Austral *Comunicación*
ISSN-L 2313-9129
ISSN-E 2313-9137
Volumen 14, número 2, 2025
e01410

Changing the Relation of Science and Religion through Integrated Islamic Curricula: A Theoretical Position on Faith-Based Science Education

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Fecha de finalización: 4 de agosto de 2024.
Recibido: 5 de agosto de 2024.
Aceptado: 2 de marzo de 2025.
Publicado: 10 de abril de 2025.

DOI: https://doi.org/10.26422/aucom.2025.1402.isa.

Abstract

This theoretical paper explores the integration of religious values into a primary science curriculum aligned with the Next Generation Science Standards (NGSS) within Islamic educational settings. Addressing the historical conflict between science and religion, the paper leverages Ian Barbour's typology to propose a model where science and religion are seen as complementary. By integrating the principles of Islamic education—Tawhid (the Unity of God), Tarbiyah (moral and character development), Ta'lim (instruction), and Tazkiyah (spiritual purification and self-growth)—the proposed curriculum aims to cultivate a holistic educational experience. This approach enhances scientific understanding through a faith-based perspective, fostering both spiritual and intellectual growth. The curriculum design includes project-based learning, Quranic integration, and activities that promote higher-order thinking and community engagement. The paper concludes with a discussion on the potential benefits and challenges of implementing such an integrated curriculum, emphasizing its role in nurturing well-

rounded individuals who can simultaneously apply Islamic principles and scientific knowledge to contemporary issues.

Keywords: Faith-based science education, Islamic philosophy of education, science and religion integration, holistic curriculum design, Tawhid-centered education, Islamic pedagogy and STEM.

Cambio en la relación entre la ciencia y la religión a través de los currículos islámicos integrados: Una posición teórica sobre la educación científica basada en la fe

Resumen

Este artículo teórico explora la integración de los valores religiosos en un currículo de ciencias primarias alineado con los Estándares de Ciencia de la Próxima Generación (NGSS, en inglés) dentro de entornos educativos islámicos. Abordando el conflicto histórico entre la ciencia y la religión, el artículo utiliza la tipología de Ian Barbour para proponer un modelo en el que la ciencia y la religión se consideran complementarias. Al integrar los principios de la educación islámica —Tawhid (Unidad de Dios), Tarbiyah (desarrollo moral y del carácter), Ta'lim (instrucción) y Tazkiyah (purificación espiritual y crecimiento personal)—, el currículo propuesto busca cultivar una experiencia educativa holística. Este enfoque mejora la comprensión científica a través de una perspectiva basada en la fe, fomentando tanto el crecimiento espiritual como intelectual. El diseño curricular incluye aprendizaje basado en proyectos, integración del Corán y actividades que promueven el pensamiento de orden superior y la participación comunitaria. El artículo concluye con una discusión sobre los posibles beneficios y desafíos de la implementación de un currículo integrado de este tipo, enfatizando su papel en la formación de individuos equilibrados que puedan aplicar simultáneamente los principios islámicos y el conocimiento científico a los problemas contemporáneos.

Palabras clave: Educación científica basada en la fe, filosofía de la educación islámica, integración de ciencia y religión, diseño curricular holístico, educación centrada en Tawhid, pedagogía islámica y STEM.

Mudando a relação entre ciência e religião através de currículos islâmicos integrados: Uma posição teórica sobre a educação científica baseada na fé

Resumo

Este artigo teórico explora a integração dos valores religiosos em um currículo de ciências primárias alinhado aos Padrões da Próxima Geração de Ciências (NGSS) dentro de contextos educacionais islâmicos. Abordando o conflito histórico entre ciência e religião, o artigo utiliza a tipologia de Ian Barbour para propor um modelo onde ciência e religião são vistas como complementares. Ao integrar os princípios da educação islâmica —Tawhid (Unidade de Deus), Tarbiyah (desenvolvimento moral e de caráter), Ta'lim (instrução) e Tazkiyah (purificação espiritual e crescimento pessoal)— o currículo proposto busca promover uma experiência educacional holística. Essa abordagem aprimora a compreensão científica a partir de uma perspectiva baseada na fé, promovendo tanto o crescimento espiritual quanto intelectual. O design curricular inclui aprendizagem baseada em projetos, integração do Alcorão e atividades que incentivam o pensamento de nível superior e o engajamento comunitário. O artigo conclui com uma discussão sobre os benefícios e desafios potenciais da implementação de um currículo integrado desse tipo, enfatizando seu papel na formação de indivíduos completos que possam aplicar simultaneamente os princípios islâmicos e o conhecimento científico às questões contemporâneas.

Palavras-chave: Educação científica baseada na fé, filosofia da educação islâmica, integração entre ciência e religião, design curricular holístico, educação centrada em Tawhid, pedagogia islâmica e STEM.

Introduction

Many scholars have recently underscored the importance of fostering dialogue between the scientific and religious domains, integrating religious values into science-related topics, and encouraging collaboration between the two domains in K-12 education (Aprison & Junaidi, 2022; Billingsley et al., 2014; Mansir, 2021; Paiva et al., 2020). Additionally, studies have delved into the influence of religious beliefs on science teachers' performance in the classroom, proposing ways in which science teacher education can tackle issues related to science and religion within the teaching environment (Mansour,

2008). Despite such acknowledgment of the necessity for collaboration and integration between science and religion in education, the practical implementation of integrated science-faith encounters challenges due to the distinct cultures, pedagogies, and contentions of each domain (Billingsley et al., 2014). In addressing the conflict and resolution between science and faith in K-12 education, it is vital to consider perspectives to the nature of science (NOS) (Lederman et al., 2002) that are less epistemically narrow. Rather than being guided by a strictly rational scientific mindset (Johnson et al., 2023) that unreflectively separating science and religion, school science might be more productively approached with a scientific spirit (Snowden, 1917) that begins with a philosophical sense of wonder, considers bigger meanings, values virtues, and embraces pluralistic thinking (i.e., is open to multiple truths). Such an endeavor inevitably requires classrooms to be conceived as epistemically neutral spaces not strictly scientific nor religious wherein students can safely engage in transcendental exploration and experience firsthand the scientific spirit.

To explore the possibility of integrating science and faith in an educational setting, this theoretical paper articulates and illustrates how religious values can be combined into an NGSS-aligned school science curriculum in the USA. NGSS was initiated with the goal of creating a set of research-based, up-to-date K–12 science standards for educators to design STEM learning experiences (NGSS Lead States, 2024). Integrating religion and science aims to create a more inclusive and comprehensive educational experience where scientific concepts are viewed through the lens of faith. Throughout the paper, attention is given to the secularization of education, the revitalization of religious education, and the theories influencing both educational efforts.

Literature Review and Theoretical Background

Ian Barbour, a prominent figure in the scholarship on the relationship between science and religion, introduced a fourfold typology to explain how these two domains interact. This typology includes conflict, independence, dialogue, and integration (Paulissen, 2018). Barbour's approach emphasizes that science and religion can share synergic similarities and can provide complementary accounts of reality (Lee, 2019; Shin, 2016). He suggests that these two fields can be understood as different languages that provide complementary descriptions of a common referent, akin to the wave-particle duality of an electron (Lee, 2019).

Barbour's framework provides an analytical framework for educators to consider alternative ways that science and religion can be taught in ways that reinforce conflict and separation versus dialogue and integration. In the realm of Islamic education, scholars have also highlighted the importance of dialogic and integrated instructional paradigms, emphasizing the need for systematic application of these curricular notions to religious education practices (Abdullah, 2014). Barbour's typology influenced the design of comprehensive frameworks (e.g., Damper, 2022) that allow exploration of various relationships between science and religion. These frameworks provide educators with a valuable tool to facilitate discussions and critical thinking on these complex topics within educational environments.

To highlight the value of Barbour's framework to education, we will elaborate on the four educational models proposed by Damper (2022):

- **Conflict Model:** This model presents science and religion as being in a state of constant conflict, primarily because they make contradicting claims about the same observation. This perspective tends to be predominant in portrayals of the relationship between two domains.
- **Independence Model:** This model suggests that science and religion are separate fields that independently address different questions and concerns.
- **Dialogue Model:** In this model, science and religion engage in a constructive dialogue; each can inform and enrich the other while still supporting their distinct domains. This interaction can lead to a deeper understanding of both perspectives.
- **Integration Model:** This model advocates for a coalescence of scientific and religious knowledge into a cohesive worldview. It proposes that insights from both domains can be integrated to form a more comprehensive understanding of reality.

As we delve deeper, it should be noted that integration is unlike the dialogue model, which aims for mere rapprochement. In contrast, the integration model is more ambitious in seeking unification (Damper, 2022). Barbour (2000, p. 39) expresses great sympathy for this model, and consequently gives it some prominence. Damper (2022) also visually depicts Barbour's taxonomy in terms of a domain axis and method/language axis (Figure 1).

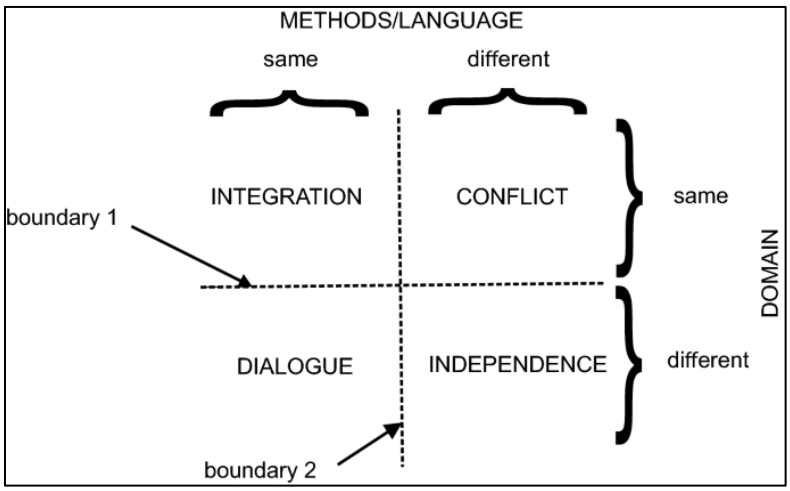

Figure 1. Diagrammatic representation from Barbour's four-fold taxonomy from Damper (2022, p. 711).

The Domain axis in Figure 1 shows whether the domains of science and religion can be considered the same or different. If they are considered the same, science and religion are seen as addressing the same overall reality. If they are considered different, it implies that science and religion deal with separate realms of inquiry and understanding. In contrast, the Methods/Language axis shows whether the methods and language used by science and religion are seen as the same or different. If the methods and language are the same, science and religion are seen as using similar approaches to gain knowledge and communicate about reality. If they are different, science and religion are seen as employing distinct methodologies and terminologies. Lastly, the use of dashed lines in Boundaries 1 and 2 indicates that distinctions between categories are not necessarily sharp.

According to Figure 1, when integrating science and religion in education, an instructional design should be taken that consistently uses the same domain and the same method/language. This integration in educational contexts, we argue, can be approached through systematic **synthesis**, a philosophical process that that seeks to combine science and religion through inclusive metaphysics and that views reality as comprising dynamic processes rather than static objects.

Islamic philosophy of education resonates with this proposed systematic synthesis. This philosophy is traditionally comprehensive, aiming not only at transmitting information but also at cultivating faith, morality, and personal development. The philosophy of Islamic Education emphasizes the need to provide humans with knowledge that can help them understand their own creation and take responsibility as the caliphs of Allah -the domain-

where they are responsible to care for Earth and Humanity. The philosophy of Islamic education is not only about knowledge acquisition but also about instilling values, morals, and a sense of purpose in individuals (Şahin, 2018) (the method/language). While mainstream Western education leans towards individualistic acquisition of knowledge, Islamic education values not only academic knowledge but also about nurturing individuals to become pious, morally upright, and faithful members of society (Şahin, 2018).

The emphasis on religion in faith-based educational institutions influences not only what students learn but also how they learn. As Hinterplattner (2022) reported, faith influences what students learn, revealing a need for a holistic approach to education. In the context of virtues and flourishing, a faith-based education approach usually aims to cultivate moral virtues among learners, such as humility and justice, through virtue-based educational programs (Kotsonis, 2021). Such programs are designed to promote the growth of virtues foundational to ethical decision-making and personal development among students who subsequently will affect their communities. Accordingly, faith-based organizations, including educational institutions, can serve as strategic partners in addressing the needs of marginalized and underserved communities (Taylor et al., 2011). By integrating faith-based principles into education, these organizations can contribute to the expansion of capabilities for individuals, particularly those facing social challenges (Mkwananzi & Wilson-Strydom, 2018). Through these integrated educational organizations, an emphasis on human flourishing approaches to development are consistent with a holistic perspective that considers relational well-being and non-material aspects of prosperity (Tadros, 2011).

A curricular approach that focuses on virtues flourishing is anchored in the holistic practices of Islamic philosophy of education, which includes *Tawhid* (the Unity of God), *Tarbiyah* (moral and character development), *Ta'lim* (instruction), and *Tazkiyah* (spiritual purification and self-growth). These practices are well aligned with the goals of project-based learning aimed at eliciting higher-order thinking, orienting students to subject- area content, and engaging students in disciplinary practices (Grossman et al., 2019).

Such a curriculum emphasizes both individual and community focus, critical thinking, *Ijtihad* (independent reasoning) and the pursuit of lifelong learning and

continuous improvement, underpinned by an integrated curriculum uniting religious knowledge with worldly sciences.

This Islamic curriculum is characterized by the following pedagogical components (practices) (Khamis & Salleh, 2010):

- **Tawhid:** Students explore scientific concepts through the lens of the unity of creation, recognizing the interconnectedness of all things and the role of scientific inquiry in understanding the Creator.
- **Tarbiyah:** Emphasis is placed on character education through the narratives accompanying scientific principles, fostering moral reasoning and ethics in line with Islamic principles.
- **Ta'lim:** Instruction integrates Quranic teachings with scientific content, encouraging students to see the complementary nature of religious and empirical knowledge.
- **Tazkiyah:** Activities and projects aim to nurture the heart and soul, encouraging personal reflection, spiritual purification, social interaction, and the cultivation of virtues.
- **Ijtihad** (Independent Reasoning): Prompts fostering the ability to engage in Ijtihad, where students can apply Islamic principles to contemporary issues through reasoned judgment.

Figure 2 provides an overview of the educational vision behind these faith-based curriculum components as well as a summary of the key features of a holistic approach to Islamic education.

Tawhid - Unity of God` Intellectual and Spiritual	Tarbiyah – Nurturing Moral & Character Development	Ta'lim – Instruction Academic & Instructional	Tazkiyah - Purification Personal & Social Development
Recognizes that all knowledge originates from Allah and aims to instill the understanding of the interconnectedness of all things through the oneness of God. Education is not seen as merely the transmission of information but as a means to understand the Creator and creation	Focuses on the nurturing aspect of education, where the development of good character, proper manners, and Islamic ethics is just as important as academic achievement. It involves guiding students to live according to Islamic principles.	Refers to the process of imparting knowledge, which includes the traditional subjects but with an Islamic perspective. It ensures that students learn both the religious sciences and the secular sciences, seeing them as complementary rather than separate realms.	Aims to purify the heart and soul, which in turn influences behavior and social interaction. Tazkiyah deals with self-discipline, personal development, and the cultivation of virtues such as humility, patience, and gratitude.
Holistic Approach to Islamic Education			
Integrated Curriculum	**Individual & Community Focus**	**Critical Thinking & Ijtihad (Independent Reasoning)**	**Lifelong Learning & Continuous Improvement**
An Islamic holistic educational approach would use an integrated curriculum that combines religious knowledge with worldly sciences, ensuring that students understand their roles and responsibilities as Muslims in society.	Education is seen as a means to better oneself and, by extension, to contribute positively to the community. Students are taught the importance of communal obligations and the concept of Ummah (the global Muslim community).	Although deeply rooted in tradition, Islamic education also values the role of critical thinking and the ability to engage in ijtihad. Students can apply Islamic principles to contemporary issues through reasoned judgment.	Islamic philosophy emphasizes that learning is a lifelong endeavor and encourages continuous improvement, not only in one's profession but also in one's spiritual and moral life.

Figure 2. Holistic practices in the Islamic Philosophy of Education (Synthesis of key concepts from the literature).

A secular curriculum, while aiming to provide a neutral educational environment, falls short of promoting the flourishing of learners' virtues. In our view, this constitutes a *hidden curriculum* – a set of values, attitudes, and behaviors implicitly taught alongside the formal curriculum -- that plays a crucial role in shaping learners' values (Lawrence et al., 2018). For example, one virtue commonly fostered by Islamic curricula is faith). In contrast, this virtue fails to flourish through student engagement in secular curricula as the religious point of view is usually disregarded. This disregard can be considered a hidden curriculum in the sense of implicitly teaching students that the religious point of view should not be welcomed in democratic discussion. In contrast, from a faith-based perspective, discussion of different points of view should be encouraged, and argued for/against to help students naturally flourish and to promote virtues like critical thinking, moderation, kindness, and empathy.

In the Islamic and most faith contexts, virtues are fundamental in guiding individuals towards a life of flourishing. Islamic teachings emphasize the importance of character strength and virtues as valuable assets (Wiguna et al., 2020). These virtues, when aligned with noble morals, are considered essential in Islam. Moreover, research has shown that virtues are not only integral not only in Islam but are also other major religions and spiritual traditions, hence highlighting their universal significance (McKenna, 2019).

Connection between curriculum pedagogies and faith-science integration

To illustrate the above theoretical stance, a curriculum is now proposed. The proposed primary school science lesson marries this holistic educational philosophy, the Islamic Philosophy of Education, with the principles of the *How People Learn* framework, while utilizing the *Next Generation Science Standards*, to cultivate well-rounded individuals who can apply Islamic principles and scientific knowledge to contemporary issues. *How People Learn* employs socio-cultural theory, emphasizing the interaction between the teacher, learner, and curriculum, and its reflection within the community (National Research Council, 2000). Additionally, NGSS encourages student curiosity in science as well as college preparation, choice of professional careers, and active citizenship (NGSS Lead States, 2024).

Underlying the proposed curriculum, is a theoretical stance that resonates with Islamic education philosophies advocating for an integrated approach to learning that encompasses genuine spiritual, emotional, and intellectual growth. Scholars such as Aminuddin Hassan et al. (2010) emphasize the holistic development fostered by Islamic educational philosophy, aiming to produce balanced individuals through the interconnection of knowledge, belief, and practice. Faryadi (2015) discusses the integration of *Naqli* (revealed knowledge) and *Aqli* (rational knowledge), essential for a comprehensive Islamic education that respects both spiritual and empirical truths an example of revealed knowledge are the scripture and scripture interpretation, as prophetic sayings, and actions in Islamic belief. An example of rational knowledge is scientific theories and foundational knowledge such as reading, writing, math, physics, etc. It is important to note that there is no contradiction between revealed and rational knowledge. On the contrary, they complement each other, giving learners freedom to explore and reflect upon their learning.

In Islamic tradition, the *Quran* (The Scripture) is revealed by Allah (God) to the Prophet Muhammad (Peace Be Upon Him or PBUH). *Naqli* originates from the *Quran* and the *Sunnah* (Prophet Muhammad's practices that are followed by Muslims such as cleaning one’s teeth using Miswak). The latter are recorded in the *Hadith* (texts that document Prophet Muhammad's teachings, deeds, and sayings recorded by the Prophet's companions). While the *Sunnah* are the manifestation of Allah’s revelation in actions, the virtues of faith were manifested in the Sunnah of Muhammad (PBUH). Moreover, the authenticity of

Sunnah/Hadith is evaluated based on their *Sanad* (the chain of narrators who passed down the hadith and who are listed in chronological order) and *Matn* (the main text of the hadith, which is the speech of the Prophet Muhammad) to determine their reliability and applicability in various contexts, including curriculum development (Abdelaal et al., 2019; Ismail et al., 2014).

In designing a faith-based curriculum, it is essential to ensure that the content is rooted in authentic sources (Hadiths). The process of evaluating Hadiths involves rigorous methodologies that assess the credibility of narrators and the coherence of the text with established Islamic principles. For instance, studies have shown that the classification of Hadiths based on their Sanad and Matn is critical for determining their authenticity. Accordingly, by utilizing Hadiths that are recognized as authentic, educators can create a learning environment that emphasizes moral and ethical development in alignment with Islamic values. As a curriculum designer for the proposed curriculum, it was important to build up the faith resources from the Quran and the two most authentic Sunnah books Ṣaḥīḥ Al-Bukhari (صحيح البخاري) compiled by Imam Muhammad ibn Ismail al-Bukhari (810–870 CE) and Ṣaḥīḥ Muslim (صحيح مسلم) Compiled by Imam Muslim ibn al-Hajjaj (821–875 CE). This collection is regarded as the most authentic book of Hadith, containing rigorously verified narrations.

The Integrated Curriculum

Consistent with *backward curriculum design* (Wiggins & McTighe, 2005), each lesson begins with objectives closely aligned with the *Next Generation Science Standards for grades K-2*, connecting scientific concepts to tangible life applications, and enhancing engagement through contextual learning. Moreover, it integrates elements from Islamic scripture with project-based approaches to science teaching to provide learners with more a holistic educational experience. The curriculum design reflects the integrated approach of Islamic education outlined in *Figure* 2, being structured around key components that intertwine Islamic teachings with scientific inquiry:

1. **Quranic Integration:** Each lesson begins with an Ayah (verse) from the Quran related to the scientific concept being taught, fostering a connection between religious texts and empirical observations.

2. **Stories and Narratives:** Selected picture books and stories from Islamic traditions and books related to scientific concepts are included to provide scientific understanding and moral lessons.
3. **Interactive Games:** Games that are designed to explain the scientific concepts and connect the concept with the Islamic understanding of the same concept being taught, engaging students in active learning.
5. **Comprehensive Projects:** At the end of each unit, students undertake projects that encourage them to apply scientific concepts in practical scenarios; a project ties all the lessons together, emphasizing the interconnectedness of knowledge.
6. **Family Connection:** A list of home-based activities that reflect Islamic values discussed through the lessons, encouraging family involvement in the educational process.

These components help ensure that learning outcomes cater to both academic standards and spiritual growth, providing a balanced educational experience. Assessment is formative, focusing on projects and interactive participation rather than traditional exams, to better gauge students' understanding and engagement with both the scientific and Islamic content.

As emphasized earlier (Figure 1), seamless integration of science and religion requires the domain and method/language used to be the same. This is the design principle behind the proposed integrated curriculum; the learner is introduced to scientific concepts on a natural "need to know" basis. As shown in Figure 3, the lesson starts with an inquiry, which is followed by interactive experience and then application. Inquiry in this curriculum arises from an Ayah (A Quranic Verse) that is used as the discussion starter.

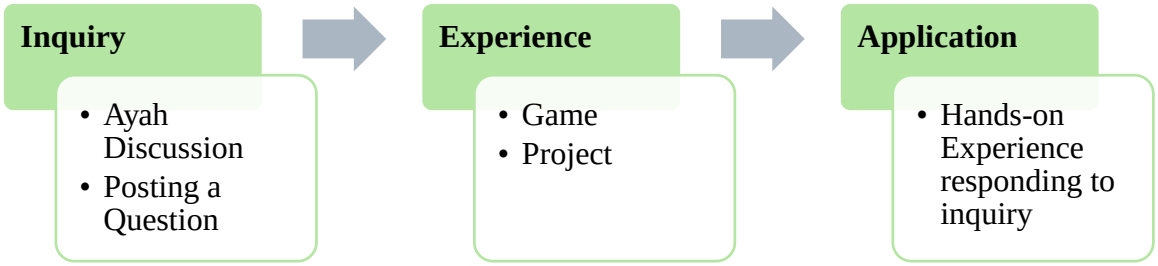

Figure 3. Integrated curriculum lesson sequence (Designed by the author)

A sample lesson plan for Kindergarteners can be found in Appendix 1. One of the NGSS performance expectations for this unit is understanding Push and Pull forces. The

lesson starts with an Ayah that discusses a common concept about holding tight to the rope of faith collectively. The discussion later unfolds as **an inquiry** into what is strength and how it differs if we do it alone or together. This discussion leads to a role play game designed to incorporate Islamic believe and scientific concepts, which is **the experience**. The setting of the game is that the learners are stuck on a boat – kids are sitting on a cardboard or a light carpet that can slip on the floor (the "Candy Sea"), which might cause cavity. The learners know there is *Miswak Island* close to them –a miswak is a type of tree branch known for its antibacterial properties and used to clean the teeth as a prophetic tradition. There is a rope fixed at Miswak Island that the kids must pull together to reach safety from the Candy Sea cavity. This challenge resonates with the inquiry initiated in the Ayah discussion and ties into the scientific concepts. The learners not only learn the meaning of pull but also **apply** it to solve a challenge, pulling themselves out of the Candy Sea. This lesson is designed for a 30-minutes session, and it covers only two components of the discussed curriculum components, namely the Quranic integration and Interactive games. As Table 1 shows, the content of the lesson varies between Aqli (Scientific reasoning about the force effect and the scientific benefits of using a Miswak) and Naqli (Scripture resembled in the Ayat and Sunnah).

Table 1. Curriculum Components Manifestation (Author's elaboration)

Curriculum component	Game	Ayah Discussion
Islamic Philosophy manifestation	♦ Tazkiyah (Cleanliness of our body using Miswak) ♦ Ijtihad (Thinking about how to solve the challenge) ♦ Tarbiyah and Community care (Learning that when they pull together is better for everyone)	♦ Tawheed (Connecting with the scripture as words of the Creator) ♦ Talim (Understanding the meaning of the Ayah and the translation of the Arabic words of the scripture)
Science concept manifestation	♦ Talim (Applying the scientific concepts of Pulling the rope and identifying ways to keep healthy teeth knowing the antibacterial elements in Miswak) ♦ Continuous learning (Exploring other ways to keep healthy teeth building on the information accessed in the game)	♦ The rope is a materialistic element that is used to pull items

Following a similar approach in additional lessons will give rise to an integrated curriculum designed in such a way that promotes seamless integration of faith and science, connecting the two worlds and presenting them as complementary to each other rather than being in conflict. This approach is consistent with strategies previously used for infusing Islamic concepts into different educational facets (Adawiyah, 2021) and blending Islamic religious education with general science (Warapsari, 2023).

Figure 4 outlines the proposed curriculum development approach to integrating faith and science wherein motivation to explore science emerges from Islamic philosophy of education, being framed as an act of worship. The nested circles in Figure 4 capture the structured approach to integrating faith and science in education being proposed. The outermost circle represents the foundation of Islamic Philosophy of Education, encompassing core principles like Tawhid (Unity of God), Tarbiyah (Moral and Character Development), Ta'lim (Instruction), Tazkiyah (spiritual purification and self-growth), Ijtihad (Independent Reasoning), Community Focus, Integration, and Continuity. The second circle reflects the Next Generation Science Standards (NGSS), providing a structured framework to teach science based on learners' cognitive abilities of the targeted grade. The third circle details the curriculum components, including Quranic Integration, Stories and Narratives, Interactive Games, Projects, and Family Connection, which connects religious teachings with scientific inquiry in an interactive setting. The innermost circle outlines the lesson plan flow: Inquiry, Experience, and Application, ensuring that each lesson engages students actively and connects their learning to both faith and real-world scientific concepts. This structure approach, we believe, can help ensure a holistic and integrated educational experience for students.

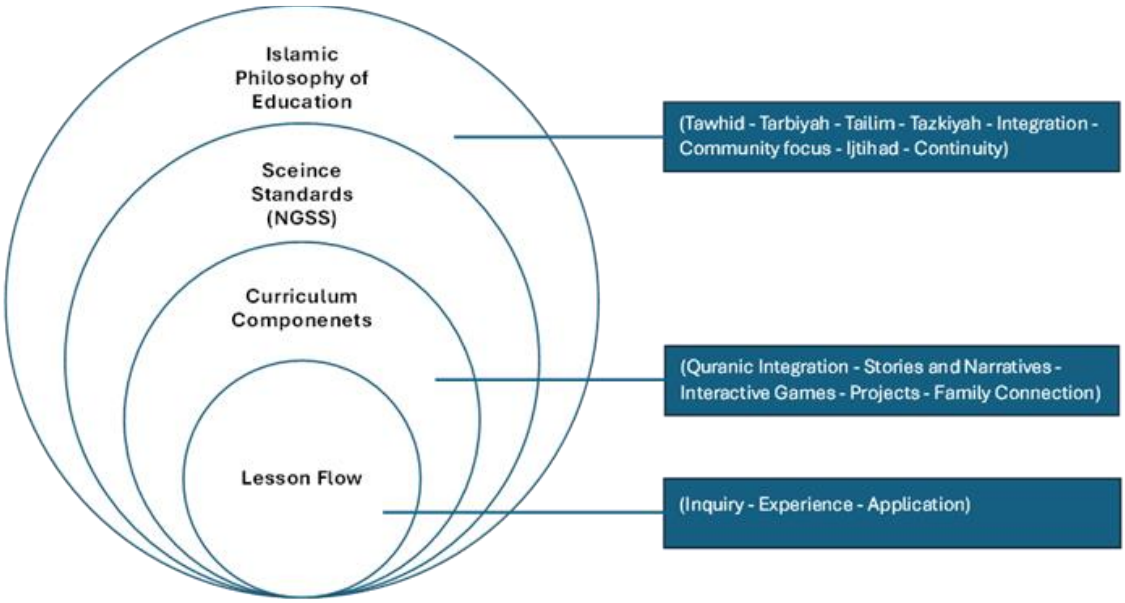

Figure 4. Design process for faith-based science curriculum (Author's elaboration).

Teachers and Learners Holistic Development through the Integrated Curriculum

The proposed integrated curriculum fosters engagement between the teacher and the student, and between the learner and the subject matter. As emphasized by Dreikurs & Soltz (1964, p.14), children seek a sense of belonging, and once they find a group or more to which they feel like they belong, they will shape their identity according to that group/groups. From this perspective, integration of Islamic faith and science in education can help foster a positive social environment where humans, regardless their age, feel that they belong, value their communities, and who participate fully in the construction and development of a community that is successful in this world and hereafter (Hassan, 2003 as cited in Wahyuni, 2020; Wahyuni, 2020).

The proposed curriculum focus is on the application of scientific concepts for the benefit of the community around the learner and for the learner's wellbeing as well. This concept also resonates with Hawkins point that: "Adults and children, like adults with each other, can associate well only in worthy interests and pursuits, only through a community of subject-matter and engagement which extends beyond the circle of their intimacy" Hawkins (1974, p. 52)

Hawkins emphasized that adults and children can associate well only in the pursuit of worthy interests and pursuits that take place through a community that has common interests. Learning must make sense and have a positive impact on the learner and their

community. That impact, as Hawkins (1974) described, involves creating an educational environment enriched by adult engagement that is not isolated but integrated with the broader world, thereby fostering a deeper connection and respect for learner accomplishments.

This integrated curriculum focuses on the community as a learning environment where the curriculum content is in a reciprocating relationship with the community. The learner in this curriculum plays a dynamic role between the teacher and the student. The teachers are considered learners when engaging in teaching and growing spiritually through their teaching journey. The students are learners and are encouraged to apply the scientific concepts learned in their everyday life with an aim to serve their community with the knowledge they gain. In other words, students and teachers go through a purposeful learning experience to learn science to benefit their community.

Having a motivated teacher with strong content knowledge in faith and science will be essential to ensure seamless integrated curriculum enactment in the classroom. Additionally, successful implementation of the proposed integrated curriculum is unlikely without first equipping teachers with pedagogical knowledge and instructional tools/skills that they can use to navigate the rich and nuanced curriculum landscape that results from integrating faith and science. Teachers aiming to teach the proposed curriculum will likely need to have access to professional development and expert guidance.

Discussion

Hassan et al. (2010) described how integrating faith, and science has been a source of controversy between supporters and opponents because of science and religion's terrible past (particularly in medieval churches) (Draper, 1986; Khozin & Umiarso, 2019). From an Islamic perspective, the rationale for such integration is that there is no actual epistemological contradiction in doing so. On the contrary, Ijtihad (Independent Reasoning) one of the main pillars of Islamic philosophy of education, holds that there should be no judgement as long as the learner reaches a conclusion based on authentic resources (e.g., references to recognized scholars), similar to activities in the academic research communities.

Another possible challenge to the presented integrated curriculum is the lack of research-based evidence on its effectiveness in improving student achievement in test

scores and other summative assessments. However, this problem can be solved once the curriculum is fully developed and ready to be piloted. Data collected from these piloting can also inform revisions and improvements to ensure the curriculum meets the needs of diverse learners. Several instruments can be used: (1) *The Teaching and Learning International Survey* (TALIS) to measure teachers' job satisfaction and professional learning effectiveness (Organization for Economic Cooperation and Development, 2014); (2) *The Intrinsic Spirituality Scale* (ISS) (Hodge, 2003) and *The Spiritual Well-being Scale* (SWBS) (Ellison & Paloutzian, 1982) to examine how teachers grow spiritually while teaching the presented curriculum; (3) *The Science Curriculum Implementation Questionnaire* (SCIQ) to evaluate science program delivery at the classroom and school level (Lewthwaite, 2001); and (4) *The Social and Civic Responsibility Questionnaire* (SCRQ) to assess students' sense of social and civic responsibility (Henrick et al., 2021).

One of the arguments that can be given against this curriculum is that it is designed to serve learners from a particular faith while neglecting students from other religious groups. While this can be viewed as a limitation, it should also be noted that one of the aims of this curriculum is to provide educators with a model for designing similar faith-based science curricula for other religious groups in ways that can support learners' and teachers' development of virtues and enable them to flourish as whole human beings while gaining a strong knowledge foundation in STEM.

Conclusion

The objective behind the proposed curriculum development approach was to foster a holistic educational experience that respects Muslim students' religious beliefs while integrating them with the learning of grade-level scientific concepts. Through dialogue between the spiritual and empirical worlds, such a curriculum will not only educate but also instill a sense of wonder and responsibility toward the natural world, integrating both Islamic principles and contemporary scientific standards. Such a curriculum, we strongly believe, will not only provide a rich academic experience but also nurture the spiritual and moral dimensions of the learner, preparing them to fulfill their roles as knowledgeable and ethical Muslims in society. Moving forward with this curriculum will also require

developing a teacher preparation program aligned with its faith-and- science integrated objective.

Ultimately, having a faith-based science curriculum can provide teachers and students with a gateway to flourishing virtues, bridging islands of religious and scientific knowledge, and achieving epistemic harmony through integration. Such a comprehensive approach will ensure that students are not only academically equipped but also spiritually and morally grounded, fostering a balanced and harmonious development that bridges the gap between science and religion.

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***Roles de autoría/ CREDIT author statement**

La autora tuvo a su cargo todos los roles de autoría del trabajo. Manifiesta no tener conflicto de interés alguno.

The author was responsible for all aspects of authorship in this work, and declares that he have no conflicts of interest.

Appendix 1

Sample Integrated Science-Faith Lesson for Kindergarten

This lesson plan is based on a framework provided by Wiggins, G., & McTighe, J. (2005)

Understanding by Design (UbD) Lesson Plan			
Title: Unit 1 – Forces (Pull & Push)		**Subject/Course:**	Faith/Science
Grade: K	**Topic** Hold on Tight		

Stage 1 – Desired Results (PLAN)

GOALS

Faith and Virtues:
Understanding and experiencing commitment to good deeds as a united group is a form of strength. Evaluate actions that can help us do virtuous deeds.

Science:
The lesson aligns with NGSS following standards:
K-PS2-1. Plan and investigate to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Understandings:	**Essential Questions:**
Students will understand that… • Unity gives more strength for the pull and push. • There is a difference between push and pull and we use them in different situations. • Push and pull can be physical forces (Pulling a rope or pushing a chair) and can be imaginary concepts (Pulling the good thinking and pushing away the bad thinking by God remembrance)	• How can working together help us do good things? • What happens when we push or pull objects? • How do we use pushing and pulling in our everyday activities? • How can remembering God help us think good thoughts and push away bad ones?
Students will know/understand… • the difference between push and pull forces. • how working together can enhance strength and effectiveness in accomplishing tasks. • the concept of unity and its importance in both physical and moral contexts. • that pushing and pulling can apply to both physical actions and abstract ideas, such as maintaining positive thoughts and actions.	Students will be able to…. • plan and conduct simple investigations to compare different strengths and directions of pushes and pulls. • analyze data to determine if a design solution effectively changes the speed or direction of an object.

	• collaborate effectively in groups to solve problems and perform tasks. • evaluate actions and decisions that contribute to virtuous deeds and understand the role of unity in achieving common goals. • develop critical thinking skills by connecting scientific concepts to real-life applications and moral lessons.

Stage 2 – Assessment Evidence (STUDY)

- Plan and Conduct Investigation: Students will design and carry out experiments to compare the effects of different strengths and directions of pushes and pulls on various objects.
- Analyze Data: Students will record their observations and analyze the data to determine if their design solutions work as intended.
- Collaborate and Reflect: Students will discuss how working together helped them achieve their goals and relate this to the importance of unity in doing virtuous deeds.
- Presentation: Students will present their findings and reflections to the class, explaining both the scientific and moral lessons they learned.

Stage 3 – Learning Plan (DO)

Learning Activities

1. **The Ayah "Verse"**

1.1. Teacher begins by reading the Aya verse bellow aloud in Arabic and English:

Verse in Arabic:

"وَاعْتَصِمُوا بِحَبْلِ اللَّهِ جَمِيعًا وَلَا تَفَرَّقُوا ۚ وَاذْكُرُوا نِعْمَتَ اللَّهِ عَلَيْكُمْ إِذْ كُنتُمْ أَعْدَاءً فَأَلَّفَ بَيْنَ قُلُوبِكُمْ فَأَصْبَحْتُم بِنِعْمَتِهِ إِخْوَانًا وَكُنتُمْ عَلَىٰ شَفَا حُفْرَةٍ مِّنَ النَّارِ فَأَنقَذَكُم مِّنْهَا ۗ كَذَٰلِكَ يُبَيِّنُ اللَّهُ لَكُمْ آيَاتِهِ لَعَلَّكُمْ تَهْتَدُونَ"

(Surat Al-Imran, Verse 103, Holy Quran)

Verse in English:

As Stated in Surah 3 (Al-Imran) verse 103

" Hold Fast together to the rope of Allah (the religion of God) and be not divided. Remember the blessing that Allah bestowed upon you were once enemies then He brought your hearts together so that through His blessing you became brothers. You stood on the brink of a pit of fire, and He delivered you from it. Thus, Allah makes His signs clear to you so that you may be guided to the right way." (SurahQuran.com, 2024)

1.2. ***Discussion***

1.2.1. After reading the verse, the teacher makes the comment below to set the tone: *"Allah loves me, and he gave me a lot of blessings, Alhamdule Allah gave me strength to help others, He gave me health to take care of myself, my friends, and my family, and He gave me a brain to think with. With all these blessings Allah gave us."*

The teacher asks the following open-ended questions:

- *How can we preserve it, what virtuous deeds can we do to be grateful for Allah and keep these blessings intact?*

- *Prompt the children to share some virtuous deeds then guide them with questioning*

1.2.2. Teacher wrap up

"These are genuinely nice actions, here is an important question my friend, are we stronger when we fight or when we do virtuous deeds together? Would you like to try out a game to look in to check the answer?"

2. The Game

	The floor is Candy
Game Items	• Candy Sea: Is a sea made out of all candies that get you cavity if not cleaned by Miswak • Miswak Island is the safe place where you use the Miswak as a sunnah to save you from cavity • BismAllah Rope/stick/hand: It's the only tool to get you to the Miswak Island • The Gama'aa boat: A mat where they can sit together for safety
Instructions:	• The game starts where the students are sitting in the middle of the Candy Sea • They hold on to one end of a tool (rope, stick, hand, …). The other end is connected to a pole at the Miswak land • Students sit on a slippery mat "The Gama'a Boat" all together. • Students are asked to (Pull) the rope all together to get closer to Miswak land, and to hold on tight to the Bism (Allah Rope) so they don't fall into the cavity trap
Printouts	The Gama'a (Unity) Boat picture - Candy Sea Label- Miswak Island Label

The teacher concludes the game as following:

"When you tried to pull the rope to go to the miswak land by yourself, it was harder than when you did it collectively. When we unite and do virtuous deeds together, we are stronger. What virtuous deeds can we do together so that we can hold tight to the path that pleases Allah?"

The teacher listens to the kids' suggestions and adds to them.

The teacher gives the learners a coloring sheet from which they choose what virtuous deeds they will hold on tight to them this week.