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Development of Islamic Values–STEM Integrated Instructional Materials to Enhance Students' Analytical Thinking Skills

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Abstract

This study set out to design and refine instructional materials for Islamic Educational Philosophy by weaving together Islamic values and a STEM-oriented perspective, with the broader aim of strengthening students' analytical thinking. The project followed a Research and Development (R&D) approach and adopted the ADDIE framework (Analysis, Design, Development, Implementation, and Evaluation). It was carried out in the Graduate Program of IAIN Curup. The initial needs assessment revealed a rather telling pattern. Around 83.33% of lecturers and 85.45% of students felt that the existing teaching materials did not fully respond to the demands of current learning practices. In other words, there was a clear gap between what was available and what was actually needed in the classroom. After the materials were developed and reviewed, they achieved an average validity score of 92.03, which places them in the "highly appropriate" category. The product was considered ready for implementation without substantial revision. From the students' perspective, the response was equally encouraging: all participants (100%) rated the materials as appropriate or highly appropriate for use, suggesting a strong level of practicality and perceived effectiveness. More importantly, the integration of Islamic values with a STEM framework appeared to sharpen students' analytical capacities. They showed greater confidence in interpreting philosophical issues, constructing coherent and logically grounded arguments, and connecting ethical reasoning with scientific modes of inquiry. Taken together, these findings indicate that thoughtfully designed integrative materials can do more than deliver content, they can reshape the way students think.

Keywords: *Islamic Educational Philosophy; Islamic Values-STEM Intergartion; Analytical Thinking; Instructional Materials.*

Abstrak

Penelitian ini bertujuan untuk merancang dan menyempurnakan bahan ajar Filsafat Pendidikan Islam dengan memadukan nilai-nilai Islam dan perspektif berorientasi STEM, dengan tujuan yang lebih luas untuk memperkuat kemampuan berpikir analitis mahasiswa. Proyek ini mengikuti pendekatan Penelitian dan Pengembangan (R&D) serta mengadopsi kerangka kerja ADDIE (Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi). Penelitian ini dilaksanakan di

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Program Pascasarjana IAIN Curup. Penilaian kebutuhan awal menunjukkan pola yang cukup jelas. Sekitar 83,33% dosen dan 85,45% mahasiswa merasa bahwa bahan ajar yang ada belum sepenuhnya memenuhi tuntutan praktik pembelajaran saat ini. Dengan kata lain, terdapat kesenjangan yang jelas antara apa yang tersedia dan apa yang sebenarnya dibutuhkan di dalam kelas. Setelah bahan-bahan tersebut dikembangkan dan ditinjau, mereka memperoleh skor validitas rata-rata sebesar 92,03, yang menempatkannya dalam kategori "sangat sesuai". Produk tersebut dianggap siap untuk diterapkan tanpa revisi yang signifikan. Dari sudut pandang siswa, tanggapannya sama-sama menggembirakan: seluruh peserta (100%) menilai bahan-bahan tersebut sesuai atau sangat sesuai untuk digunakan, yang menunjukkan tingkat kepraktisan dan efektivitas yang dirasakan yang tinggi. Yang lebih penting lagi, integrasi nilai-nilai Islam dengan kerangka kerja STEM tampaknya mempertajam kemampuan analitis siswa. Mereka menunjukkan kepercayaan diri yang lebih besar dalam menafsirkan masalah-masalah filosofis, menyusun argumen yang koheren dan berlandaskan logika, serta menghubungkan penalaran etis dengan cara-cara penyelidikan ilmiah. Secara keseluruhan, temuan-temuan ini menunjukkan bahwa materi integratif yang dirancang dengan cermat tidak hanya sekadar menyampaikan konten, tetapi juga dapat membentuk kembali cara berpikir siswa.

Kata kunci : Filsafat Pendidikan Islam; Integrasi Nilai-Nilai Islam dan STEM; Pemikiran Analitis; Bahan Ajar.

I. Introduction

Profound shifts in the global educational landscape have compelled institutions to rethink what it truly means to educate. It is no longer sufficient to produce graduates who simply possess a broad base of knowledge. What is increasingly demanded—both by society and by the complexities of contemporary life—is a generation capable of higher-order thinking, creative exploration, reflective judgment, and, perhaps most importantly, moral integrity (Lütge, Merse, and Rauschert 2023). Islamic higher education is not immune to these demands. In many ways, Islamic higher education carries a dual responsibility, strengthening students' intellectual capacity while simultaneously nurturing their spiritual character. Balancing these two aspects (reason and faith) is at the heart of its mission, although not always easy in practice. In this context, analytical thinking becomes crucial. This skill helps students interpret complex issues logically, examine relationships between variables, and construct systematic arguments grounded in rational principles and Islamic values (Rawolle and Lingard 2022; Beyer 1995; Facione 2010). In line with this, learning innovations that combine modern scientific approaches and Islamic values are becoming increasingly important. Such integration is necessary to ensure that Islamic education remains relevant and truly meaningful in the digital age.

In the context of higher education, analytical thinking is increasingly recognized as one of the important higher order thinking skills required to face complex intellectual and social challenges. Analytical thinking is understood as the ability to examine problems systematically, interpret information critically, identify logical relationships between ideas, evaluate arguments based on evidence, and formulate reasonable conclusions. This perspective is primarily based on a critical thinking framework which

emphasizes core cognitive skills such as interpretation, analysis, evaluation, inference, and explanation (Facione et al., 1994). These dimensions are especially relevant in the study of Islamic Educational Philosophy, where students are expected not only to understand theoretical concepts, but also to critically analyze philosophical assumptions, ethical implications, and contemporary educational problems from both rational and Islamic perspectives.

The integration of Islamic values with the STEM (Science, Technology, Engineering, and Mathematics) approach is increasingly seen as a promising framework for renewing Islamic education at the university level. STEM itself has long been recognized as a learning strategy for strengthening critical thinking skills, as it encourages students to question assumptions, analyze evidence, and approach problems in a structured yet flexible manner (Kim, Kim, and Oliver 2022), It also fosters problem-solving skills and fosters scientific collaboration among students, as they are encouraged to work together, test ideas, and refine their understanding through joint investigations (Jindal, Singh, and Aggarwal 2023). However, despite its advantages, this approach is often seen as somewhat detached from the moral and spiritual dimensions, as if operating in a space that prioritizes technical reasoning while neglecting ethical meaning (Kayumova and Strom 2023). On the other hand, Islamic education is firmly rooted in ethical principles, a sense of monotheism, and a strong sense of humanity. These foundations serve as a compass, guiding the development of knowledge so that it does not deviate from its divine orientation (Lundeto, Talibo, and Nento 2021). Therefore, uniting the two is a strategic move. The goal is to create a more holistic learning model by combining sharp rational inquiry with a deeply held spiritual depth. This is not just about mastering concepts or learning to know. It also speaks of learning to be and learning to live ethically. In the broader vision of Islamic education, this integration reflects an effort to nurture the whole person. Education is not merely an intellectual exercise; it is a process of human formation, guiding students toward the ideal of insan kamil, a fully developed human being, both in mind and spirit.

Over the past decade, a growing body of research has reported significant progress in integrating religious values with STEM approaches across various learning contexts. These studies demonstrate that these findings are no longer theoretical but are being applied in real-world classroom practice. For example, a recent study by Abas, Rahman, and Huda (2024) showed that integrating STEM with Islamic education can significantly strengthen Muslim students' higher-order thinking skills. Their findings also demonstrated a deeper conceptual understanding of how scientific knowledge and ethical values are interconnected, rather than separate domains. Similarly, a systematic review conducted by Masud, Yusuf, and Hanifah (2023) concluded that STEM-based learning, when grounded in moral and spiritual values, not only sharpens cognitive abilities but can also foster students' ethical awareness, shaping their thinking and how

they position themselves in relation to knowledge. Meanwhile, Aksan (2023) in his research emphasized the importance of adopting a more humanistic perspective in STEM education. Without such a perspective, science and technology risk becoming detached from humanitarian and ethical considerations, an issue that is particularly pressing in higher education environments where professionalism and moral responsibility are key expectations.

Within Islamic education itself, the call to integrate knowledge and values is nothing new. Muslim scholars have long challenged the separation between religious and secular knowledge. Syed Muhammad Naquib al-Attas (2020), for example, emphasized the unity of knowledge ('ilm) and adab (adab), arguing that education loses its way when ethics and intellectual inquiry are treated as separate fields. In a similar context, Jalaluddin (2022) developed this idea by proposing an Islam-STEM model that leverages Islamic epistemology while incorporating modern scientific approaches, with the aim of shaping students' character and analytical capacities. Despite this, most empirical work in this area still focuses on primary and secondary education, specifically in subjects such as science, mathematics, and technology. A study by Sujudillah and Qulub (2024), for example, largely locates integration efforts within these domains. Implementation at the university level (particularly in courses like Philosophy of Islamic Education, and even more so at the postgraduate level) remains relatively limited. Initiatives that go beyond conceptual discussions to the systematic development of empirically tested learning materials are even rarer.

This body of literature demonstrates an encouraging trend toward integrating values and science. However, it also reveals several glaring gaps. First, previous studies tend to concentrate on the implementation of values-based STEM in empirical settings such as laboratories, classroom experiments, or project-based activities. Far less attention has been paid to reflective or philosophical domains, where students are required to engage in conceptual reasoning rather than direct experimentation. Second, most existing research measures broad cognitive outcomes, such as general conceptual understanding or critical thinking. Analytical thinking (a more emphasized skill) is rarely examined as a separate variable. This concern stems from the fact that analytical competencies often receive less attention than other higher-order skills. (Tamrazova, 2022; Tkachenko, 2021). Third, previous research has primarily emphasized instructional design or teaching strategies. Only a small portion has shifted to the development of concrete instructional materials as products, systematically designed, validated, and tested through structured development procedures such as the ADDIE model. In this regard, the practical dimensions of instructional materials development remain underexplored.

This gap provides the primary basis for this research. Rather than rehashing general discussions about integration, this research intentionally focuses on developing learning

materials for the Philosophy of Islamic Education based on the Islamic Values-STEM framework. This approach shifts the integration of values and STEM from a purely scientific practicum setting and into a reflective philosophical space, where ideas are questioned, arguments are constructed, and assumptions are more closely examined. In other words, this research goes beyond simply asserting that religion and science are intertwined. It goes further by exploring how Islamic values can be systematically integrated into scientific approaches to shape students' analytical and ethical thinking. The emphasis is not simply on what students learn, but on how they reason and place knowledge within a moral context. Methodologically, this research also offers a distinct contribution. It combines the development of values-based learning materials with empirical analysis, examining the product's validity, practicality, and effectiveness in the context of Islamic higher education. Thus, this approach seeks to bridge conceptual discourse and measurable educational outcomes, which have often been discussed separately but rarely combined into a coherent design.

Initial findings from the Postgraduate Program at IAIN Curup provide a fairly clear picture. Approximately 83.33% of lecturers and 85.45% of students indicated that existing Islamic Philosophy of Education materials no longer meet the demands of 21st-century learning—especially in terms of fostering analytical thinking. Most available materials remain highly textual and largely theoretical. They explain concepts but rarely connect them to contemporary issues such as the ethics of technology, the philosophy of digital education, or the ongoing dialogue between faith and scientific rationality. As a result, discussions often feel distant from the realities faced by students today. This situation underscores the urgency of developing new, more contextual, interdisciplinary, and integrative teaching materials, grounded in the Islamic Values-STEM framework. Ideally, such materials should not only inform but also inspire. They should encourage students to think critically and analytically, while fostering moral awareness and spiritual reflection as they engage with educational issues.

This study aims to design and produce teaching materials for the Philosophy of Islamic Education based on the Islamic Values-STEM integration model, proven valid, practical, and effective in strengthening students' analytical thinking skills. Validity was examined through expert assessment, including content suitability, language clarity, presentation coherence, and visual or graphic quality. Practicality was assessed by examining how easily the materials could be used by lecturers and students during lectures. Effectiveness was measured more directly by observing whether students' analytical thinking skills improved after using the developed materials. Using a Research and Development (R&D) approach, this project aimed not only to produce another set of teaching resources but also to formulate a conceptual model that, with appropriate adjustments, could be adapted and replicated in other Islamic higher education institutions.

The novelty of this research lies in its attempt to rethink how Islamic educational materials are developed by bringing spiritual values and scientific methodology into a more coherent and balanced relationship. Rather than placing faith and reason on separate tracks, the Islamic Values–STEM integration proposed here seeks to let them inform one another in a meaningful way. Such integration is believed to foster a learning environment where rational inquiry and religious consciousness grow side by side. The hope is simple, though not modest: to nurture graduates who can think critically and analytically, yet remain anchored in moral awareness and social responsibility. In other words, intellectual sharpness should not come at the expense of ethical depth. Beyond the immediate classroom context, this study is also expected to contribute to the broader discourse on integrative pedagogy. It aims to add a practical dimension to ongoing theoretical debates and to support the strengthening of curriculum design in Islamic higher education particularly curricula that aspire to shape students not only as competent thinkers, but as intellectually and spiritually grounded individuals in today's complex world.

The scholarly contribution of this study can be seen in at least two major respects. First, at the theoretical level, it seeks to reinforce the epistemological foundation of the relationship between scientific knowledge and Islamic values. In doing so, it reinterprets STEM not merely as a scientific or technical framework, but as an educational approach that can (and arguably should) be guided by ethical awareness and civility. STEM, from this perspective, is not value-free; it carries moral implications that deserve deliberate attention. Second, on a more practical plane, the study produces a set of instructional materials whose validity, practicality, and effectiveness have been systematically examined, particularly in enhancing students' analytical thinking skills. These materials may serve as a reference point for lecturers and curriculum developers who aim to design philosophy courses that are contextual, integrative, and responsive to the demands of the twenty-first century. Taken together, the findings reaffirm the importance of fostering a genuine synergy between science and Islamic values. Such a synthesis, this research suggests, is not an abstract ideal but a necessary foundation for cultivating reflective and humanistic learning within Islamic higher education.

II. Research Method

This study adopts a Research and Development (R&D) approach with the primary aim of producing Islamic Educational Philosophy teaching materials grounded in an Islamic Values–STEM integration framework. The ultimate goal is straightforward: to strengthen students' analytical thinking skills through a carefully designed learning resource. The development process follows the ADDIE framework (Analysis, Design, Development, Implementation, and Evaluation). This model was selected not simply because it is widely used, but because it offers a clear and systematic structure while still allowing room for

flexibility. Each stage builds on the previous one, yet revisions remain possible as formative evaluation results emerge. In practice, this means the product is not treated as final too quickly; it evolves through reflection and refinement. The ADDIE model is particularly suitable for this study since it helps align three essential elements: users' actual needs, relevant learning theories, and the empirical outcomes expected from the developed materials. By moving step by step (without being overly rigid) the approach seeks to ensure that the final product is both conceptually grounded and practically workable in the context of Islamic higher education.

The research was carried out in the Graduate Program of IAIN Curup, specifically in the Islamic Educational Philosophy course within the Islamic Religious Education (PAI) study program. This site was chosen deliberately. Institutionally, the program shows a clear commitment to curriculum development rooted in Islamic values and to innovative learning practices. Yet, despite that commitment, no teaching materials had been developed that explicitly integrate an Islamic Values–STEM approach. There was another consideration as well. Graduate students tend to possess stronger reflective capacities and a greater readiness for conceptual exploration. For that reason, they represent an appropriate group for examining whether an instructional model oriented toward strengthening analytical thinking can truly function as intended. In short, the setting was not incidental it provided both the need and the intellectual climate required for this kind of development study.

The participants in this study were drawn from two closely related groups: lecturers and students who were directly involved in both the course and the development of the instructional materials. Six lecturers took part in the research. Their areas of expertise include Islamic Educational Philosophy, Educational Technology, and Curriculum Development. They were not merely observers; they acted as content validators, instructional design experts, and research partners who assessed the product's validity and practicality from a professional standpoint. In addition, 17 second-semester graduate students from the Islamic Religious Education (PAI) program were involved as primary users of the developed materials. Their role was essential, since the effectiveness of the product ultimately depends on how it functions in real classroom use. All respondents were selected through total sampling. In other words, the entire population connected to the course was included, given that each member had direct relevance to the instructional context being developed.

The effectiveness testing in this study used a quasi-experimental approach with a single-group pretest-posttest design in a specific course, in this case the Philosophy of Islamic Education course. In educational research, a quasi-experimental design allows researchers to manipulate independent variables without full randomization or the inclusion of a control group (Muse & Baldwin, 2021). One common form is the single-group pretest-posttest model, in which participants are observed before and after an

intervention to identify changes in learning outcomes (Cham et al., 2024). In the context of this study, this design was deemed appropriate because the primary focus was not solely on establishing a strict cause-and-effect relationship, but rather on evaluating the initial effectiveness of the Islamic Values-STEM learning materials developed in an authentic classroom environment.

However, the researchers recognized that the lack of a control group limits the ability to fully eliminate threats to internal validity. Changes in students' analytical thinking skills may also be influenced by external variables beyond the intervention itself. Therefore, these findings should be interpreted as preliminary evidence of effectiveness, and future research is encouraged to use more rigorous experimental or quasi-experimental designs involving comparison groups and larger samples.

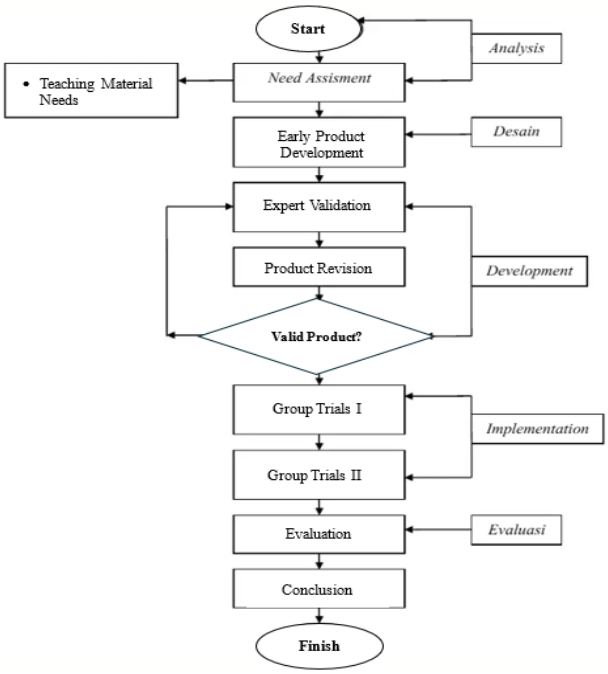

Figure 1. Stages of research implementation using the ADDIE model

This study was carried out by following the stages of the ADDIE, beginning with a careful needs analysis involving both lecturers and graduate students in Islamic Educational Philosophy. A review of curriculum documents, interviews, and questionnaires revealed a consistent concern: 83.33% of lecturers and 85.45% of students felt that the previously used materials did not sufficiently foster analytical thinking or meaningfully integrate Islamic values with a scientific approach. These findings were not treated as mere statistics; they became the starting point for redesigning instructional materials that are more contextual and intentionally oriented toward strengthening higher-order thinking skills.

During the design phase, the materials were structured around constructivist principles, supported by project-based learning and problem-solving strategies. Core concepts of Islamic Educational Philosophy were interwoven with a STEM perspective in a coherent rather than parallel manner. The development phase produced a prototype that was evaluated by three groups of experts (specialists in Islamic Educational Philosophy, value-based education scholars, and instructional design experts) using a 1–5 Likert scale. The product was considered feasible when it reached at least 80% of the maximum score. A limited classroom trial was then conducted to examine practicality and effectiveness. Students' analytical thinking improvement was measured using the normalized gain score introduced by Richard Hake (1998), categorized as high ($g \geqslant 0.70$), moderate ($0.30 \leqslant g < 0.70$), or low ($g < 0.30$).

All data gathered from questionnaires, observations, and interviews were examined through a combination of quantitative and qualitative approaches. Numerical data (such as expert validation scores and user evaluations) were processed using percentage formulas to determine the level of feasibility and practicality of the instructional materials. Meanwhile, qualitative data derived from interviews and classroom observations were analyzed through stages of reduction, categorization, and interpretation. This process made it possible to uncover not only what happened during implementation, but also what those findings meant in a broader pedagogical sense. To strengthen data credibility, triangulation was applied by comparing results across different sources and collection methods, ensuring that the conclusions drawn were consistent and well-grounded.

The success of the study was measured against three principal criteria: validity, practicality, and effectiveness. The product was considered valid if expert assessments reached at least 80% of the maximum score and did not require major revisions to its core content. Practicality was determined based on user responses, with a minimum of 80% of lecturers and students rating the materials as "appropriate" or "highly appropriate." Effectiveness, on the other hand, was assessed through improvements in students' analytical thinking as reflected in pretest and posttest results. The materials were deemed effective when gains fell within the moderate to high category and when test outcomes aligned with observational data and user feedback.

Throughout the entire process, research ethics were carefully observed. Participation by lecturers and students was voluntary and based on informed consent, and participants' identities were kept confidential. All collected data were used solely for academic purposes and scholarly development. By adopting a systematic, participatory, and ethically responsible approach, this study not only produced innovative instructional materials but also proposed a conceptual model of Islamic Values–STEM integration that may serve as a reference for developing Islamic Educational Philosophy learning in higher education institutions.

III. Result and Discussion

A. Research Findings

1. Analysis of Lecturer and Student Needs

The needs analysis revealed that the Islamic Educational Philosophy materials used prior to this study were widely perceived as falling short of postgraduate learning demands. Based on questionnaire data completed by three course lecturers, 36.11% rated the previous materials as "highly unsuitable," 47.22% as "not suitable," and 11.11% as "less suitable." Only 5.55% considered them "suitable," and notably, none selected "very suitable." In practical terms, this means that 83.33% of the lecturers viewed the existing materials as misaligned with the analytical and philosophical orientation expected at the graduate level.

A similar pattern emerged from the 17 student responses. The majority 69.44% described the materials as "highly unsuitable," while 16.01% chose "not suitable," and 5.88% "less suitbale." Merely 8.33% felt that the materials were suitable. These figures suggest that the earlier teaching resources were seen as insufficiently contextual and, perhaps more importantly, not particularly effective in stimulating deeper analytical thinking.

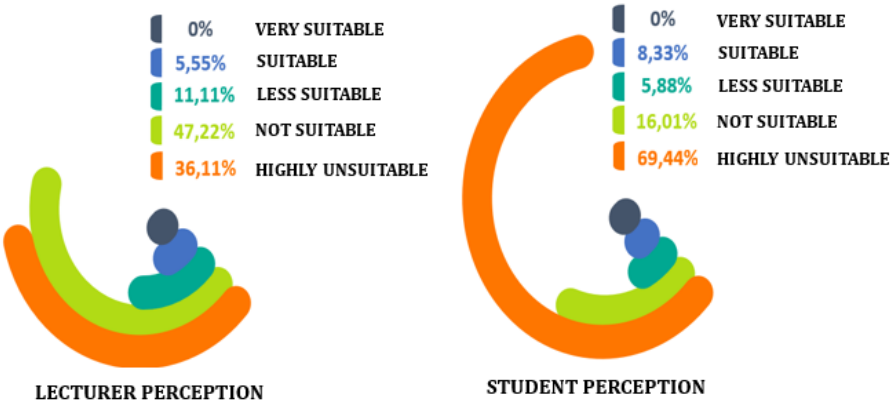

Figure 2. Questionnaire on lecturers' and students' perceptions of the teaching materials that have been used so far.

In contrast to the earlier findings, both lecturers and students expressed a strong need for the development of teaching materials based on an Islamic Values–STEM integration model. Survey data from lecturers show that 49.70% considered the materials "highly needed" and 46.24% "needed", while only 4.06% viewed them as "less needed", resulting in a combined 95.94% that reflects a very high level of demand. A similar tendency appeared among students: 28.93% selected "highly needed", 50.84% "needed", and 20.23% "less needed", with no respondent indicating that the materials were "not needed". Altogether, 79.77% of students demonstrated a clear inclination toward the development of integrative teaching resources. These numbers, taken as a whole, suggest that both groups recognize a genuine gap in the current learning materials and see the proposed integrative approach as not just relevant, but timely.

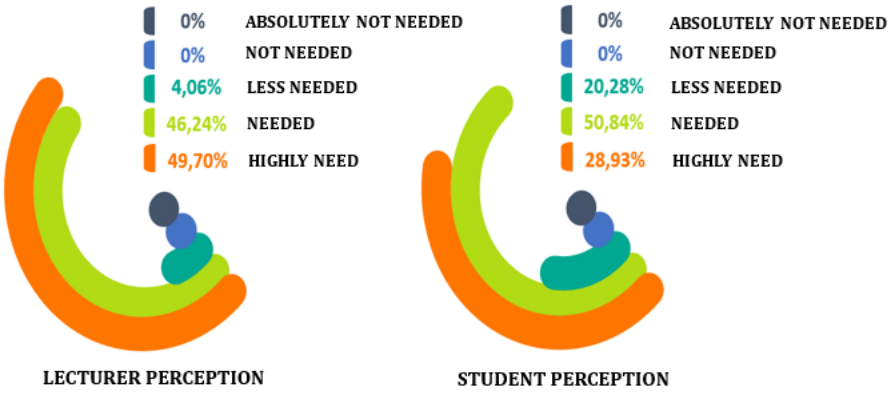

Figure 3. Questionnaire Data on Lecturer and Student Needs for Islamic Values-STEM Integration Model Teaching Materials

Taken together, these two sets of findings make one thing quite clear: both lecturers and students agree that new teaching materials are needed. What they seem to be asking for is not simply another text that revisits philosophical concepts in abstract, theoretical terms. Rather, they expect materials that can bridge those ideas with the lived realities of science and technology, bringing theory down to earth. At the same time, there is a shared expectation that Islamic values should not stand at the margins, but instead function as an ethical compass grounding scientific inquiry within a moral and spiritual framework.

2. Expert Validation Result for Teaching Materials

Once the design and development stages had been completed, the prototype of the teaching material was submitted for expert review. Four specialists were involved in this validation process: a content expert, a presentation expert, a graphic design expert, and a language expert. Each of them examined the material from a slightly different angle, looking at content relevance, the organization and flow of presentation, conceptual accuracy, the integration of Islamic values with STEM perspectives, and the clarity of language. In short, the manuscript was scrutinized both in substance and in form. The

validation results indicate a very high level of feasibility overall. The average scores across the four assessment aspects are presented in the following table:

Table 1. Summary of Validation Results of Islamic Education Philosophy Teaching Materials Integration of Islamic Values–STEM

No	Assessment Aspects	Average Score	Criteria
1.	Content/material Suitability	95,91	Highly Suitable
2.	Presentation Suitability	86,10	Highly Suitable
3.	Graphic Suitability	91,10	Highly Suitable
4.	Linguistic Suitability	95,00	Highly Suitable
	Overall average	92,03	Highly Suitable

Source: Expert validation data (processed, 2025)

The validation findings indicate that the teaching material has met solid academic standards in terms of substance, organization, visual design, and language use. From the reviewers' perspective, the core structure was already sound. The suggestions they offered were relatively minor, mostly related to refining wording here and there and adding a few more contextual illustrations to make certain sections feel less abstract. No major revisions were deemed necessary. For that reason, the product was considered ready to move forward to the implementation stage.

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3. Result of Practicality and User Feasibility Tests

During the implementation phase, the teaching material was piloted with 17 students enrolled in the Islamic Philosophy of Education course. After using the material in class, they were asked to share their responses through a questionnaire. The results were strikingly consistent: 50.69% of the students rated the material as "suitable", while 49.31% considered it "highly suitable". In other words, every single participant (100% of the class) regarded the material as suitable for use in the learning process. Such unanimity is not always easy to achieve, which makes this outcome particularly noteworthy.

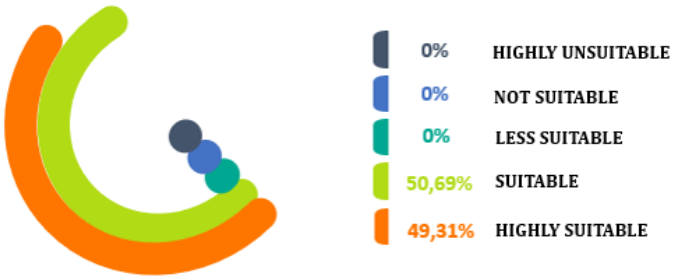


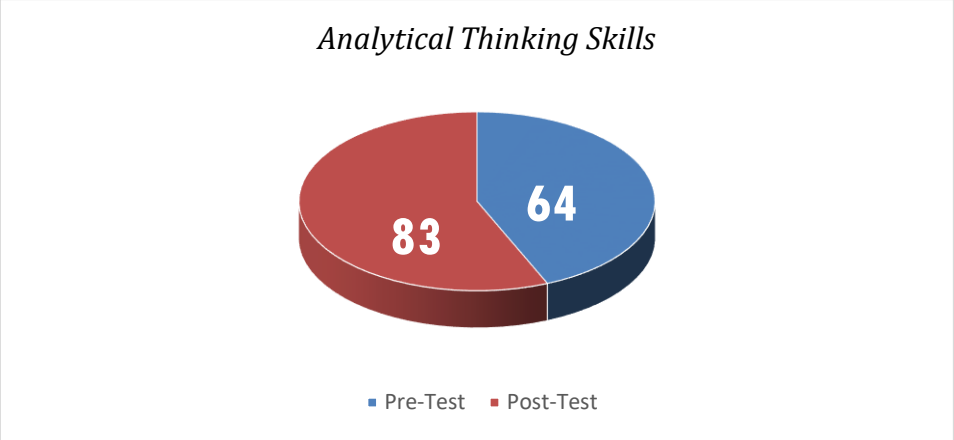
Figure 4. Feasibility of Islamic Education Philosophy Teaching Materials with an Islamic Values-STEM Integration Model to Improve Students' Analytical Thinking Skills.

In their open-ended comments, students pointed out several strengths of the material. First, they appreciated the way Islamic values were woven into discussions of contemporary scientific issues, it did not feel forced, but rather naturally connected. Second, the reflective activities were seen as particularly helpful in sparking critical discussion; some students noted that these sections pushed them to question assumptions they had previously taken for granted. Third, the mini-project guidelines were considered practical and relevant, especially in translating philosophical concepts into present-day contexts of technology and education.

The course lecturer who partnered in the trial phase offered a complementary view. According to the lecturer, the material made it easier to structure the teaching sequence in a more coherent and systematic manner, reducing the tendency to jump between topics. Taken together, these responses suggest that the teaching material demonstrates a high level of practicality, both from the students' standpoint and from the instructional perspective.

4. Result of The Effectiveness Test of Teachinf Materials

The effectiveness of the teaching material was examined through an analytical thinking test administered before and after its use. Prior to the intervention, students obtained an average pretest score of 64. After the learning sessions were completed, the average posttest score rose to 83. This shift, modest at first glance yet meaningful in context, was further analyzed using the normalized gain formula introduced by Richard Hake (1998). The calculation produced a gain value of g = 0.58, which falls into the moderate-to-high improvement category. In practical terms, this suggests that the material did more than simply add information, it appears to have sharpened students' analytical engagement with the subject matter. A visual representation of this improvement in analytical thinking skills is presented in the following figure.



Average gain score = 0.58 (medium–high category)
Source: Results of the effectiveness test of teaching materials (processed, 2025)

Figure 5. Diagram of Improvement of Students' Analytical Thinking Skills

These findings indicate that, after engaging with the integrative Islamic Values–STEM teaching material, students demonstrated a noticeable improvement in their analytical abilities. They were better able to unpack complex concepts in philosophy of education, trace the connections between Islamic values and contemporary educational theories, and construct more coherent, logically grounded arguments during class discussions. In several sessions, the difference was quite apparent, the conversations became sharper, less descriptive, and more argumentative in tone. Taken together, the three principal performance indicators (validity, practicality, and effectiveness) were satisfactorily achieved. The material was not only judged to be highly appropriate in quality, but also practical in classroom use and demonstrably effective in strengthening students' analytical thinking skills. In short, it worked as intended, both on paper and in practice.

This research uses a quasi-experimental one-group pretest-posttest design, a model that is often used in educational development research because it allows the implementation of learning interventions without the need for randomization or separate control classes. Through this approach, changes in students' analytical thinking abilities before and after using Islamic Values - STEM teaching materials can be systematically observed. However, despite the positive improvements shown in the posttest results, the absence of a control group means that the findings must be interpreted with caution. Other factors, such as learning experiences outside the intervention, classroom interactions, or increased understanding of course content, may also have contributed to the observed progress. Therefore, although this study provides meaningful initial evidence regarding the pedagogical potential of the developed materials, future research should strengthen the methodological design by including control groups, broader participant populations, and longer intervention periods.

B. Discussion

The findings of this study point to several insights with meaningful theoretical as well as practical implications for the development of value- and science-based Islamic education. The low relevance of previous teaching materials reflects a deeper pedagogical problem in conventional Islamic philosophy teaching. Much of this material was heavily text-centered and concept-oriented, emphasizing theoretical transmission over analytical engagement. As a result, students were often positioned as passive recipients of philosophical knowledge rather than active interpreters of educational realities. This situation helps explain why such materials were deemed insufficient for cultivating higher-order thinking skills, particularly analytical reasoning.

In many ways, these findings reinforce the argument of Tkachenko (2021), who observed that traditional teaching materials often struggle to foster higher-order thinking because they rely too heavily on memorizing concepts rather than encouraging students to critically engage with authentic values, contexts, and issues. However, this research suggests a more specific explanation within the context of Islamic higher education. When philosophical learning remains disconnected from contemporary scientific, ethical, and technological realities, students may grasp concepts at a theoretical level but struggle to apply them analytically to real-life educational problems.

The Islamic Values–STEM integration model appears to address this limitation by repositioning learning as an interdisciplinary and reflective process. Rather than simply presenting philosophical doctrines, the developed materials encourage students to analyze educational phenomena through multiple perspectives, scientific reasoning, ethical reflection, and Islamic values simultaneously. This integrative structure likely contributes to the observed improvement in analytical thinking, as students are consistently required to interpret problems, evaluate arguments, connect abstract concepts to contemporary realities, and formulate reasoned conclusions based on logic and moral considerations. From this perspective, the demand for a more contextual and interdisciplinary teaching model is no longer simply an educational trend. It reflects a real pedagogical need in contemporary Islamic higher education, particularly in courses aimed at developing reflective and analytical thinking.

At the same time, the strong support for the Islamic Values–STEM integration reinforces the view that contemporary learning should not revolve solely around scientific rationality. Intellectual rigor matters, of course, but so does moral formation. This line of thought resonates with Syed Muhammad Naquib al-Attas (2020), who stresses the inseparability of knowledge (‘ilm) and proper conduct (adab) within Islamic education. By embedding Islamic values into a STEM-oriented framework, learning shifts from being purely cognitive to becoming ethically and spiritually grounded. The present findings also align with the work of Aksan (2023), who argues that a humanistic turn in

STEM can restore the ethical and human dimensions often sidelined in technical instruction. In the context of this research, the Islamic Values–STEM approach may be understood as a concrete expression of this "humanizing STEM" orientation one in which tauhid, moral character, and the pursuit of public good subtly guide students' scientific reasoning.

The strong validation results from the panel of experts further underscore the overall quality of the instructional design and content. An average score of 92.03 suggests that the substance, structure, and mode of presentation are well aligned with widely recognized principles of effective instructional design, as outlined by Walter Dick, Lou Carey, and James Carey (2015). Viewed through the ADDIE framework, this outcome signals that the development and formative evaluation stages were carried out successfully, not merely procedurally but with careful attention to quality. It also lends support to the argument advanced by Robert Maribe Branch (2016), who maintains that instructional products tend to reach a high level of feasibility when experts are involved from the early phases of development. In short, collaboration at the outset appears to pay off.

Turning to effectiveness, the improvement in students' analytical scores points to a meaningful connection between the integrative approach and higher-order thinking skills. The model invited students to examine educational issues across disciplinary boundaries while remaining attentive to ethical considerations. That combination (critical inquiry alongside moral reflection) seems to have encouraged deeper, more deliberate thinking. The rise in average scores from 64 to 83, with a normalized gain of 0.58, reflects an effectiveness level comparable to the findings of Richard Hake (1998), who reported significant conceptual gains in learning environments that emphasized active engagement and reflection. The pattern here feels consistent: when students are asked not only to absorb ideas but to wrestle with them, understanding tends to grow.

In this light, the Islamic Values–STEM teaching material functions as more than a vehicle for transmitting information. It becomes, in a sense, a catalyst for reshaping how students think. Each learning unit, which invites reflection on Islamic values in relation to scientific and technological concepts, encourages students to connect rational argumentation with moral and religious commitments. The classroom conversation, as observed during implementation, gradually shifts from descriptive summaries to more principled reasoning.

The practicality test reveals that the material was not only conceptually sound but also workable in real classroom settings. Students described it as accessible and engaging, while the lecturer noted that its structure helped organize the flow of instruction more coherently. This suggests that the user-centered design principles embedded within the ADDIE model were effectively realized. As argued by Borg and Gall (2007), a strong

educational product is not only theoretically valid but also practical and usable in the field. The present findings seem to affirm that balance.

The empirical evidence generated in this study also resonates quite closely with the ideas put forward by Jalaluddin (2022), who proposed an Islamic–STEM integration model grounded in the synthesis of Islamic epistemology and scientific principles as a way to cultivate both analytical competence and student character. What the present research does, however, is extend that conversation into the domain of Islamic philosophy of education at the postgraduate level, an area that, until now, has received relatively limited scholarly attention. In that sense, the study offers a modest but meaningful contribution: it shifts the integration of values and science beyond the natural sciences and into the humanities, where questions of meaning and ethics are arguably even more pronounced.

In terms of alignment with previous research, these findings are consistent with the conclusions drawn by Masud, Yusuf, and Hanifah (2023), who reported that combining STEM approaches with faith-based education positively influences learners' cognitive and moral development. Yet the present study goes a step further. It demonstrates that such integration is not only beneficial within scientific disciplines but can also effectively strengthen analytical thinking in philosophical inquiry. In other words, the impact is not confined to laboratories or technical problem-solving; it reaches into the reflective, argumentative spaces of philosophical study as well.

The results of this study are also in harmony with the work of Abas, Rahman, and Huda (2024), who found that Islamic-oriented STEM instruction can strengthen Muslim students' higher-order thinking skills. What this study adds, however, is further empirical support showing that the positive impact is not confined to technical or scientific subjects. It also appears in reflective, value-laden courses such as Islamic philosophy of education, where abstract reasoning and ethical positioning play a central role.

Interestingly, this outcome differs from several earlier reports—such as that of Aksan (2023)—which highlighted practical barriers to value–STEM integration, including limited resources and lecturer resistance. In the present case, institutional backing and collaboration among lecturers seemed to ease the transition toward the new teaching materials. This suggests that the success of integration depends not only on the instructional model itself, but equally on the readiness of the academic environment and the broader institutional culture. Even a well-designed model can struggle without that support; conversely, a supportive setting can make innovation feel far less daunting.

More broadly, these findings enrich the literature on integrative pedagogy by offering concrete evidence that Islamic values and scientific approaches can be meaningfully combined through systematically designed teaching materials. The contribution, therefore, operates on two levels. Theoretically, it reinforces the epistemological linkage between revelation and reason within Islamic education. Practically, it provides a design

model that could, with suitable adjustments, be replicated in other courses across Islamic higher education institutions.

From a theoretical standpoint, this study points to the need for a fresh paradigm in developing Islamic education materials, one that deliberately brings values and science into the same conversation. Such integration, in a way, restores the broader mission of Islamic education: not merely producing graduates who are knowledgeable, but nurturing individuals who embody insan kamil, whole persons who understand not only how knowledge works, but also how it ought to be used. Mastery of content alone is no longer enough; ethical awareness must walk alongside it.

On a more practical level, the teaching material developed through this research can serve as a workable model for philosophy courses and related subjects in Islamic higher education. Its structured learning sequence, project-based syntax, and built-in reflections on Islamic values in relation to contemporary technological issues open space for learning that is both active and meaningful. Rather than positioning students as passive recipients of theory, the design encourages them to question, connect, and apply. In that sense, the material is not just a resource, it becomes a framework for cultivating thoughtful, ethically grounded engagement in the classroom.

IV. Conclusion

This study ultimately arrives at a clear conclusion: the development of Islamic Philosophy of Education teaching materials grounded in an Islamic Values–STEM integration model has proven to be valid, practical, and effective in enhancing students' analytical thinking skills. Developed through the ADDIE framework (moving from analysis and design to development, implementation, and evaluation) the final product took shape as a systematic and contextual resource, firmly rooted in Islamic values. Expert validation placed the material in the highly appropriate category across content, presentation, language, and graphical design, with an average score of 92.03. That figure is more than just a number; it suggests that scientific rigor and Islamic ethical orientation can, in fact, coexist within a coherent instructional structure.

The implementation data further reinforce this point. Students' analytical thinking scores increased significantly, with an average normalized gain of 0.58, categorized as moderate to high improvement. This shift indicates that the integrative learning syntax did more than transmit information, it encouraged active reasoning, critical reflection, and the ability to relate philosophical concepts to contemporary issues in science and technology. In practice, the material seems to have worked on two levels at once: sharpening cognitive engagement while simultaneously nurturing ethical and spiritual awareness in understanding the nature of Islamic education. For that reason, the Islamic

Values–STEM approach may be viewed as a viable alternative pedagogical model, one that attempts to bridge knowledge and values, reason and revelation, theory and lived reality within Islamic higher education.

Importantly, the initial need identified at the outset of the study has been addressed in concrete terms. Earlier perceptions, shared by both lecturers and students, that the previous materials were outdated or insufficiently relevant have shifted toward a more positive appraisal of the newly developed product. It is now regarded as contextual, engaging, and meaningful. This transformation underscores the value of learner-centered instructional design, particularly when aligned with the evolving demands of twenty-first century learning.

On a theoretical level, the findings strengthen the case for an integrative paradigm in Islamic education. Science and technology need not be treated as domains detached from Islamic values; rather, they can function as instruments for deepening insight into Divine wisdom. The integrative concept explored here could be further elaborated into what might be termed an Islamic-STEM Pedagogical Framework, one that places spiritual values, moral responsibility, and scientific rationality within a unified epistemological horizon. Practically speaking, the teaching material produced through this research offers a replicable model for other Islamic education programs seeking to foster reflective, contextual, and value-oriented learning.

In sum, this study contributes at both theoretical and practical levels. Theoretically, it enriches the discourse of Islamic philosophy of education by advancing an integrative vision that connects modern scholarship with Islamic ethical foundations in a functional way. Practically, it delivers an empirically tested instructional model ready for application in Islamic higher education settings. It is hoped that this approach will encourage forms of learning that cultivate not only intellectual competence, but also moral steadiness and spiritual depth, the qualities that, at their best, define authentic Islamic education..

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