it rotates on its axis, revolves around the sun, depends on the sun, and is also influenced by the moon. In all this rapid movement, our earth changes over time based on its position relative to the solar system and galaxy. None of these movements affect our position in relation to the sun, nor do they end our lives on this earth (Mandal et al., 2023).

Copernicus, Kepler, and Galileo expressed the opinion that it was the sun that did not move and that the earth and earth revolved around the sun. Later, using sophisticated telescopes and collections of cosmological data, it was concluded that the sun moves, and the earth revolves around this moving sun (Adi et al., 2022). All movements of the sun, moon and earth continue in perfect harmony. Everything is so arranged that even Jupiter, the largest planet in the solar system, contributes to the life of the earth. Astronomer Gorge Wetherill, in his article about Jupiter, said that if Jupiter were not where it is supposed to be now, we could not be here because the earth could have been destroyed by colliding with each other (Kaseger et al., 2022). The elements that form mountains are the same as the elements that form the earth, which are needed by plants to develop. When rainwater falls on the mountain, the rocks crumble little by little in size and scale. Then, the waters carried the crushed parts rather soft like soil. This water containing sand

deposits waters the agricultural land. Then, deposits accumulate on the ground as a source of human food and water sources for rivers (Gupta, 2023).

The earth's plates expand above the liquid. The outermost layer of the earth is 5 km thick from the surface. The depth of the mountain strata reaches 35 km. Therefore, mountains are like pegs driven into the earth. Just like the pegs used to fix a tent to the ground, these pegs fix the plates of the earth (Hasan et al., 2023a). The world and the sun did not exist immediately after the big explosion (big bang) because the universe was in a gaseous state before the formation of stars. This gaseous state was originally made of hydrogen and helium. Compaction and compression form planets, earth, sun and stars which are nothing but gas products (Cruz et al., 2023). The atmospheric layer consists of layers, namely: (1). Troposphere; (2). Stratosphere; (3). Ozonosphere; (4). Mesosphere; (5). Thermosphere; (6). Lonosphere; (7). Exosphere. Each layer of the atmosphere has its own function. (Caner taslaman. 2011). The shape of the earth is oval. The oval shape is difficult to understand so the translator translates it as spread out (Alberts & Noble, 2022).

Integration of Knowledge (Science-Islam) on the Subject of the Creation of the Universe and Solar System

The findings in this research are based on the context of the Koran and science regarding the process of creating the Universe and the Solar System, where integration occurs between the two and a common thread is found regarding how the universe and its contents came to be (Mostofa & Islam, 2023). The explanation is as follows:

Perfect Creation

God Almighty. He has power over anything and can do anything. In Surah Al-Jasiyah: 3, the sign of Allah's power is revealed, namely the creation of the heavens and the earth. This verse explains that the vast sky and the earth where humans live there are signs of God's power. These signs include the variety of celestial bodies, the variety of creatures on earth, and also the uniqueness of humans physically and spiritually. The signs of God's power are spread across the sky, the earth, and between the two (Annisa, 2022).

Surah ar-Rad: 3 explains the existence and power of Allah as proven by various creations that humans can see and feel. Allah explains in detail the condition of the sky which is elevated without pillars, the journey of the sun and moon, each of which circulates according to a predetermined time and

orbit. All of this shows that only an Almighty Being can make this happen. He is Allah the Greatest. The signs of Allah's power in the heavens are described in this verse as follows: (1) The creation of the heavens above the earth without pillars, as can be witnessed by all creatures. (2) The abode of Allah on the Throne and the wise arrangement of the universe, so that the billions of planets and stars do not collide with one another. He arranged it all with amazing regularity (Hasan et al., 2023b).

Surah Yunus: 3 explains that Allah subjected the sun and the moon to the sun and the moon to provide benefits to humans and other creatures. Each circulates in a predetermined orbit and time. With the journey that has been outlined, humans can find many benefits. Among the benefits of circulation is that it becomes a benchmark for determining time and calculating years (Akram & Hasanuzzaman, 2022).

In Surah Fattr: 41 it is explained that Allah holds the heavens and the earth so that they do not disappear. This means that Allah maintains and regulates both of them with His power so that both of them remain and are not destroyed by colliding with each other. God's providence is carried out by his laws, including the law of gravity which regulates the orbits of heavenly bodies. The force that binds these celestial bodies makes the position of each object firm so that each remains in its orbit. Each star and planet moves on its axis and circulates in its own orbit so that they do not collide with each other, except under certain conditions. All of this is the perfection of God's creation that humans cannot do (Trevisani, 2024).

Integration is a must. Integration can be applied in science lessons, by linking science and Islam, a common thread can be drawn regarding an extraordinary scientific study. Integrating the subject of the creation of the solar system and the universe was carried out to see what it would be like if science and Islam were united in a lesson, more precisely learning about the creation of the solar system and the universe at the ibtidaiyah madrasah (Muzdalifah & Ismail, 2023).

The creation of this universe was created by Allah SWT, the Almighty Being who created the heavens and the earth and their contents and benefits perfectly. Everything was told in the Koran 1400 years ago. In science, with the controversy of scientists, one of the Big Bang theories emerged, a theory that explains how the universe was formed. Based on the Big Bang theory put forward by Hubble (1929) in (Yilweri, 2023). He said that the universe was originally one unit and there was an explosion until the particles were separated. This is in line with what is explained in the Al-Quran in Surah an-

Anbiya: 30 where it is said that the earth and sky were once one unit attached or one solid, then Allah created the wind in the middle so that it separated them.

The universe consists of earth and sky. In the Koran it is stated that Allah created this universe in six eras. Scientifically, these six periods are associated with very long periods of time. The six periods themselves consist of two periods when Allah created the heavens, four periods when Allah created the earth and its contents. In detail, the six periods are as follows: the first period, the Big Bang explosion as the beginning of the birth of space and time. The second period, the universe expanded, celestial bodies were far apart (the sky was getting higher). The third period, when Allah created the sun to shine and the earth to rotate, so that there was day and night. The fourth period was marked by the spreading of the earth and the formation of the moon from the ejection of part of the earth's crust. The fifth period, marked by the creation of life and water (Zaman & Fahruddin, 2023).

The sixth period, the period when God formed the mountains. The earth was created in two periods, namely the third and fourth periods. In the third period, the period of creation of the sun and earth and other planets, the earth was re-formed by a collection of gas (could of gas) and dust, more than 4.5-4.6 billion years ago. Light elements including hydrogen (H) and oxygen (O) in very large quantities collected on planets as condensed gases and formed soft rock (molten rock) and began the history of the earth and other planets (Geenhuizen, 2023). In the beginning, the earth did not have the form of rocks except meteorites. It was in this fourth period that evolution on earth occurred, after the formation of the moon from part of the ejection of the earth's crust due to the collision of other celestial bodies, large continental plates spread out, causing the continents to begin to separate to form 5 continents plus Antarctica.

After Allah created the earth, Allah filled the earth and its benefits for two periods. Namely in the fifth and sixth periods. In this fifth period, Allah created springs, from these springs, Allah grew plants in preparation for the life of His creatures. Then in the sixth period, Allah created mountains as stakes in the earth so that the earth did not shake and the mountains were fixed firmly, after that new animals and humans were created. After completing the creation of the earth and its contents, Allah created the heavens which were then perfected into seven heavens. Each sky has its condition and function determined (Surah Al-Baqarah: 29). Allah also decorates the sky with stars, planets, galaxies, meteors and so on. The

creation of the heavens also took two periods. Initially the sky was formed from gas made of hydrogen and helium. Compaction and compression form planets, earth, sun and stars which are nothing but gas products.

The atmosphere is a blanket of invisible gases 10,000 km thick that surrounds our planet. Although the structure is transparent, the atmosphere is a steel shield. This atmosphere is what science calls the seven layers of the sky. The essence of the seven heavens itself is widely interpreted by commentators and scientists in relation to astronomical objects such as the atmosphere, planets and stars (Bodewits et al., 2023).

The universe was created to resemble the shape of a large ball, whose walls are joined by pillars that meet each other between the base, walls, and roof or sky. Scientific findings state that this ball-like building technology is what causes construction to no longer require poles. This is why the vast sky is used as the roof of the earth and does not fall down. After creating the sky, Allah decorated the sky with celestial objects such as the moon, sun and stars. All God created with their respective benefits. The movement of the moon and sun which remain oriented in their orbits is useful for determining the day and year. The presence of the moon and sun determines the time of day and night, and the presence of stars to read the constellations (Roshan & Mashhoon, 2022).

CONCLUSION

Efforts to integrate science learning with Islamic values cannot be separated from the science that must be applied in the learning process without prioritizing scientific independence. The integration of Islamic values is realized in the integrity of the Islamic values framework in science learning in schools which is integrated as a whole (integral-holistic), the diversity of models, methods and integrated approaches with Islamic values as a normative framework can be used as a new perspective for educators in implementing the science learning process and the integration of education implementation which requires that Islamic values in science learning in schools be applied in an integrated manner with the needs of the community and family. The creation of the heavens and solar system is also very amazing. God created seven layers of heaven, consisting of seven layers of the atmosphere, each of which has its own function. Allah created the sun, moon and stars. Allah made night and day. All things in the solar system and outer space, the moon, sun, stars and other planets orbit according to the center of their circulation.

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