

## Q-STEAM APPROACH: A NEW TEACHING PARADIGM BASED ON THE QUR'AN

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### ABSTRACT

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Integrated learning is a pedagogical approach that fosters students' creativity, critical thinking, and ability to connect classroom knowledge with real-world contexts. However, current STEAM implementations often lack a spiritual dimension that guides students' moral and ethical development. This paper aims to introduce and conceptualize the Q-STEAM (Qur'an-Science, Technology, Engineering, Art, and Mathematics) approach as a new teaching paradigm grounded in Quranic principles. The purpose of this conceptual paper is to formulate the philosophical foundations, framework, and pedagogical

implications of Q-STEAM as an integrative model that bridges faith and innovation in education. Drawing from the integration of Yakman's STEAM model and Quranic perspectives, this paper argues that Q-STEAM can serve as a holistic learning paradigm where knowledge, values, and skills are interconnected. This approach enables teachers to design project-based learning experiences that link scientific inquiry with spiritual reflection, fostering both intellectual excellence and moral integrity. Ultimately, this paradigm supports the development of *ulul albab*—individuals who are intellectually capable, ethically responsible, and spiritually grounded.

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## INTRODUCTION

The STEAM approach was introduced in 2008 with the intention of revamping the educational process into a holistic and inventive one. It aims to merge the following elements into a cohesive and interactive experience. STEAM is an approach that integrates the components of science, technology, engineering, art, and mathematics in a single project. This approach has shifted the traditional view on education, previously characterized as isolated instruction (Yakman, 2010). The STEAM approach is a modification of the STEM (Science, Technology, Engineering, and Mathematics) approach developed in the 1990s by the National Science Foundation (NSF); It emerged as a response to increasing worries about the nation's competitiveness in scientific and technological

fields. The program aims to reform education to increase workforce skills in science, technology, engineering, and mathematics while addressing the reported shortage of skilled workers in these fields. While the STEM approach initially focuses only on technical skills, innovative problem-solving requires a holistic approach that integrates artistic components with technical skills (Jesionkowska et al., 2020).

Yakman (2008) as an early founder of STEAM, proposed a framework to add art (A) to STEM education. He defines the STEAM approach as five levels, namely lifelong learning, integrative learning, multidisciplinary learning, discipline-specific learning, and content-specific learning. STEAM learning is a project-based teaching approach and is suitable for improving students' mathematical skills. It also focuses on aesthetic values and social skills that students will use in everyday life, as well as language, which is an essential tool for success in today's industrialized world (Badriyah et al., 2020). Yakman (2010) classifies art education into distinct categories; the initial category encompasses language arts, comprising English, ESL, sign language, and other artistic expressions predominantly linked to communication. The second category is fine arts, which include the topics of painting, sculpture, color theory, and true creative expression. The third category is physical arts, which includes personal or collective movement, sports, dance, and performances. The fourth category is manual art, which includes topics related to physical skills or specific techniques required to manipulate objects. The fifth category is the broadest category, the liberal arts, which includes social sciences such as sociology, philosophy, psychology, theology, history, civics, and politics, and, for educators, one of the most important classifications, the field of education itself.

Other subjects can be connected to art as it inspires students to think creatively, unconventionally, and without limitations. It also helps us to formulate our own questions based on what we see, hear, and feel in order to demonstrate the right answers (McGarry, 2018). The demand for skills nurtured through the arts remains consistently high in the professional sphere (Yakman & Lee, 2012). In solving a problem, a person needs creative thinking and different perspectives and can take advantage of all the knowledge he has. According to Heinecke (2018), there are six key reasons for including art within the STEM approach. Art has become an important part of science, technology, engineering, and mathematics. Art makes STEM topics more interesting to students who dislike science or mathematics. Art strengthens students' understanding by involving them directly in projects and experiments. Art can connect students' interests with the real world. Students learn from art how to address creative issues and appreciate the significance of each

mistake. Art also helps reduce students' apprehension towards STEM. Art, as a social science, has a close connection with students' religious understanding. Religion and social science have a complex relationship. On the one hand, social scientists generally study religion as a social phenomenon, examining how religious beliefs and practices influence individuals and societies. Many social scientists consider religion as a separate field of investigation from the scientific and social sciences (Rakhmat, 2004; Ward, 1922). The relationship between religion and social science can be seen from various perspectives. From the perspective of social science, religion can be considered a social phenomenon that influences the behavior of individuals and society. From a religious perspective, social science can be viewed as a means of comprehending and analyzing the social environment. The two interact and are frequently used jointly to describe social phenomena.

Despite the strengths of the STEAM framework, its implementation often remains limited to cognitive and technical dimensions, leaving moral and spiritual aspects underexplored. Therefore, there is a growing need for an integrative learning paradigm that combines scientific inquiry with faith-based reflection. This conceptual paper aims to propose the Q-STEAM (Qur'an-Science, Technology, Engineering, Art, and Mathematics) framework as a holistic educational model grounded in Quranic principles and Islamic epistemology.

### **Theoretical Background**

The most advanced stage of STEAM learning is lifelong learning. Yakman associates lifelong learning with holistic education, which is defined as a purposefully designed but uncontrollable teaching program that is constantly changing and being updated based on the student's personality and environment, resulting in everyone having a different perception based on their experience and understanding of something (Yakman, 2010). Various religious traditions provide normatively comprehensive holistic education (Miller, 2019). In the Islamic understanding, holistic education must be based on the revelations revealed by Allah, as well as the teachings given by the Prophets (Azman, 2019). In the holy Qur'an Allah SWT says:

يَا أَيُّهَا الَّذِينَ ءَامَنُوا ادْخُلُوا فِي السِّلْمِ كَآفَّةً وَلَا تَتَّبِعُوا خُطُوَاتِ الشَّيْطَانِ إِنَّهُ لَكُمْ عَدُوٌّ مُّبِينٌ

Meaning: "O you who have believed, enter Islam completely [and perfectly] and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy. (QS. Al-Baqarah. 208)

In the Islamic worldview, holistic education encompasses not only intellectual growth but also moral and spiritual development, as stated in the Qur'an (Al-Baqarah: 208). This perspective complements Yakman's highest level of STEAM learning—lifelong learning—which emphasizes continuous personal growth and adaptation.

Holistic education is a teaching and learning approach that emphasizes the harmonious relationship between every aspect of life and individual development, including intellectual, aesthetic, physical, emotional, intellectual, spiritual, and social dimensions. This approach stresses personal growth, self-awareness, and the development of critical thinking skills, and it frequently combines experience with realistic learning. It should focus on life skills, attitudes, and personal awareness that students need in an increasingly complex world (Miseliunaite et al., 2022).

Project-based teaching and balancing between worldly and spiritual knowledge can be accomplished in the classroom setting, transforming the learning experience into one that emphasizes lifelong learning. This is important for Muslims when they learn worldly knowledge because they experience the benefit of gaining more than just concepts and memorization. They also learn religious concepts that are advantageous for the afterlife. The belief in an afterlife being connected to general lessons can motivate students, as they find it new and perceive the benefits of believing in it (Muzakkir, et al., 2024). Every piece of knowledge students learn in the classroom will be useful and applicable throughout their lives, instilling in them the confidence that their education will have a tangible impact on their real experiences. The ability to read and comprehend the Quran is a fundamental understanding that every Muslim must have. The inclusion of this component in the teaching and learning process in the classroom is important as it impacts the development of students' personal qualities (Nik Abdullah et al., 2015). Ibnu Sina's educational view holds that the combination of rational and religious aspects is consistent with solving problems and reflecting reality (Ansari & Qomarudin, 2021). The concept of faith and fardu ain will be introduced to students, making learning feel more useful as they go beyond just looking at formulas and solving problems. Therefore, this conceptual paper aims to develop and propose the Q-STEAM (Qur'an–Science, Technology, Engineering, Art, and Mathematics) framework as a faith-based integrative learning model.

## **RESEARCH METHODE**

### **Conceptual Framework: The Q-STEAM Approach**

## Philosophical Foundation

The philosophical foundation of the Q-STEAM framework is grounded in the Islamic concept of *ta'dib* articulated by Syed Muhammad Naquib Al-Attas (1991). *Ta'dib* represents the holistic process of cultivating an individual's intellect, character, and spirituality through the harmonious integration of *'ilm* (knowledge), *ta'lim* (instruction), and *tarbiah* (nurturing). According to Syed Muhammad Naquib Al-Attas (1991), *ta'dib* is the most comprehensive term to describe Islamic education because it encompasses not only the transmission of knowledge but also the internalization of ethical and spiritual values that lead to just and balanced human beings (*insan adabi*).

In contemporary educational discourse, *ta'dib* offers a philosophical corrective to the fragmentation of modern education by emphasizing the unity of knowledge and the inseparability of cognitive and moral dimensions. It positions education as both an epistemological and ethical process, one that seeks to form individuals who think critically while remaining anchored in divine guidance. This conception resonates with Yakman's (2010) principle of lifelong and integrative learning within the STEAM framework, where learning extends beyond disciplinary boundaries toward the formation of holistic, adaptive, and value-driven learners.

From this perspective, Q-STEAM redefines the purpose of integrative and project-based learning as a medium for *adab*, the cultivation of moral discernment, reflective thinking, and spiritual awareness through engagement with scientific and technological inquiry. The synthesis of *ta'dib* and STEAM parallels Einstein's assertion that "science without religion is blind, religion without science is lame," underscoring the necessity of aligning scientific exploration with ethical and spiritual consciousness.

Ultimately, *ta'dib* serves as the epistemological compass of the Q-STEAM framework. It ensures that the pursuit of 21st-century competencies, critical thinking, creativity, collaboration, and innovation is inseparable from the formation of spiritual integrity and moral responsibility. Through this foundation, Q-STEAM aspires to cultivate *ulul albab*—learners who embody both intellectual excellence and deep spiritual insight, capable of engaging with the modern world while remaining guided by the Qur'anic worldview.

## Conceptual Structure of the Q-STEAM Approach

Quran - Science, Technology, Engineering, Art, and Mathematics (Q-STEAM) is the acronym for the combination of the STEAM and Quranic approaches to learning. The process of teaching and learning with the Q-STEAM approach will produce students who

are able to understand concepts and relate science concepts to students' daily experiences, as well as connect them with related Quranic understandings. Those skills can be developed because the Q-STEAM approach begins the learning process by presenting problems that students frequently encounter in their daily lives that are related to the ideas being studied, afterwards the problem is connected to religious concepts and legal foundations from the Quran. Finally, students are expected to answer the issues by creating a project involving all of the skills of science, technology, engineering, art, and mathematics.

The integration of the STEAM approach with Quranic teachings is strongly supported by several fundamental theories in education and learning, such as the theory of social constructivism pioneered by Vygotsky as a major milestone. Some viewpoints within social constructivism theory: i) Student-centered approach: individuals actively participate in the learning process; ii) experiential learning: various activities such as play can help people learn; iii) collaborative: people learn by working together and interacting with peers; iv) process: emphasizes the process of learning, i.e., how individuals solve problems rather than the outcome of learning or answers to solutions. v) Social environment: the interaction between people's physical and social settings is vital for their cognitive development (Gray & MacBlain, 2015). The integration of Quranic understanding into the STEAM approach can be done by modifying the concept of integrating mathematics in the Quran developed by Abdussakir dan Rosimanidar (2017).

The integration employed in this approach is integrative in nature, as teachers cannot address classroom challenges without considering the curriculum being implemented. Teachers must align the assigned project with the instructional content, ensuring that all relevant concepts required for project completion have either been previously taught or will be introduced during the learning process. This integrative approach distinguishes school-based project-based learning from the scientific research projects typically undertaken by professional researchers.

The steps used in completing the given project were adapted to the Engineering Design Process (EDP) model developed by the Massachusetts Department of Education (2006). The eight steps of the EDP start with identifying the need or problem. At this stage, the students in their group identify and analyze the given problem or challenge. The problem or challenge sets certain constraints and solution criteria for the students in this step. They are expected to identify these limitations, such as the available tools and materials, costs, and various requirements. The second step is to conduct research. At this stage, the tasks performed include collecting information about the problem, which can

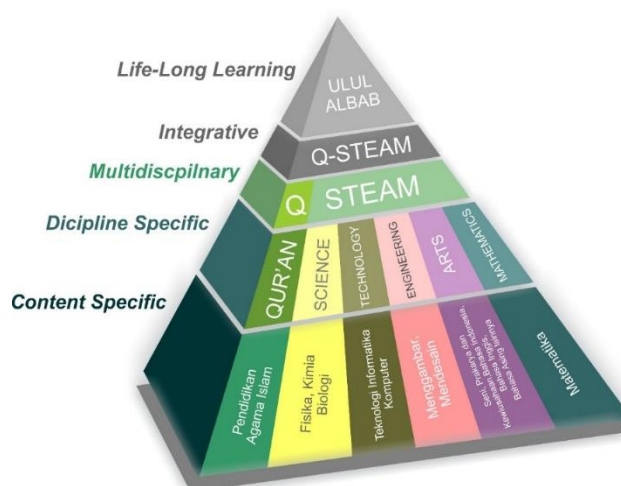
help us understand or solve the problem. Teachers must ensure they have comprehended all necessary knowledge at this point. If they encounter difficulties, they should facilitate understanding by presenting teachers who have grasped the concept. Here, teachers need a collaborative team. The third step is to imagine a possible solution; at this stage, students discuss ideas about various possible solutions to solve the given problem. Students integrate all the obtained knowledge from the previous step to find possible solutions. The fourth step is planning. In this stage, the best solution will be chosen by the students, and they will create a model or make a concrete sketch of the solution. In this design, students are asked to explain the design parts, the functions related to this part, the materials used, and how the design solution will be able to answer the problem.

The fifth step is to build a prototype. In this step, students use the materials that have been determined as well as the steps that have been determined previously to develop a prototype for completing the project. Students are asked to complete as a group as well as commit to each step that has been agreed upon at the previous stage. The sixth step is to test and evaluate the prototype that has been created. At this point, students will know whether the prototype solution they created can solve the problem or challenge that has been presented or whether it cannot. At this stage, students can also recognize the weaknesses and shortcomings of their product. The seventh step of this process is sharing solutions/communication; each group will convey their experience in solving the given problem. Each group needs to explain the justification of each material, method, and design option. Students also need to demonstrate each step they took, as well as explain the successes and challenges they encountered while completing the project. Other groups will give responses, suggestions, and criticisms to the presented products. This stage is where the teacher offers feedback, evaluations, suggestions, and follows up on the students' solutions. The final step of this process is redesigning. If the product produced cannot solve the given problem, then in groups, students identify and analyze the cause of failure and determine the improvements that need to be made to the solution that has been developed.

The model of integrating the Qur'an into STEAM learning is done by modifying the integration model developed by Abdussakir dan Rosimanidar (2017) and then adapting it to the STEAM learning component. A summary of the Al-Qur'an integration model and the STEAM component is as follows: 1) Mathematics and science from the Al-Qur'an (Developing the concept of mathematics and science from the Al-Qur'an), 2). Mathematics and science for Al-Qur'an (Using the concepts of mathematics and science to practice the Al-Qur'an), 3). Mathematics and science to explore Al-Qur'an (using mathematics and

science concepts to uncover the miracle of Al-Qur'an), 4). Mathematics and science to explain the Qur'an (Using the concept of mathematics and science to explain the Qur'an), 5). Mathematics and science to deliver Al-Qur'an (Using the concept of mathematics and science to deliver Al-Qur'an), 6). Mathematics and science with Al-Qur'an (Teaching the concept of mathematics and science with Al-Qur'an values).

Each constituent component of the Q-STEAM approach is designed to have a clear relationship and complement one another. Each component will be present to solve the problem according to the appropriate stages and steps. This approach will show how each subject has a significant relationship and open the perspective of students who believe that science and religion are two separate and unrelated subjects. This approach does not ignore specific subject skills in isolation but will be used simultaneously during the completion of the project. The Quran will be understood by students in relation to concepts from science, technology, engineering, art, and mathematics, which they will have learned at an early stage. This knowledge is used to complete the project in an integrated manner at the next stage. The relationship between each step of the Q-STEAM approach can be seen in the pyramid diagram below, which is modified from the STEAM pyramid developed Yakman (2008) for the scheme of integrating the Quran into the STEAM approach.



Picture 1. Q-STEAM pyramid

The pyramid above shows the relationship formed from each component of Q-STEAM, the teaching process starting from specific content that complements each other. In the pyramid above, each step is a process that is carried out during teaching and learning with the Q-STEAM approach. At the base of this pyramid, it shows that the teaching and learning process in Indonesia, where each lesson must be taught in silos with their respective curriculum standards, each student should have a strong understanding of each knowledge as a foundation in continuing to the next level. In this process, the teacher can make use of the students' existing abilities or collaborate with the relevant subject teachers to introduce the concept in detail and comprehensively. At this stage, students will gain new knowledge or understand the connections formed from each lesson.

In the second phase, students arrange the different types of knowledge applied in STEAM. After grasping each concept in the preceding phase, students now complete the Q-STEAM matrix and group the details of each knowledge base. This matrix will be filled up to ensure that every Q-STEAM component is used to complete the assigned project. Students must make sure they have a solid understanding of every idea from the earlier stages. At the next level, students have become familiar with integrated learning with fields such as science, technology, engineering, arts, and mathematics. However, they are still not familiar with integrating these concepts with Qur'anic understanding. The teacher begins to relate the knowledge of the Qur'an to the idea of science. At this stage, the teacher must understand how the Qur'an relates to the STEAM component. The teacher must understand the concepts to be taught in the religious studies and Quranic understanding without seeking the religious studies teacher's assistance during the guidance of students. Teachers must understand and comprehend Quranic concepts so that it is easier for them to explain to students in linking each step and issue with Quranic understanding. In this stage, the teacher must be capable of integrating all components of the project into a single cohesive unit, stimulating students' thinking, and connecting academic concepts to their everyday lives.

At this fourth level of the pyramid, students are encouraged to complete a given project using all their existing knowledge. Teachers should be able to convince students that problem-solving skills and knowledge integration will be important in the world of work as well as their daily lives. In the era of the industrial revolution, students will be provided with project-based teaching that optimizes the STEAM approach and integrates it with the understanding of the Quran. This will serve as a counterbalance to their knowledge, and the understanding of the Quran and the knowledge of the hereafter will

be their capital to return to God. At this stage, students are taught that in solving a problem in everyday life we need to combine several sciences simultaneously. Each problem in real life requires a combination of sciences to be solved; this is something that teachers must demonstrate to students, highlighting the interconnectedness and necessity of each component.

The final level of this pyramid is lifelong learning; the skills that have been honed while completing the project will continue to be used by students in their daily lives. The STEAM approach and Qur'an understanding will develop students who, with a deep devotion to the creator, can interpret and gain knowledge from every creation of Allah SWT. They will acquire knowledge, hone skills, and exhibit high creativity. *Ulul albab* are mentioned in the educational goals described in the Qur'an. They are called this by Allah in Surah Ali Imran, verses 90-91. Allah explains that those with the title *ulul albab* are those who always use their wisdom to meditate, observe, think, appreciate, and contemplate the things that exist. It was created by Allah. Humans, as *ulil albab*, always remember in their minds that everything in this world is the creation of Allah and nothing is in vain. All creatures created by Allah certainly have benefits. Those who use reason as *muhasabah* towards benefit.

## RESULT AND DISSCUSSION

*Ulul albab* is described as an intellectual who has deep spirituality (Al-baqarah: 197), extensive knowledge (Ali imran: 190), and a strong desire to change society for the better through action and example (Ar-ra'd: 19-22). The *ulul albab* figure is considered the ideal figure who is expected to lead the earth as its *khalifah*, who develops the concepts of remembrance, reflection, and good deeds (Shihab, 2005). This concept is in line with the goal of national education, which is to cultivate the ability, shape the character and civilization of a nation with dignity, and foster the potential of students to become human beings in order to educate the life of the nation, faithful and devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and responsible citizens (Depdiknas, 2003). God's creation and knowledge are always considered by students using the Q-STEAM approach as they increase their capital for life in the world and provide evidence to strengthen their belief in creation. This approach utilizes students who have solid mathematical, scientific, artistic, engineering, and technical skills to be competent in the era of the industrial revolution and can capitalize on perfect faith and piety, become a

believing servant of Allah, and become *ulul albab*, who educates hope in the Qur'an, making humans as servants of Allah and Khalifah.

The Q-STEAM approach is designed with the concept of an integrated teaching approach. Students will be familiarized with seeing the connections between knowledge that has been taught separately through this approach. The use of an integrated approach also makes students familiar with the benefits of each knowledge learned, not just a collection of theories, formulas, and numbers. The Q-STEAM approach will motivate students to appreciate the relationship between science concepts and the understanding of the Quran, and it will help them realize that religious science and general science are not different but complement each other. Learning with the Q-STEAM approach will always familiarize students with reading the Quran and meditating on the AL-Quran, thus making them close to Allah SWT. The Q-STEAM approach transforms students' learning, once considered a communal obligation (*fardhu kifayah*), into an activity that brings personal rewards (*Fahala*). The Q-STEAM approach also characterizes project-based learning; project-based learning will make students familiar with solving problems that often occur in their environment. The selection of contextual issues at the beginning of the project is consistent with the concept of the constructivism learning theory; students will quickly grasp and evaluate the challenges presented, making it easier for them to address these problems. Moreover, students will learn new knowledge from the completion of the project they design. With the perfect combination of the STEAM approach, learning with the Q-STEAM approach will make learners discover new concepts as scientists discover their concepts. The project will motivate and inspire the student to think creatively and find the best solution. This approach can also arouse learners' curiosity and involve the use of current technology to get the right information and solutions.

Each Qur'anic verse used in the teaching and learning process with the Q-STEAM approach is not only related to the problem being studied, but more than that, the Qur'anic verse used is related to the concept of morals or character to be built from each activity in learning. The Quran is recited at the beginning of each step in the EDP process to remind students of religious knowledge. This ensures that students acquire not only secular knowledge but also gain a deep understanding of the Islamic teachings embedded in each Quranic verse. The Q-STEAM method of learning goes beyond having students read the Qur'an; it also involves comprehending the significance of the verses and the moral values they convey. The assignment will familiarize students with interpreting and studying the Qur'an. The character building of students will be fully fostered from every process carried

out by students in preparing the given project. Students will not forget to perform ablution before starting to study and will maintain their attitude and speech during the learning process because they will continue to interact with the Quran.

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