Studi Multidisipliner: **Jurnal Kajian Keislaman**
Vol.10, 2 (December, 2023), pp. 115-133
ISSN: 2355-7850 (print), 2477-0280 (online), DOI: 10.24952/multidisipliner.v10i2.9516

SCIENCE IN THE DEVELOPMENT OF ISLAMIC EDUCATION: Dialectics of Muslim Scientific Thought and Its Urgency

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Abstract

Islamic education is still understood traditionally as containing the sciences of tafaqquh fiddin. On the other hand, science is still considered a separate scientific discipline from Islamic Education. This study aims to explain and analyze the dialectics of scientists regarding Islamic Science and the urgency of science for the development of Islamic Education. This article is the result of a systematic literature review through the identification, evaluation and synthesis of the thoughts of Muslim scientists. This study concluded that science education is the peak achievement of Muslims' dialectic towards science. Science education is necessary for Islamic education, which will provide a way forward towards the revival of Islamic civilization—namely, science that uses metaphysics in an Islamic perspective to guide in formulating concepts about the universe. Finally, science education will only be realized if scientists and religionists have a harmonious relationship. So, it is necessary to create a dialogical, pluralist and democratic climate so science education can grow and run well.

Keywords: *Science, Islamic Education*

Abstrak

Pendidikan Islam masih dipahami secara tradisional sebagai mengandung ilmu-ilmu tafaqquh fiddin. Di sisi lain, sains masih dianggap sebagai disiplin ilmu yang terpisah dari Pendidikan Islam. Penelitian ini bertujuan untuk menjelaskan dan menganalisis dialektika ilmuwan mengenai Ilmu Pengetahuan Islam dan urgensi ilmu pengetahuan bagi pengembangan Pendidikan Islam. Artikel ini merupakan hasil kajian pustaka yang sistematis melalui identifikasi, evaluasi dan sintesis pemikiran para ilmuwan Muslim. Penelitian ini menyimpulkan bahwa pendidikan sains merupakan puncak pencapaian dialektika umat Islam terhadap sains. Pendidikan sains diperlukan untuk pendidikan Islam,

yang akan memberikan jalan ke depan menuju kebangkitan peradaban Islam — yaitu, sains yang menggunakan metafisika dalam perspektif Islam untuk memandu dalam merumuskan konsep tentang alam semesta. Akhirnya, pendidikan sains hanya akan terwujud jika ilmuwan dan agamawan memiliki hubungan yang harmonis. Sehingga, perlu diciptakan iklim dialogis, pluralis dan demokratis agar pendidikan ilmu pengetahuan dapat tumbuh dan berjalan dengan baik.
Kata Kunci *: Sains, Pendidikan Islam*

INTRODUCTION

Awareness of the importance of science and scientific methods could be higher, challenging the dream of making a superior and leading Islamic civilization. While modern countries have created many scientific products, Muslims are still busy debating the relationship between religion and science and starting from the concept of "Islamic science" by Nasr, Ghoslani and Sardar, "Islamization of Science" by al-Faruqi and al-Attas, "scientification of science" by Kuntowijoyo; "Integration-Interconnection" by Amin Abdullah; to "Reconciling Science" by Nidhal Guessoum. However, these ideas are still much better because awareness has emerged about the importance of science. Rather than the dominant conservative view, which tends not to care and thinks science is unimportant.

The study of the urgency of science in Islamic education has been introduced previously. Therefore, there have been many publications of research results discussing this issue. Several publications focus on discussing the dialectics of Islamic science according to scientists, as shown in the articles: Yusuf[1], Ihsan[2], and Bistara[3]. As shown in Mansir's articles, several other studies have even specifically discussed patterns and models of science integration in Islamic education

[1] Mohamad Yasin Yusuf, "Epistemologi Sains Islam Perspektif Agus Purwanto," *Analisis: Jurnal Studi Keislaman* 17, no. 1 (2017): 65–90.

[2] Nur Hadi Ihsan, "Hubungan Agama Dan Sains: Telaah Kritis Sejarah Filsafat Sains Islam Dan Modern," *Intizar* 27, no. 2 (2021): 97–111.

[3] Raha Bistara, "Islam Dan Sains Menurut Sayyed Nasr Nasr," *Prosiding Konferensi Integrasi Interkoneksi Islam Dan Sains* 2 (2020): 113–17.

curriculum and learning[4], Amin[5], Sulaiman[6], Arifudin[7], Zhulfarani[8], and Chanifudin[9]. To enrich previous studies, this article will discuss the nature of science, the criticism and views of Islamic scientists on science, and the urgency of science education. This paper is a review of Nidhal Guessoum's book: *Islam's Quantum Question Reconciling Muslim Tradition and Modern Science*. So, automatically, the perspective and mapping pattern also refers to Nidhal Goessoum's reading pattern. Apart from mapping the response of Muslims to science, this paper also presents science education as an alternative solution to the weakness of education in the Muslim community in general.

METHOD

This research is a type of library research. As is widely known by academics, library research is research carried out by collecting data, information and various other materials contained in the library. By stating the type of this research, the focus and steps that will be taken in this research will become more apparent. The primary source for this research is the book by Nidhal Guessoum, Islam's Quantum Question Reconciling Muslim Tradition and Modern Science, and other literature relevant to science education as a secondary source.

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[4] Firman Mansir, "Diskursus Sains Dalam Kurikulum Pendidikan Agama Islam Di Sekolah Dan Madrasah Era Digital," *Kamaya: Jurnal Ilmu Agama* 3, no. 2 (2020): 144–57.

[5] Muhammad Amin, "Hakikat Dan Model Integrasi Sains Dan Islam Serta Relevansinya Pada Rekonstruksi Pendidikan Islam," *IndraTech* 1, no. 2 (2020): 47–56.

[6] Muhammad Sulaiman, "Integrasi Agama Islam Dan Ilmu Sains Dalam Pembelajaran," *Pancawahana: Jurnal Studi Islam* 15, no. 1 (2020): 96–110.

[7] Iis Arifudin, "Integrasi Sains Dan Agama Serta Implikasinya Terhadap Pendidikan Islam," *Edukasia Islamika*, 2017, 161–80.

[8] Alya Zhulfarani et al., "INTEGRASI SAINS DAN AGAMA SERTA IMPLIKASINYA TERHADAP PENDIDIKAN ISLAM," *Humantech: Jurnal Ilmiah Multidisiplin Indonesia* 2, no. Spesial Issues 3 (2022): 773–79.

[9] Chanifudin Chanifudin and Tuti Nuriyati, "Integrasi Sains Dan Islam Dalam Pembelajaran," *Asatiza* 1, no. 2 (2020): 212–29.

RESULTS AND DISCUSSION

Questioning the Nature of Science

For Muslim scientists, the definition of science and the standardization of scientific methods are felt to be conditional on colonialist motives and seem very hegemonic. Therefore, they question the definition of science and its scientific principles, which are considered established and standard. As is generally understood, science is a translation of the word *science* in English. The word *science* comes from the Latin word *scientia, which means knowledge.* However, in its development, science *has* expanded its meaning to become an orderly collection of knowledge. So, it is differentiated from *knowledge*, understood as knowledge about anything (comprehensive in scope). Knowledge only requires belief, so that understanding or information that is believed in the sense that there is no doubt about it is worthy of being called knowledge. Meanwhile, science *is* not that simple; it is an accumulation of knowledge with various characteristics that are much more complex.[10]

At this stage of its development, the term science was combined with knowledge and science. Science is characterized as an activity carried out consciously by humans. It is not just a single activity; knowledge is a series of activities. The process in this series of activities is intellectual and leads to specific goals. So, science is connecting various (ordinary) knowledge based on rational-empirical principles. For this reason, science must be testable, objective, universal and progressive.[11]

Apart from being an activity, science can also be interpreted as a collection of knowledge from the results of human thinking, which means science is a product of knowledge. The two characteristics of science, both as an activity and a product, cannot be separated from the third characteristic of science, namely, as a method. So, the scientific method was known. This is how knowledge (science) is generally understood, although this definition is more directed towards the definition of science in the sense of modern science. Meanwhile, the standard and universal definition of science is still debated by experts.

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[10] Sri Soeprapto, "Metode Ilmiah," in *Filsafat Ilmu Sebagai Dasar Pengembangan Ilmu Pengetahuan*, 2nd ed. (Yogyakarta: Liberty Yogyakarta, 2010), 126–30.

[11] Soeprapto, 126–30.

As Guessoum explained, Rutherford (a discoverer of the atomic nucleus) defined science as what scientists do, which means all human efforts to build objective explanations about the world around them. In line with Rutherford's definition, Samir Osaka considers science to be only an attempt to understand, explain and predict our life in the world by providing objective explanations. Science is the result of human creation, so the possibility of error or bias always exists. Meanwhile, Sardar defines science as an organized, systematic and orderly model of investigation based on experimentation and empiricism, which creates results that can then be tested and reproduced and are universally applicable to all cultures.[12]

Sardar's definition indirectly limits science to only the natural sciences. Does non-natural science mean unscientific, such as psychology, art, culture and others? Of course, this definition needs to be more comprehensive. The primary and most important characteristic of science lies in the methods and processes built into it, which are almost strictly canonized and demand obedience from anyone who works in it. If so, the scientific method is actually.[13] More significant than the results achieved by scientists.

Western writers tend to regard the Renaissance, especially the Copernican revolution and the victory of the Galilean paradigm over the Aristotelian paradigm, as the most crucial turning point. Meanwhile, Muslim critics (and some non-Muslims) criticize this assumption by saying that elements and even the basics of modern science have been known since Arab-Muslim civilization. The claims of Western writers have indirectly negated the science that developed before the Renaissance. The main milestones in the development of modern science were marked by the discovery of Kepler (laws of planetary motion), Galileo (his victory over the dominant Aristotelian view of the cosmos and earth and his emphasis on the use of mathematics as the language of science), Descartes (description of the

[12] Nidhal Goessoum, *Islam Dan Sains Modern: Bagaimana Mempertemukan Islam Dan Sains Modern*, Ter. Maufur (Bandung: Mizan, 2011), 139.

[13] The scientific method is a procedure that includes various mental actions, work patterns, technical methods, and steps to obtain new knowledge or to develop existing knowledge. General procedures in the scientific method include Searching, formulating and identifying problems; Developing a framework for thinking (logical construct); Hypothesis formulation; Testing hypotheses empirically; Conducting discussions; and Drawing conclusions. Soetrisno and Rita Hanafie, *Filsafat Ilmu Dan Metode Penelitian* (Yogyakarta: Penerbit ANDI, 2007), 157.

natural/mechanical world), Newton (unification of physics, applies on earth and in the sky), Darwin (natural explanation of the diversity of biological organisms), Einstein, and others.[14]

In fact, before that, Muslims had developed at least the basics and "spirit" of modern science by emphasizing the call repeatedly mentioned in the Koran, for humans to observe and reflect on natural phenomena to know Allah or His decrees. His. So, the ideas of Ibn al-Haitam, al-Biruni, Ibn Sina, and other Muslim scientists were born, becoming the basis of the scientific spirit in the Islamic world. Muslim scientists since the Middle Ages have emphasized experimentation and systematic observation. Sardar even wrote: " It was from Islam that Europeans learned how to conduct logical reasoning, obtained experimental methods, emphasized medical ideas, and rediscovered Greek philosophy.[15] Muslim scientists have also become familiar with the inductive method, making generalizations from limited observations they have made themselves or others. They begin the step by providing an explanation, now known as a hypothesis in the scientific method.

However, Chittick's contention that 'modern science' did not emerge from Islamic civilization is also reasonable and culturally consistent. For him, the critical feature of modern science that makes it a dangerous 'anomaly' is its rejection of teleology. According to Chittick, unlike (traditional) 'Islamic science', modern science increasingly widens the sharp distinction between subject and object, which means it does not "acknowledge that consciousness is more real than material facts". In the end, modern science is considered to ignore 'the highest and transcendent', so that modern science does not grow within Islam.[16]

Roger Bacon is a scientist who has standardized modern scientific methods. Historically, the first change in the scientific enterprise was the realization that the method of deduction inherited from philosophy had to be changed to induction. However, the construction of scientific enterprise *became* stronger after the establishment of 'methodological naturalism' as the basic foundation of science. Thus, only natural explanations can be accepted in scientific endeavours, while supernatural explanations and arguments from powerful people are not included in

[14] Goessoum, *Islam Dan Sains Modern: Bagaimana Mempertemukan Islam Dan Sains Modern*, 144–45.

[15] Goessoum, 145–46.

[16] Goessoum, 155.

scientific discourse. So, there is a dividing line between the scientific and the non-scientific.[17]

In subsequent developments, at least Karl Poper and Thomas Khun succeeded in contributing to understanding how science works.[18] Moreover, how to realize its limitations and areas of authority in some instances only. Popper emphasized that for a hypothesis to have scientific value, it must be falsifiable by making several predictions or must be able to lead to consequences that can be tested and proven to be true or false. So, all hypotheses that cannot be tested or refuted are considered unscientific. Meanwhile, Khun explains that science continues to progress through his book *The Structure of Scientific Revolutions*. Each period has its own paradigm. So, there is no universal truth in science because, with paradigm changes at each stage, it is possible to emerge new science that erases old theories. According to Sardar, Khun was trying to show that far from pursuing objectivity and truth, science is nothing more than solving problems within accepted belief patterns. Apart from that, he also considers claims of objectivity and universalism to be a mirage.[19]

Critique of Conservative Reason

The dominance of tradition in the consciousness of the majority of Muslims is allegedly the cause of the birth of conservative views. Theoretically and practically, conservatives tend not to care and think that science education is not essential. These attitudes and views have significantly impacted science development in the Islamic world. Therefore, this type of thinking needs to be criticized and even reconstructed for the sake of the progress of Islamic education.

Commitment to always adhering to classical Islamic traditions is indeed important. Returning to basic principles (classical tradition) should proceed critically,

[17] Goessoum, 157.

[18] A problem that often escapes the attention of society in general, and Muslim elites in particular, is a lack of attention and appreciation for how science works and how many achievements must be made every day at a reasonably ample level. And it is too easy to believe in almost all types of claims from whatever reference source, even if it only comes from newspapers, television and news from local people.

[19] Goessoum, *Islam Dan Sains Modern: Bagaimana Mempertemukan Islam Dan Sains Modern*, 159–61.

aiming to go beyond the past to leap into the future.[20] Instead of strengthening the authority of tradition, it creates memories that are increasingly far from reality. As a result, contemporary reality is read from the perspective of tradition. [21]Because it is seen that this thought (tradition) is something produced by scholars who are far from error, it is sacred.

Responding to this mindset of the majority, at least al-Jabiri, through his criticism of Arab reasoning, has attempted to help Muslims *move on* from the superiority of their traditions. Al-Jabiri tries to establish that Arabic (Islamic) reason, like the reason in general, is *'aql al-mukawwan,* namely formed reason. The reason is a rule drawn from particular objects.[22] Thus, Arabic (Islamic) reason is a reason formed by the principles and rules underlying knowledge in Islamic culture. Thus, it is possible to carry out an objective scientific analysis of the principles and rules that form Islamic culture's principles and systems of knowledge.

If reason as a constituent component of knowledge is not sacred because it is formed by the influence of the culture that surrounds it, then so are the sciences produced from it, such as tafsir, fiqh, kalam, Sufism and others are also not sacred. So that it is possible to carry out a critical analysis of it. Addressing the sacred and profane dimensions of religion, Abdul Karim Soroush, through the theory of contraction and expansion of religious interpretation*,* also[23] differentiates between religion and religious science, where religion is sacred and ukhrawi while

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[20] Muhammad Abed Al-Jabiri, *Isykaliyat Al-Fikr al-'Arabi al-Muashir* (Beirut: Markaz Dirasah al-wahdah al-'Arabiyah, 1989), 26.

[21] Muhammad Abed Al-Jabiri, *At-Turats Wa al-Hadatsah: Dirasah Wa Munaqasat* (Beirut: al-Markaz al- Wahdah, 1999), 50.

[22] Muhammad Abed Al-Jabiri, *Naqd Al-'Aql al-'Arabi (1), Takwin al-'Aql al-'Arabi* , Cet. 4 (Beirut: Markaz Dirasah al-wahdah al-'Arabiyah, 1989), 29.

[23]According to Haidar Bagir, the theory of expansion and narrowing of religion proposes three principles. First, the principle of coherence or integration and correspondence: All understanding of religion (true or false) is carried out in the context of a collection of human knowledge and, whether we realize it or not, constantly adapts to that collection of human knowledge. Second, the principle of interpretation, narrowing or expansion in the human knowledge system can penetrate the area of our understanding of religion. Third, the principle of evolution: The human knowledge system, namely science and human philosophy, understands broadening and narrowing. The result of the study of religion is knowledge about it, not the religion itself. Haidar Bagir, "Foreword: Soroush: Portrait of a "Liberal" Muslim in Abdul Karim Soroush, *Contesting Religious Authority and Tradition*, Trans. Abdullah Ali (Bandung: Mizan, 2002). , xxiii.

understanding religion is humane and worldly. Religion (*din*) is constant, while what experiences change is religious knowledge (*al-ma'rifah al-diniyah)*.[24]

As a historical product, traditions need to be studied rationally and objectively. Objective means to make the tradition more contextual or relevant to itself (*mu'asiran linafsihi*). The way to do this is by separating the object from our present (*al-fashl*). This means that the object of study (*turats*) must be studied in a more specific environmental domain, both epistemological, sociological and historical. Meanwhile, rationality aims to make this tradition more contextual to our current conditions (*mu'asiran lana*). We are linking the object (after the objectification process) with our current existence (*al-washl*). This effort means bringing *turats* to the attention of the subject (us) and positioning it as an object we project according to our current conditions. So, only what is rational and relevant to our present time is taken.[25]

With these two processes, tradition is no longer present as part of our existence, appearing like a subject before us, but rather as an object in our midst (which we should study rationally and objectively). Nor is it a tradition that controls our consciousness, but a tradition that must be conditioned according to our needs. Through objectification and rationalization of this tradition, science can gain significance and urgency in the consciousness of most Muslims because science is one of the pillars of progress of Islamic civilization.

al-Fashl and *al-Washl* methodology, the urgency and significance of science can be explained to "traditional people". However, on the other hand, the assumption that science is not essential is also allegedly triggered by disharmony between Islam and the West. Some Muslims always look suspicious of everything that comes from the West, including science. For this reason, religious authoritarianism and exclusivism in religion need to be deconstructed so that a pluralist and democratic climate can be created as a means of opening space for dialogue between Islam and the West (non-Muslims).

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[24] Abdul Karim Soroush, *Reason, Freedom, and Democracy in Islam Essential Writings of Abdolkarim Soroush* (Oxford: Oxford University Press, 2011), 31.

[25] Ahmad Baso, *Al-Jabiri, Eropa Dan Kita: Doalog Metodologi Islam Nusantara Untuk Dunia* (Jakarta: Pustaka Aid, 2017), 181–82.

From the results of reflections on the thoughts of contemporary Muslim scientists, as discussed above, a common thread can be drawn that the authoritarianism of religious understanding and the sacralization of *law* will cause the stagnation of Islamic thought. Therefore, the first effort must be to urge *religious law* and erode the authoritarian attitude of religious understanding. All forms of religious knowledge (Islam) are an interpretation and must be placed in its historical context with various limitations. There is no single interpretation or single truth in the area of interpretation. So, the values of pluralism and democracy need to be strengthened and developed through interdisciplinary studies with various approaches: historical, sociological, anthropological, linguistic and so on). Finally, there is no longer excessive suspicion towards the West (non-Muslims) but rather prioritizes effective and mutually beneficial dialogue in building a more humane civilization.

Views of Muslim Scientists

The term "Islamic Sians" was initially introduced by Seyyed Hossein Nasr, although he had a unique approach and meaning to the term. In this discourse, Zainal Abidin Bagir made a classification of "modern science": 1) the instrumentalist school consisting of conventional scientists (Abdus Salam et al.); 2) the Islamic school of science, with several different variants (Nasr, Sardar, al-Faruqi, Gholshani, and al-Attas); 3) the I'jaz flow represented by Bucaille; and 4) the creationist school led by Harun Yahya.[26] Meanwhile, Sardar divides Muslim thinkers into three categories: 1) traditionalist scientists, namely scientists who view science as a sect (Sufism) represented by Nasr and al-Faruqi; 2) conventional scientists are represented by Abdus Salam and his followers, who are predominantly educated in the West, but have little or no understanding of the philosophy of science and its problems. Assumes that science is neutral, objective and universal; 3) I'jaz scientists (amazing scientific facts in the Koran). This flow is addressed to followers of Maurice Bucaille's thinking.

Next, Nidhal discussed Islamic science in various variants:

Perennial Madhab of Science

[26] Goessoum, *Islam Dan Sains Modern: Bagaimana Mempertemukan Islam Dan Sains Modern*, 200–201.

For this school of thought, the scientific paradigm is directed at the treasures of the Islamic tradition by reviving its history and philosophy. Nasr belongs to the traditionalist school based on "perennial philosophy". According to Nasr, Islamic science is a science that truly comes from "divine intelligence", not from human reason. The centre of intelligence is the heart, not the head, and reason is nothing more than a reflection of the heart on physical things. Nasr combines the rational and empirical aspects with the intuitive aspects of religious belief. The uniqueness of Nasr's Islamic science is the desire to return to its traditional character. According to him, modern science is an anomaly in the history of humanity. Western science has negated the sacredness of the universe, thus causing environmental damage.[27] Nasr uses *scientia sacra* (sacred knowledge) as the knowledge that lies at the heart of every revelation and at the centre of the circle that encompasses and characterizes tradition—traditional philosophy as the basis of Islamic science that is integrated, comprehensive and sacred. According to him, the damage to science, philosophy and modern life is due to the fragmentation of the three.

Sardar offered sharp criticism of the philosophy (traditional and sacred) presented by Nasr. Sardar suggests that Nasr's perennial philosophy is a "magical mystery journey" and calls him the " *Nowhere Man* ". Sardar criticized Nasr's Islamic science style because it was considered too reverent of the Gnosticism school's occult (inner) "symbolism of science". However, Nasr and Sardar had several conceptual similarities. If Nasr based aspects of his thinking on Sufism, Gnosticism and tradition, So Sardar claims al-Ghazali as his classical roots. Both of them reject the objectivity, neutrality and universality of science.[28]

School of Islamization of Science

So far, al-Faruqi has been known as a pioneer of the concept of "Islamization of science", even though it was not the Islamization of science that was his main idea. The Islamization of science is only part of his thinking. So it is natural that Sardar, as quoted by Nidhal, stated that al-Faruqi's work was *Islamization of*

[27] Goessoum, 201–5.

[28] Goessoum, 207–8.

Knowledge: *General Principles and Workplan* (1982) as an ordinary work. Nidhal does not discuss al-Faruqi's conceptual thinking or his position on science too deeply but rather on broader knowledge. Nidhal explained that the Islamization program started from the following two observations or premises: first, the failure of modern Muslim reformers to give birth to a genuine revival of civilization; second, the failure of Western postmodern critics to distance the modern world from the humanitarian crisis.[29]

In al-Faruqi's view, the Qur'an has an alternative universal, epistemological and systematic concept. However, according to Alwani, the epistemological system of the Koran is hampered by the legacy of classical interpretation, which later became *a habit of the mainstream*. Therefore, educational information and changing the framework of thinking are needed. This is what makes this project fail. In addition, the goals of this project are still vague and general. Nidhal explained that other critics who opposed this program pointed out the fact that none of the scholars of Islam's golden age had ever "Islamized knowledge originating from previous civilizations". Instead, they studied, digested, mastered and criticized this knowledge not from an Islamic perspective but through discovery methods in the search for scientific truth.[30] For Sardar, "Islamic science does not mean Islamizing science that is already well-known today, nor does it mean producing (new) sciences for Muslims. Instead, it means rethinking existing science and knowledge from an Islamic perspective, especially Islam's global view of humans, which teaches the benefits of human values and behaviour.[31]

Ijmali Madhab

In formulating an Islamic philosophy of science, Sardar and his group were based on two fundamental ideas: (1) modern science is flawed and dangerous both from a metaphysical perspective and its technological applications; (2) Islam strongly encourages the pursuit and teaching of science but considers ethics. Sardar considers science as a worship that has spirituality and sociality. Therefore,

[29] Goessoum, 213.

[30] Goessoum, 214.

[31] Goessoum, 222.

it is necessary to develop mechanisms so science ('ilm) can move to the centre of socio-cultural and economic life.[32]

In *Islamic Science: The Way Ahead*, Sardar explains the foundations of the ljmali school: "Efforts to rediscover Islamic science must begin with the rejection of the axioms about nature, the universe, time and humanity, as well as the aims and direction of Western science or methodology which gives rise to meaningless reductionism, scientific objectification of nature, and the abuse of animals."[33] In a dramatic confrontation with aI-Faruqi, Sardar then called for the return of the "new wheel", namely the scientific disciplines initially developed in the Islamic world.

According to Andrew Jamison, Sardar's program for forming Islamic science has improved rhetorically but has lost direction regarding its practical achievements and focus—efforts to restore science repeat processes that have already occurred before. Primarily, the development of science for the people has been going on since the 1970s.

School of Objectivity and Universality of Science

Muhammad Abdus Salam, a Nobel Prize winner in Physics, is called a "conventionalist scientist" who believes that science is universal, while its application is influenced by objectivity (cultural factors). Abdus Salam emphasizes his views on the Koran, which repeatedly urges believers to observe, ponder, reflect, understand and learn from the universe. Compared to only dozens of verses about law, the Qur'an contains hundreds of universal verses that encourage the use of "reason". Three essential things underlie its thinking:[34] aI- The Qur'an, the spirit of Islamic scholarship, and rational reflection as sources of civilization.

Salam's essential question: has medieval science become Islamic science? He answered himself: "All the stories of famous Muslim scientists in the Middle Ages, such as (al-Kindi, al-Farabi, al-Farabi, Ibnu Haitsam, and Ibnu Sina) show that, apart from the fact that they were Muslims, there was nothing that typically

[32] Goessoum, 225.

[33] Goessoum, 226.

[34] Goessoum, 236.

Islamic." He also added that according to Ibn Haitsam, "truth only appears in material form that is perceived by sensory perception. That is why Haitsam was labelled a heretic and forgotten in the Muslim world.

According to Hoodboy, it provides a vigorous defence of the nature of "secular science". He says, "Science is a secular pursuit, and it is impossible otherwise. Scientists can choose religion as they like, but science knows no other laws outside of itself. He accepts the value of religion but only distinguishes between the two. Hoodboy firmly states that there is no Islamic science. There is no Islamic science in the physical world; efforts to produce Islamic science in the physical world are futile.[35] First, Islamic science does not exist, and efforts to make it happen have failed. Until now, there is no agreed definition of Islamic science among Muslims.

Perves Hoodboy, who adheres to Abdus Salam's views, chose the five greatest thinkers of the golden age (al-Kindi, al-Razi, Ibnu Sina, Ibnu Rushd and Ibnu Khaldun). One important thing here, according to Salam, is that "modern science is more compatible with Islam".[36] Muslim scientists created "experimental methodology", which has the same characteristics and face as "modern science". Therefore, Salam rejects Islamic science. So, how can faith and modern science meet? Salam discovered some of the limitations of science and had questions beyond the scope of the scientific world. According to him, "science has achieved success by limiting itself to certain types of research". Furthermore, "my own faith (is) based on the eternal spiritual messages of Islam, issues that the world of physics has never reached".

Madhhab I'jaz

Later, another trend emerged in the 20th century with the claim that the principle "all kinds of knowledge are in the Qur'an" was expanded to include "modern science" so that everything that has been and will be created by humans can be found in the texts of the Qur'an. -Qur'an, if explored carefully.[37] The theory of I'jaz

[35] Goessoum, 240–41.

[36] Goessoum, 239.

[37] Goessoum, 288.

(scientific miracles) is the study of the scientific content in the Koran.[38] One of the most striking ideas in Islamic literature is the claim that the Koran contains "all kinds of knowledge" and sometimes adds "that which existed from ancient to modern times".

Scientific interpretation utilizes scientific knowledge in the interpretation of the Koran. There are two versions of this last trend: (1) the school of "scientific interpretation" (tafsir ilmi), which states that modern scientific knowledge must be used together with other scientific tools to understand better some verses of the Koran that cannot be interpreted correctly in modern times. formerly; and (2) the school of " scientific miracles" (l'jaz ilmi), which claims that several verses of the Koran, if read and interpreted 'scientifically', quite explicitly reveal some of the scientific truths discovered recently because the Koran is considered a scientific miracle that comes from God.[39]

From the various schools of Islamic science above, according to Nidhal, al-Faruqi's Islamization of science is conceptually and methodologically flawed, resulting in a stagnation of thought. The ljmali Sardar model achieved modest progress with its concept but needed to be stronger and grounded. Sardar's excessive criticism of modern science was considered violent and immoral. Nidhal objected to Sardar that the scientific method was considered not objective. Finally, Nidhal thought that all work on Islamic science came from the West. None of the ideas are presented here, with the slight exception of the figure of Golshani.

The Urgency of Science Education: A Theoretical Conception

After science was removed from the madrasa curriculum in the Middle Ages, science became unintegrated with Islamic education. Indeed, in recent years, schools, madrasas, Islamic boarding schools and religious universities such as UIN

[38]Nidhal emphasized that most of the supporters of this method are educated people despite their propositions being easily countered. They are truly sincere when trying to confirm the truth of the authentic statements of the Koran. This flow emerged around the middle of the 19th century with the emergence of reformers such as Sir Seyyed Ahmad Khan, Jamaludin al-Afghani, and Muhammad Abduh. This school claims that Fakhr al-Din al-Razi pioneered the interpretation of the 12th-century classical Qur'an because he used scientific knowledge. The Qur'an contains many layers of meaning and can be discerned by prior knowledge.

[39] Goessoum, *Islam and Modern Science: How to Reconcile Islam and Modern Science*, 259.

have integrated science into Islamic education, specifically in Islamic educational institutions. However, Islamic education is dominated by Islamic religious education, which emphasizes its study of knowledge, *tafaquh fi ad-din*. Like; Qur'an-Hadith, Fiqh, Tafsir, Kalam, Sufism, and so on. The material presented in these religious sciences also tends to be old products, which sometimes lack context for the present. Because tradition still dominates the consciousness of Muslims, it has the impact of being apathetic, indifferent and assuming that science is not essential to study.

Efforts to integrate science in the curriculum of Islamic educational institutions, as has been implemented by several UINs throughout Indonesia, are a very strategic effort. Amin Abdullah's integration-interconnection paradigm, which became the foundation for the development of UIN Sunan Kalijaga, is a systematic methodological effort to neutralize tensions over the dichotomy of religious and secular sciences. If the "integration" paradigm is assumed, there will be no more tension by merging and pulverizing one into another. The "interconnection" paradigm is expected to be able to measure one's abilities (*modesti*) to make one humble (*humanity*) and humane (*human*). The "interconnection" paradigm assumes that to understand the complexity of life phenomena faced and lived by humans, any scientific building, whether religious science, social science, humanities or natural sciences, cannot stand alone. Collaboration, greeting each other, needing each other, mutual correction, and interconnectedness between scientific disciplines will be better able to help humans understand the complexity of their lives and solve their problems.[40] The "interconnection" paradigm can simultaneously minimize scientific organization, that one scientific discipline can stand alone in solving various problems.

The scientific paradigm offered by Amin Abdullah is very mature. Of course, this paradigm was born from reflection and in-depth reading of the past, present and various demands and needs for the future. However, efforts to integrate science in Islamic education still seem limited to collecting (secular) science and religious sciences in one institution. Meanwhile, as debated by scientists in the previous discussion, the form of Islamic science is still in the conceptual realm and still needs

[40] M. Amin Abdullah, *Islamic Studies Di Perguruan Tinggi* (Yogyakarta: Pustaka Pelajar, 2006), 7–8.

to be applied. Conceptually, to formulate science education, a thinker must first understand the philosophy of science. The initial stage that needs to be done is to develop a framework of thinking based on Islamic metaphysics. According to George R. Knight, four aspects fall within the scope of metaphysics. These are cosmology (about the universe), ontology (about what exists), theology (about the unseen, God and his descendants), and anthropology (about humans).[41] All these aspects are formulated based on an Islamic perspective. It must align with the revelation instructions through *qouliah* and *kauniah* verses.

Because science tends to be synonymous with natural science, the second stage is to develop a concept of the universe (cosmology) based on Islamic metaphysics. How did the universe begin and develop? Is there a destination that is the beginning of the journey of the universe? These are questions that must be resolved within the scope of cosmology. In this case, the answers must be aligned with the guidance of revelation (Islam). Only later, the concept of nature is explained in a scientific map. All these efforts are not accessible. They require serious effort. All these processes must also not be separated from the basic principles of religion (Islam), namely the principle of monotheism, awareness of the unity of the universe system and what and where the purpose of the universe's movement is. In the end, everything will come down to monotheism, too.

Apart from understanding the philosophy of science, building dialogue between scientists and religionists is essential. If a harmonious, productive and proportional relationship is created, we are optimistic that science education in Islam will grow and develop well. Dialogue is the keyword for the sustainability of science in Islam. Effective dialogue will only be realized in a pluralist and democratic climate. Meanwhile, a pluralist and democratic climate will not be realized if religious authoritarianism and religious exclusivity still dominate. So, the actualization of the ideas of al-Jabiri, Sorous, Arkoun, and Abou el-Fadl, as explained in the previous discussion, occupies an essential position in efforts to realize science education in Islam.

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[41] George R. Knight, *Issues and Alternatives in Educational Philosophy* (Michigan: Andrews University Press, 1982), 23.

CONCLUSION

Science education is the pinnacle of achievement (synthesis) of the Muslim dialectic towards science. Science education is necessary in Islamic education, which will provide a way forward towards the revival of Islamic civilization. Namely, science that uses metaphysics from an Islamic perspective as a guide in formulating concepts about the universe. A concept based on the principles of monotheism and the unity of a purposeful universe system. Furthermore, science education will only be realized if scientists and religionists have a harmonious and dialogical relationship. So, for science education to grow and run well, a dialogical, pluralistic and democratic climate must always be sought and maintained.

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