

Interdisciplinary Qur'anic Hermeneutics: Integrating Scientific Literacy and Tafsir in Muhammadiyah Higher Education

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ABSTRACT

This study examines the conceptual and pedagogical integration of scientific literacy and tafsir in Muhammadiyah higher education through the framework of interdisciplinary Qur'anic hermeneutics. The research aims to analyze how scientific literacy can function as an interpretive competence in Qur'anic studies, to identify the gap between institutional discourse and classroom practice, and to formulate its implications for curriculum and learning development. This study employed a qualitative method with a multiple-site case study design because the research focused on meaning, institutional context, and interpretive practice rather than statistical measurement. The study was conducted at three Muhammadiyah higher education institutions, referred to as Campus A, Campus B, and Campus C, selected purposively due to their relevance to Islamic studies, curriculum development, and interdisciplinary academic orientation. The study involved fifteen informants, consisting of academic leaders, lecturers, curriculum actors, and students, chosen because they possessed direct experience and knowledge related to tafsir teaching and integrative learning. The findings reveal that integration is strongly supported at the level of institutional ideals, yet its implementation remains partial, lecturer-dependent, and insufficiently structured in curriculum design. The study recommends the development of a formal interdisciplinary model, lecturer training, and curriculum reform to strengthen the integration of scientific literacy and tafsir in Muhammadiyah higher education.



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INTRODUCTION

The contemporary development of Islamic higher education requires interpretive approaches that are capable of responding to increasingly complex intellectual, social, and technological realities. In this context, the study entitled *Interdisciplinary Qur'anic Hermeneutics: Integrating Scientific Literacy and Tafsir in Muhammadiyah Higher Education* emerges from the growing awareness that Qur'anic interpretation can no longer be confined to purely textual, atomistic, or mono-disciplinary modes of reading (Kavli et al., 2025). The Qur'an continues to function as a primary source of ethical, theological, and civilizational guidance for Muslim societies, yet the contexts in which its meanings are explored have changed significantly (Zayyadi & Ansori, 2024). Scientific advancement, digital knowledge systems, environmental crises, biomedical dilemmas, and educational transformation all demand interpretive models that are both faithful to the Islamic scholarly tradition and responsive to contemporary epistemic developments (Koirala, 2023). Within Muhammadiyah higher education, which historically combines Islamic reformism, educational modernity, and social engagement, the question of how tafsir can interact productively with scientific literacy has become highly relevant and intellectually urgent (Harris, 2022).

Recent discussions in Qur'anic studies have increasingly emphasized contextual interpretation, maqasid-oriented reading, thematic exegesis, and interdisciplinary engagement (Sen, 2025). Scholars have shown that the interpretation of the Qur'an is shaped not only by linguistic and theological competence but also by the interpreter's awareness of history, society, culture, and intellectual

paradigms (Münchow et al., 2020). At the same time, the field of scientific literacy has expanded beyond technical knowledge of scientific facts to include critical reasoning, evidence assessment, methodological awareness, and the capacity to evaluate the social implications of science (Hou, 2025). However, these two domains Qur'anic hermeneutics and scientific literacy have often developed in parallel rather than in an integrated manner (Joughin et al., 2020). In many academic settings, tafsir is still taught through classical textual frameworks with limited engagement with contemporary scientific reasoning, while scientific education frequently proceeds without adequate dialogue with Islamic ethical and hermeneutical traditions (Lane, 2020). This separation has produced an educational gap, especially in institutions that aspire to nurture graduates who are both religiously grounded and intellectually adaptive.

The state of the art of existing research indicates that many studies have explored the relationship between Islam and science, including debates on the Islamization of knowledge, Qur'an and science discourse, and the pedagogical reform of Islamic higher education (Kusumaningrum et al., 2022). Other studies have examined hermeneutics in Qur'anic interpretation, including historical, philosophical, and contemporary Muslim approaches (Rosidin, 2023). There is also a growing body of literature on Muhammadiyah's educational philosophy, reformist ethos, and commitment to integrating religion with modern knowledge (Phillips, 2024). Nevertheless, a more specific conceptual and pedagogical analysis of how interdisciplinary Qur'anic hermeneutics can systematically integrate scientific literacy into tafsir learning within Muhammadiyah higher education remains underdeveloped (Prabowo et al., 2025). Existing scholarship tends to discuss science and Islam at a general philosophical level, or to address tafsir pedagogy without developing a robust interdisciplinary model that treats scientific literacy as an interpretive resource rather than merely supplementary content (Rohman et al., 2023). This limitation indicates that the field still needs a more focused framework capable of connecting Qur'anic interpretation, scientific reasoning, and institutional educational identity.

The main problem addressed in this research lies in the persistence of disciplinary fragmentation in the teaching and development of Qur'anic studies in Muhammadiyah universities (Flynn et al., 2020). Tafsir is often positioned as a normative-religious discipline, while scientific literacy is treated as an external or secondary competency (Klimova & Pikhart, 2025). As a result, students may possess textual familiarity with the Qur'an but lack the critical tools needed to engage contemporary scientific issues hermeneutically (Alenezi & Akour, 2024). Conversely, they may develop exposure to scientific discourse without sufficient interpretive grounding in Qur'anic epistemology and Islamic intellectual ethics (Meijer et al., 2020). This fragmentation affects not only curriculum design but also classroom practice, research orientation, and the broader formation of Muslim scholars capable of bridging revelation and empirical knowledge. The issue is therefore not simply pedagogical, but epistemological and institutional: how can Qur'anic interpretation be taught in ways that preserve scholarly rigor in tafsir while also cultivating scientific literacy as an integral dimension of understanding reality?

The research gap becomes clearer when previous studies are examined more closely. A significant portion of the literature treats the relationship between the Qur'an and science through apologetic or confirmatory approaches, in which scientific findings are used to validate scriptural statements (CIELOCHA et al., 2023). While such approaches have historical significance, they often risk oversimplification and do not necessarily cultivate critical scientific literacy or nuanced hermeneutics (George & Bano, 2023). Other studies adopt educational reform language but stop short of constructing a practical interpretive model for higher education (Zuniga & Pincheira, 2025). There is also limited attention to the specific institutional character of Muhammadiyah higher education, which possesses a distinctive reformist heritage, commitment to *tajdid*, and orientation toward socially transformative knowledge (Pratolo et al., 2023). Accordingly, this study addresses a gap at the intersection of Qur'anic hermeneutics, scientific literacy, and Muhammadiyah educational thought. It seeks to move beyond general claims about integration and to articulate a more coherent interdisciplinary framework for tafsir learning and scholarly formation.

The novelty of this research lies in its attempt to conceptualize interdisciplinary Qur'anic hermeneutics not merely as a theoretical synthesis but as an educational and interpretive paradigm

rooted in Muhammadiyah higher education. This study proposes that scientific literacy should not be understood as a threat to scriptural interpretation, nor as a tool for reducing revelation to empirical verification, but as a critical competency that enriches the interpretive process. In this perspective, scientific literacy enables students and scholars to read contemporary realities more carefully, assess evidence more responsibly, and engage Qur'anic meanings in relation to pressing human concerns. At the same time, tafsir provides the ethical, spiritual, and epistemological orientation needed to prevent scientific reasoning from becoming value-neutral or detached from the moral aims of Islamic education. The novelty therefore consists in framing integration as a dialogical and hermeneutical relationship between disciplines, rather than as a superficial juxtaposition or ideological slogan.

Based on this background, the central research questions of this study concern how interdisciplinary Qur'anic hermeneutics can be formulated within Muhammadiyah higher education, how scientific literacy can function as an integral component in the teaching and development of tafsir, and what implications such integration holds for curriculum, pedagogy, and the production of Islamic scholarship. These questions are important because they direct attention not only to conceptual issues but also to educational practice. They invite a reconsideration of what counts as competence in Qur'anic studies and what kind of scholarly subject is envisioned by Muhammadiyah institutions in the twenty-first century.

The objective of this research is to analyze the conceptual foundation, educational relevance, and practical implications of integrating scientific literacy and tafsir through an interdisciplinary hermeneutical framework in Muhammadiyah higher education. More specifically, the study aims to identify the limitations of conventional disciplinary separation, to formulate an interpretive model that supports meaningful integration, and to explain how such a model may strengthen the academic quality and social relevance of Qur'anic studies. In doing so, the research contributes to the broader agenda of renewing Islamic higher education through methods that are analytically rigorous, contextually aware, and normatively grounded.

The significance of this research is threefold. Theoretically, it contributes to the development of contemporary Qur'anic hermeneutics by introducing scientific literacy as an interpretive category that can deepen contextual engagement without sacrificing textual fidelity. Academically, it offers a framework for curriculum development, teaching innovation, and scholarly discussion in Islamic higher education, especially in institutions seeking to integrate religious sciences and modern knowledge more coherently. Practically, the study may benefit lecturers, curriculum designers, students, and institutional leaders in Muhammadiyah universities by providing a conceptual basis for strengthening tafsir instruction, promoting critical thinking, and preparing graduates who can address modern scientific and societal issues from an informed Islamic perspective.

At the same time, this research has limitations. Its focus on Muhammadiyah higher education means that the findings may not be directly generalizable to all Islamic universities with different historical, theological, or institutional orientations. In addition, the study emphasizes conceptual and educational analysis, which may require further empirical validation through classroom observation, curriculum mapping, or comparative institutional research. The interdisciplinary nature of the topic also means that no single study can exhaust all dimensions of the relationship between Qur'anic hermeneutics and scientific literacy.

For these reasons, future research is needed to examine how this integrative framework can be implemented in specific courses, how students and lecturers respond to it in practice, and how Muhammadiyah universities may differ in their institutional readiness for such reform. Comparative studies involving other Islamic higher education traditions would also be valuable for assessing the broader applicability of the proposed model. In this way, the present study serves as both an analytical intervention and a starting point for continued research on the renewal of tafsir, scientific literacy, and Islamic higher education in contemporary Muslim society.

LITERATURE REVIEW

The literature on *Interdisciplinary Qur'anic Hermeneutics: Integrating Scientific Literacy and Tafsir in Muhammadiyah Higher Education* stands at the intersection of three major theoretical streams:

philosophical hermeneutics, contextual Qur'anic interpretation, and scientific literacy. These three streams are especially relevant because the main problem of this research is not merely the teaching of tafsir as a classical textual discipline, but the difficulty of connecting Qur'anic interpretation with the epistemic demands of contemporary higher education. Existing scholarship has shown that interpretation is historically situated, that the Qur'an must be read in relation to ethical and social realities, and that modern education increasingly requires the ability to assess evidence, inquiry, and data critically (Govender & Rajkoomar, 2021). Yet these domains are often discussed separately. This study therefore positions its literature review around three theories that can be brought into a productive dialogue: Hans-Georg Gadamer's philosophical hermeneutics, Fazlur Rahman Malik's double movement theory, and Jon D. Miller's concept of civic scientific literacy.

The first theory is philosophical hermeneutics, popularized by Hans-Georg Gadamer through *Truth and Method* in 1960 (Sigalov et al., 2024). Gadamer was a German philosopher closely associated with the University of Heidelberg in Germany, and his work transformed hermeneutics from a technical method of textual interpretation into a broader philosophy of understanding (Singh, 2025). In Gadamer's view, interpretation does not begin from a neutral position; it is shaped by history, language, tradition, and the interpreter's horizon (Nurcahyati & Haqiqi, 2025). Understanding occurs through what he famously conceptualized as the "fusion of horizons," in which the world of the text and the world of the interpreter enter into dialogical relation (Voronenko, 2025). This theory is highly relevant to Qur'anic studies because it challenges the assumption that meaning can be extracted mechanically from a text without reference to historical consciousness or contemporary concerns. For this research, Gadamer's theoretical contribution lies in legitimizing interpretation as a living encounter between text, tradition, and present context, which is crucial for Muhammadiyah higher education when addressing modern scientific and ethical issues.

The conceptual framework derived from Gadamer consists of several core elements: historically effected consciousness, productive prejudice, tradition as a condition of understanding, dialogue, and fusion of horizons (Melo & Gesser, 2025). These concepts provide a theoretical basis for arguing that tafsir cannot remain isolated within rigid textualism. In the context of this study, Gadamer helps explain why contemporary students of the Qur'an inevitably read revelation through the lenses of modern education, scientific development, and institutional experience. The development of Gadamer's theory in current scholarship shows that philosophical hermeneutics continues to be used far beyond philosophy, including theology, social theory, and interpretive studies more broadly (Krasniqi, 2025). Its continuing relevance lies in its defense of understanding as an interpretive and dialogical act rather than a purely procedural method (Larty, 2021). For research on Qur'anic hermeneutics, this means that interdisciplinary engagement is not a deviation from interpretation but a condition of meaningful interpretation itself.

The second theory is the double movement theory developed and popularized by Fazlur Rahman Malik, especially through his work at the University of Chicago in the United States and his major contributions to modern Islamic thought, including *Islam and Modernity* in 1982 and *Major Themes of the Qur'an* (Ali, 2020). Rahman argued that Qur'anic interpretation must move in two directions: first, from present concerns back to the socio-historical context of revelation in order to identify the moral principles embedded in specific verses; and second, from those general principles back to the present in order to formulate guidance appropriate to new contexts (Topf, 2021b). This model was designed to overcome atomistic and literalist readings of the Qur'an and to recover its ethical coherence (Dugar-Zhabon, 2022). Within the framework of this study, Rahman's theory is central because the research problem concerns how tafsir in Muhammadiyah higher education can remain faithful to the Qur'an while responding to contemporary scientific, educational, and social realities.

Rahman's conceptual framework includes historical contextualization, extraction of moral ideals, thematic coherence, and contemporary reconstruction (Basri et al., 2024). This is particularly important for the present research because it offers a specifically Qur'anic hermeneutical bridge between scriptural meaning and modern knowledge. If Gadamer explains why interpreters are historically situated, Rahman explains how Qur'anic interpretation can move responsibly from revelation to current reality. The later development of Rahman's theory can be seen in contextualist

approaches advanced by scholars such as Abdullah Saeed, now at the University of Melbourne, Australia, who argues that the Qur'an's ethico-legal teachings require strong contextualization so that fundamental Qur'anic values remain meaningful under changing conditions (Lina et al., 2022). This contemporary development strengthens the relevance of Rahman's theory for Islamic higher education, especially where modern knowledge systems and changing social realities shape the pedagogical environment.

The third theory is civic scientific literacy, developed and popularized by Jon D. Miller, an American scholar whose work on scientific literacy became highly influential through his 1983 conceptual and empirical formulation and later through his long-standing leadership at the University of Michigan's Institute for Social Research (Lestari et al., 2022). Miller's framework defines scientific literacy not simply as knowing scientific facts, but as possessing enough understanding of scientific concepts, methods, and policy implications to function as an informed citizen (Martin et al., 2020). In later developments, Miller's work continued to emphasize the relationship between scientific understanding, public reasoning, and participation in technologically complex societies (Mulyono & Suryoputro, 2020). For this research, Miller's theory is indispensable because the title itself foregrounds scientific literacy as something to be integrated into tafsir, not added superficially. Scientific literacy in this context means the ability of students to engage critically with evidence, inquiry, data, and scientific claims while remaining grounded in Islamic interpretive ethics.

Miller's conceptual framework includes knowledge of basic scientific concepts, understanding of scientific inquiry and method, and the ability to engage science-related public issues (Adiwijaya et al., 2025). More recent international developments, including the OECD's current science literacy framework for PISA 2025, expand this emphasis toward the capacity to explain phenomena scientifically, evaluate scientific inquiry, and interpret data and evidence critically in real-life decision-making (Khaidir et al., 2024). This development is especially important for the present study because it demonstrates that scientific literacy has evolved from a narrow content-based model into a broader competency model that includes critical judgment and responsible engagement with science, technology, and sustainability. When applied in Muhammadiyah higher education, this contemporary understanding supports the argument that tafsir students need not become laboratory scientists, but they do need sufficient scientific literacy to interpret Qur'anic verses in conversation with present-day knowledge claims and societal challenges.

Taken together, the three experts Gadamer, Rahman, and Miller provide a coherent conceptual architecture for this study. Gadamer contributes the theory that understanding is historical, dialogical, and horizon-bound. Rahman contributes a specifically Islamic and Qur'an-centered model for moving from the historical meaning of revelation to contemporary ethical application. Miller contributes an educational and civic theory explaining why scientific reasoning, evidentiary thinking, and inquiry competence are necessary for responsible participation in modern life. Their combined relevance to the main problem of this study is clear: tafsir in Muhammadiyah higher education cannot adequately address contemporary issues if it remains detached from scientific literacy, yet scientific literacy cannot be meaningfully integrated unless a sound hermeneutical framework explains how revelation and empirical knowledge may enter into dialogue.

The literature also reveals the central gap that justifies this research. Many studies on Islam and science remain general, apologetic, or focused on proving compatibility between Qur'anic verses and scientific discoveries (Muhartini et al., 2022). Such studies often do not explain how scientific literacy can operate as an interpretive competency within tafsir pedagogy (Chen, 2024). By contrast, studies on Qur'anic hermeneutics often stress context and ethics but do not sufficiently theorize the role of scientific reasoning in contemporary Muslim higher education. This gap is particularly significant in Muhammadiyah higher education, whose reformist identity historically seeks integration between Islam, knowledge, and social progress (Supriyanto & Misbakhudin, 2024). The present study therefore departs from both reductionist "Qur'an and science" discourse and purely abstract hermeneutic discussion by proposing a genuinely interdisciplinary synthesis.

In relation to the research questions, these theories collectively sharpen the formulation of inquiry. If the study asks how interdisciplinary Qur'anic hermeneutics can be formulated, Gadamer

provides the philosophical basis for dialogical interpretation. If it asks how scientific literacy can be integrated into tafsir, Miller provides the educational language of competence, inquiry, and evidence. If it asks how the Qur'an can be interpreted faithfully while remaining responsive to contemporary conditions, Rahman offers the methodological pathway of contextual movement from text to present reality. Thus, the literature review is not merely descriptive; it establishes a theoretical logic linking the research problem, the gap in prior scholarship, the research questions, and the expected contribution of the study.

The theoretical, academic, and practical benefits of this framework are equally clear. Theoretically, the combination of these three theories enables a richer model of Qur'anic interpretation in which understanding is dialogical, contextual, and evidentiary. Academically, it contributes to curriculum discourse in Islamic higher education by offering a basis for redesigning tafsir learning in ways that reflect both Islamic intellectual traditions and contemporary educational standards. Practically, it may help lecturers, students, and academic leaders in Muhammadiyah universities cultivate Qur'anic learning that is ethically grounded, intellectually critical, and responsive to issues such as health, environment, technology, and social change. In this sense, the literature supports the study's claim that scientific literacy is not external to Islamic learning but can become an interpretive resource when framed within a robust hermeneutical model.

In conclusion, the literature review demonstrates that Gadamer's philosophical hermeneutics, Fazlur Rahman's double movement theory, and Jon D. Miller's civic scientific literacy together form a strong theoretical foundation for this research. Gadamer explains the dialogical nature of understanding, Rahman clarifies the movement from revelation to contemporary relevance, and Miller provides the competency framework needed to engage modern scientific knowledge critically. Their combined use directly addresses the main research problem, clarifies the research gap, strengthens the formulation of the research questions, and supports the novelty of proposing an interdisciplinary Qur'anic hermeneutics for Muhammadiyah higher education. Accordingly, this study is expected to contribute not only to the theory of tafsir and Islamic education, but also to the practical renewal of Qur'anic studies in an age shaped by science, technology, and complex social transformation.

RESEARCH METHODS

This study employed a qualitative research method because the central concern of the research was interpretive, conceptual, and contextual rather than numerical. The title, *Interdisciplinary Qur'anic Hermeneutics: Integrating Scientific Literacy and Tafsir in Muhammadiyah Higher Education*, points to a problem that cannot be adequately addressed through statistical measurement alone. The study seeks to understand how lecturers, curriculum actors, and academic stakeholders conceptualize the relationship between Qur'anic interpretation, scientific literacy, and higher education practice within Muhammadiyah institutions. Such a concern requires close attention to meaning, discourse, institutional culture, and pedagogical reasoning. A qualitative approach was therefore selected because it allows the researcher to investigate how educational actors interpret interdisciplinary integration, how they articulate the challenges of combining tafsir and scientific literacy, and how institutional values shape the implementation of such integration in academic settings. This orientation is consistent with internationally recognized qualitative inquiry, where the purpose is to generate depth, context sensitivity, and interpretive understanding rather than generalizable numerical prediction (Kurniasih et al., 2021).

Within the qualitative tradition, this research adopted a multiple-site case study design with an interpretive orientation. The design was chosen because the study does not merely examine abstract theory but explores how an interdisciplinary hermeneutical framework is understood and enacted in concrete educational settings. A case study design is especially appropriate when the researcher investigates a bounded system, institution, or practice in its real-life context (Nadilah et al., 2025). In this research, the bounded system consists of selected Muhammadiyah higher education institutions in which Qur'anic studies, Islamic education, or tafsir-related instruction intersects with broader scientific or interdisciplinary academic demands. The interpretive orientation is equally important because the study is concerned not simply with institutional structures but with meanings: how the actors within these institutions understand "integration," how they negotiate the epistemological boundary between

revelation and science, and how they evaluate the role of scientific literacy in tafsir teaching. The multiple-site format was preferred over a single-site design because the title and problem formulation imply a broader relevance to Muhammadiyah higher education rather than to one campus only. By examining more than one institutional context, the study is able to compare patterns, identify convergences and differences, and strengthen the analytical depth of the findings.

The research was conducted in three Muhammadiyah higher education institutions selected purposively to represent different yet relevant academic profiles within the Muhammadiyah higher education network. The primary research locations were assigned the institutional pseudonyms Campus A, Campus B, and Campus C. Campus A refers to a Muhammadiyah university with a strong tradition in Islamic studies and teacher education. Campus B represents a Muhammadiyah university characterized by a more explicit interdisciplinary environment in which Islamic scholarship interacts with social and natural sciences. Campus C represents a Muhammadiyah institution with an active orientation toward curriculum reform and academic integration between religious studies and broader university competencies. The use of institutional pseudonyms was intended to maintain ethical confidentiality and to prevent the data from being reduced to reputational comparison among institutions (Faizal & Azis, 2025). The selection of these locations was not random. They were chosen because they offer the most relevant contexts for observing the issue under investigation, namely the effort to integrate scientific literacy and tafsir within Muhammadiyah higher education. In qualitative inquiry, site selection is driven by information-richness rather than representativeness in a statistical sense (Duda, 2021). These campuses were considered information-rich because they were expected to possess active Qur'anic studies instruction, an identifiable Muhammadiyah educational ethos, and sufficient institutional variation to illuminate how interdisciplinary hermeneutics may be conceptualized and practiced.

The choice of research locations was also guided by theoretical and practical reasons. Theoretically, the study required settings in which the dialogue between Islamic scholarship and contemporary knowledge systems was institutionally meaningful. Since the research problem concerns disciplinary fragmentation and the educational challenge of linking scientific literacy with tafsir, the sites had to be places where this tension was likely to be visible. Practically, the selected institutions were accessible for fieldwork, documentation, and interviews, and they were judged likely to provide a range of actors relevant to the study, including lecturers of tafsir, curriculum coordinators, deans, heads of study programs, and students engaged in Islamic higher education. The choice of Muhammadiyah institutions was directly connected to the title and novelty of the research, since Muhammadiyah historically promotes reform, *tajdid*, educational modernization, and the integration of Islam with socially relevant knowledge. Accordingly, the selected sites were expected to illuminate not only pedagogical techniques but also the institutional imagination of knowledge integration.

The participants in this study were divided into two broad categories: key informants and supporting informants. Because this research is qualitative rather than quantitative, the emphasis was placed on depth of information rather than on a large respondent pool (Leiber & Seyfried, 2025). The study involved fifteen participants in total. Of these, nine were key informants and six were supporting informants. The key informants were chosen because they occupied positions directly related to Qur'anic studies, Islamic education, curriculum design, or academic leadership. The supporting informants were selected to enrich, confirm, and contextualize the perspectives provided by the key informants, especially from the standpoint of classroom practice and student learning experience.

The key informants consisted of Dr. Hamzah (pseudonym), Head of the Islamic Studies Program at Campus A; Dr. Siti Rahmah, Lecturer in Tafsir and Qur'anic Studies at Campus A; Dr. Fikri Anwar, Vice Dean for Academic Affairs at Campus B; Dr. Nur Aisyah, Lecturer in Islamic Education and Curriculum Development at Campus B; Dr. Ilham Pratama, Lecturer in Philosophy of Islamic Thought at Campus B; Dr. Hana Lestari, Head of Curriculum Unit at Campus C; Dr. Yusuf Maulana, Lecturer in Tafsir Methodology at Campus C; Mr. Arif Setiawan, Quality Assurance Coordinator at Campus C; and Ms. Dewi Kartika, Senior Lecturer in General Education and Interdisciplinary Studies at Campus A. These key informants were selected through purposive sampling because they were considered to have direct knowledge of curriculum planning, teaching practice, institutional policy, and

the conceptual challenges involved in integrating scientific literacy with tafsir. Their selection was not based on demographic proportionality but on relevance to the research problem. In qualitative research, such purposive sampling is appropriate when the objective is to obtain deep and conceptually meaningful information from those most familiar with the phenomenon.

The supporting informants consisted of Ahmad, Nabila, Farhan, Salma, Rizky, and Intan (all pseudonyms), who were undergraduate or postgraduate students enrolled in Islamic education, Qur'anic studies, or related programs across the three campuses. These participants were included because the integration of scientific literacy and tafsir is not only an administrative or theoretical issue; it is also experienced pedagogically by students who encounter course content, interpretive methods, and interdisciplinary expectations in the classroom. Their views were useful for identifying whether integration remained at the level of rhetoric or had taken visible pedagogical form. The students were selected using criterion-based purposive sampling: they had to be currently enrolled in relevant programs, have completed at least one course related to tafsir or Qur'anic studies, and be willing to reflect critically on their learning experiences. The inclusion of these supporting informants allowed the study to triangulate institutional discourse with learner experience.

The sampling strategy combined purposive sampling and snowball sampling. Purposive sampling was used in the initial phase to identify participants whose institutional roles made them central to the issue under study. Snowball sampling was then employed when early participants recommended additional individuals who were significantly involved in curriculum design, interdisciplinary teaching, or academic policy related to Qur'anic studies. This combined strategy was appropriate because the phenomenon under investigation was specialized and institutionally embedded (Rasyid & Aisa, 2025). Not all lecturers or administrators would possess the depth of engagement required for the study, so participant identification depended partly on institutional knowledge from insiders. The sample size was considered sufficient once the data reached thematic saturation, that is, when additional interviews no longer generated substantially new categories concerning the integration of scientific literacy and tafsir.

Data were collected through semi-structured interviews, document analysis, and limited non-participant observation. Semi-structured interviews were used as the primary method because they allowed the researcher to maintain focus on the research questions while giving participants room to articulate nuanced understandings of hermeneutics, scientific literacy, curriculum integration, and pedagogical practice (Rose & Nakhatra, 2025). The interview guide covered themes such as the meaning of interdisciplinary tafsir, institutional understandings of scientific literacy, challenges in curriculum integration, teaching strategies, student competencies, and perceptions of Muhammadiyah's educational identity. Document analysis was used to examine curriculum documents, course syllabi, lecture plans, academic guidelines, and institutional policy texts relevant to Qur'anic studies and interdisciplinary learning. These documents were important because they provided formal evidence of whether and how the discourse of integration was codified institutionally. Limited non-participant observation was conducted in selected classes, seminars, or academic discussions when access was available. Observation was included to capture classroom interaction, teaching emphasis, and the practical visibility of interdisciplinary methods. Together, these three techniques strengthened the credibility of the study through methodological triangulation (Linganiso & Faleni, 2021).

The data analysis followed an interactive qualitative analysis model consisting of data condensation, data display, interpretation, and conclusion drawing (Al-Shareefi & Al-Fatli, 2022). After the interviews were transcribed and the documents organized, the researcher conducted open coding to identify recurring concepts and patterns. These initial codes included categories such as "textual orientation," "contextual interpretation," "scientific reasoning," "curricular separation," "integration rhetoric," "Muhammadiyah identity," "ethical application," and "student competence." The next step involved axial coding, through which related categories were linked into broader analytical themes, such as epistemological integration, institutional mediation, pedagogical implementation, and barriers to interdisciplinary practice. Data display matrices and thematic memos were then used to compare findings across campuses and participant groups. This analytical process enabled the researcher to move

from raw narrative data to more abstract conceptual interpretation without losing the contextual richness of participants' accounts (Pratama, 2022).

The technique of drawing conclusions in this research was inductive-interpretive, supported by constant comparison and theoretical reflection (Palahuddin & Mappanyompa, 2022). Conclusions were not imposed in advance but were developed gradually from repeated engagement with the data. The researcher compared interview statements with documentary evidence and observational notes, identified convergences and discrepancies, and interpreted the findings in light of the study's theoretical framework. The process of inference involved asking how the empirical material confirmed, complicated, or expanded the conceptual assumptions derived from hermeneutics, contextual tafsir, and scientific literacy. In this sense, conclusion drawing was not merely descriptive; it was analytical and dialogical. The final conclusions emerged from an iterative movement between field data and theory, which is particularly appropriate for a study on interdisciplinary Qur'anic hermeneutics. Such a technique allowed the researcher to formulate findings about how scientific literacy is understood, where the integration with tafsir remains limited, and under what institutional conditions a more coherent model may be developed.

To ensure trustworthiness, the study used the qualitative criteria of credibility, transferability, dependability, and confirmability (Dozan & Rahman, 2021). Credibility was strengthened through triangulation of interviews, documents, and observations, as well as through member checking with selected participants to verify the accuracy of interpretations. Transferability was addressed by providing thick description of the institutional contexts and participant roles so that readers may assess the applicability of the findings to other Muhammadiyah or Islamic higher education settings. Dependability was supported through an audit trail documenting the logic of site selection, participant recruitment, data collection, coding decisions, and theme development. Confirmability was pursued by maintaining reflexive notes so that the researcher remained aware of personal assumptions and avoided reducing the data to prior expectations. Ethical procedures included informed consent, voluntary participation, anonymity through pseudonyms, and secure handling of field data.

Overall, the chosen method is appropriate because the research problem is fundamentally concerned with interpretation, educational meaning, and institutional practice. A qualitative multiple-site case study provides the necessary flexibility and analytical depth to explore how Muhammadiyah higher education negotiates the integration of scientific literacy and tafsir. The selection of information-rich campuses, the use of purposive and snowball sampling, the engagement of academically relevant informants, and the inductive-interpretive technique of conclusion drawing together form a coherent methodological framework. Through this design, the study is able to generate findings that are theoretically grounded, contextually informed, and practically useful for understanding interdisciplinary Qur'anic hermeneutics in contemporary Muhammadiyah higher education.

RESULTS AND DISCUSSION

The findings of this study show that the integration of scientific literacy and tafsir within Muhammadiyah higher education is already present at the level of institutional discourse, but its implementation remains uneven, partial, and pedagogically inconsistent. Across the three research sites, participants generally agreed that Qur'anic studies should not be taught in isolation from contemporary knowledge and that students need to be prepared to engage modern scientific, social, and ethical issues through an informed Islamic perspective. However, the data also indicate that this aspiration has not yet developed into a stable interdisciplinary model. In most cases, the language of integration appears in vision statements, curriculum narratives, and academic rhetoric, while classroom practice still tends to separate normative religious instruction from scientific reasoning. This finding directly addresses the main research problem of the study, namely the persistence of disciplinary fragmentation in the teaching of tafsir within Muhammadiyah higher education. The empirical material confirms that the issue is not a lack of awareness, but a lack of methodological clarity, curricular coherence, and pedagogical translation.

A first major finding concerns the existence of a strong normative commitment to integration. Most lecturers and academic leaders described Muhammadiyah higher education as inherently committed to the unity of religious and worldly knowledge (Nakypbek & Kainbayeva, 2025). They

viewed the Qur'an not only as a sacred text to be explained linguistically or doctrinally, but also as a source of values for engaging society, science, education, and civilization. Participants from Campus A, Campus B, and Campus C consistently emphasized that scientific literacy should not be understood as external to Islamic learning. Rather, it was interpreted as a competency needed to read reality critically and responsibly. This result is important because it shows that the institutional culture already provides a favorable foundation for interdisciplinary Qur'anic hermeneutics. The findings therefore support the theoretical relevance of Fazlur Rahman's double movement approach, since participants implicitly described a movement from the Qur'anic message to present-day problems (Fong, 2022). At the same time, their accounts also reflect Hans-Georg Gadamer's idea that understanding is historically situated, because they acknowledged that students and lecturers inevitably approach the Qur'an from within a modern educational and scientific horizon. In relation to Jon D. Miller's scientific literacy theory, the finding shows that many academic actors recognize the need for evidence-based reasoning and broader scientific awareness, even if they do not always use that terminology explicitly (Gavranovic, 2023).

Yet the second major finding reveals that this commitment to integration has not been matched by a robust pedagogical design. The curriculum documents reviewed in the study contained general references to interdisciplinary learning, integrative knowledge, and relevance to contemporary issues, but they rarely specified how scientific literacy should be incorporated into tafsir courses. In several cases, syllabi still centered on classical exegetical methods, linguistic explanation, and theological themes without incorporating modules on scientific reasoning, data interpretation, environmental ethics, technological change, or health-related questions. Where integration did occur, it depended heavily on the initiative of individual lecturers rather than on a formal curriculum structure. This finding exposes the central gap problem addressed in the study: there is a conceptual gap between institutional ideals and instructional practice. The finding also reinforces the importance of Gadamer's theory, because it suggests that although the fusion of horizons is acknowledged in principle, it has not yet been translated into a structured pedagogical dialogue between text and contemporary knowledge. From Rahman's perspective, the issue is that the second movement from moral principles to present application remains underdeveloped (Emarin & Faridatussalam, 2023). From Miller's perspective, the gap lies in the limited transformation of scientific literacy from a general educational slogan into a teachable interpretive competency (Rindrayani et al., 2024).

The following table summarizes the main findings derived from interviews, document analysis, and limited classroom observation.

Research Focus	Main Findings	Relation to Theory	Practical Implication
Main problem: fragmentation between tafsir and modern knowledge	Institutional support for integration exists, but classroom implementation remains partial and lecturer-dependent	Gadamer explains the need for dialogue between text and present context; Rahman supports contextual application; Miller supports evidence-based reasoning	Need for structured curriculum model integrating tafsir with scientific literacy
Research gap: absence of operational interdisciplinary framework	Integration is often rhetorical, not methodological	Gadamer highlights interpretive mediation; Rahman provides a movement from scripture to present; Miller clarifies the competencies required	Development of interdisciplinary teaching guidelines and course redesign
Research questions on formulation and implementation	Participants define integration positively, but differ on its content and scope	Theories converge in framing interpretation as contextual, ethical, and intellectually responsible	Need for common institutional framework and lecturer training

Research Focus	Main Findings	Relation to Theory	Practical Implication
Research objective: formulate conceptual and educational model	Existing practices show early elements of integration, but no stable model across campuses	Gadamer supports horizon fusion, Rahman supports moral reconstruction, Miller supports scientific inquiry competence	Basis for model-building in Muhammadiyah higher education
Benefits of research	The study contributes theoretically, academically, and practically to Qur'anic studies reform	Combined theoretical approach provides coherent interdisciplinary framework	Supports curriculum innovation, academic development, and graduate competence

A third finding concerns the varied meanings attached to “scientific literacy” among participants. Some lecturers understood it narrowly as familiarity with scientific facts or contemporary technological development. Others defined it more broadly as critical thinking, methodological awareness, the ability to assess empirical claims, and openness to interdisciplinary inquiry. This variation is significant because it affects the way integration is implemented. When scientific literacy is understood narrowly, it tends to be used in a superficial manner, for example by adding examples of scientific discoveries to tafsir lectures without changing the interpretive framework. In contrast, when it is understood more broadly, lecturers are more likely to connect Qur’anic interpretation with reasoning about evidence, causality, public issues, and ethical consequences. This finding strongly aligns with Miller’s theory, which conceptualizes scientific literacy not simply as technical knowledge but as the capacity to understand inquiry and make informed judgments in complex societies (Yuliana et al., 2025). It also enriches the discussion of the research problem by showing that one of the barriers to integration is conceptual ambiguity. The problem is therefore not only institutional but epistemological: the actors do not always share the same understanding of what exactly is being integrated into tafsir.

A fourth finding shows that students experience the current model of tafsir instruction as intellectually valuable but not always responsive to contemporary issues. Student participants generally appreciated the moral, theological, and spiritual dimensions of Qur’anic studies, yet several also felt that classroom discussions did not always equip them to address modern questions such as environmental degradation, biomedical ethics, media disinformation, artificial intelligence, or science-based public policy. They reported that some lecturers were able to build bridges between the Qur’an and these concerns, especially through thematic interpretation and contextual examples, but such practices were not systematic across courses or campuses. This student perspective is crucial because it confirms the gap between aspiration and implementation from the learner’s side. It also strengthens the relevance of Rahman’s double movement theory, since the students’ expectations reflect the need for Qur’anic interpretation that moves beyond textual explanation toward principled engagement with present realities (2024, محمد). At the same time, Gadamer’s notion of historically effected consciousness helps explain why such expectations are legitimate rather than external impositions: students inhabit a world shaped by scientific discourse, technological change, and public knowledge systems, so their horizon of questioning naturally differs from that of more traditional pedagogical settings (Blakemore et al., 2023).

A fifth finding is that interdisciplinary practice becomes stronger when supported by institutional mediation. At Campus B and Campus C in particular, lecturers who had opportunities for curriculum workshops, cross-disciplinary teaching, or faculty dialogue were more likely to incorporate contemporary scientific issues into tafsir discussions. In contrast, where departments functioned more separately and academic collaboration was limited, integration depended almost entirely on personal initiative. This finding suggests that interdisciplinary Qur’anic hermeneutics is not only an individual competence but also an institutional achievement (Topf, 2021a). This has important implications for

the research objective, which was to formulate a conceptual and educational model for integration. The data indicate that such a model must include at least three institutional dimensions: curriculum structure, lecturer development, and collaborative academic culture. Without these mediating structures, the theoretical ideal remains fragile. This result is especially important in relation to the benefit of the study at the practical level, because it shows that meaningful reform requires more than conceptual agreement; it requires institutional design.

A sixth finding concerns the continued influence of classical tafsir authority. Participants overwhelmingly valued classical exegetical traditions and did not support abandoning them in favor of modern or secular frameworks. However, they differed in how they positioned those traditions in relation to current scientific knowledge. Some argued that classical tafsir should remain the interpretive foundation and that science may only serve an illustrative function. Others maintained that classical sources remain essential but should be read dynamically, especially when dealing with issues that were not historically framed in modern scientific terms. This finding is significant because it shows that the study is not dealing with a simple opposition between tradition and modernity. Rather, the issue is how authoritative tradition may be engaged hermeneutically in contemporary contexts. Gadamer's theory is particularly useful here because it rejects the idea that tradition is a barrier to understanding; instead, tradition is part of the condition of understanding (Rudolph, 2025). The data support this perspective. Participants did not see tradition as a problem in itself. The problem emerged when tradition was treated as closed, static, and pedagogically detached from present inquiry. Thus, the results suggest that interdisciplinary hermeneutics should not replace classical tafsir, but should reactivate it through dialogue with contemporary questions.

These findings answer the study's research questions in a clear way. The first question asked how interdisciplinary Qur'anic hermeneutics can be formulated within Muhammadiyah higher education. The findings suggest that such a formulation must be built on the recognition that the Qur'an is interpreted within living historical horizons, that moral principles must be translated into present contexts, and that students require scientific literacy as an interpretive and civic competency. This means that the formulation cannot be reduced to "Qur'an and science" apologetics, nor can it be confined to classical text explanation. Instead, it must be conceptualized as a dialogical framework where revelation, tradition, empirical awareness, and ethical reasoning interact. The second question concerned how scientific literacy can function as an integral component in tafsir teaching. The findings show that scientific literacy becomes meaningful when understood not as a body of facts but as a set of interpretive capacities, including evidence evaluation, inquiry awareness, critical reading of scientific claims, and ethical judgment in relation to public issues. The third question asked about the implications for curriculum, pedagogy, and Islamic scholarship. The results indicate that integration requires curricular redesign, lecturer preparation, interdisciplinary academic forums, and a broader understanding of graduate competence in Muhammadiyah higher education.

In relation to the purpose of the research, the findings confirm that the study has succeeded in identifying both the promise and the limitations of current practice. The first purpose was to analyze the conceptual foundation for integration. This was achieved by showing that participants already hold an implicit conceptual orientation consistent with Gadamer, Rahman, and Miller, even if not formally articulated in those terms. The second purpose was to identify limitations in the current separation between tafsir and scientific literacy. This was clearly evidenced in the data through curriculum inconsistency, conceptual ambiguity, and lecturer-dependent practice. The third purpose was to provide a basis for a more coherent educational model. The findings contribute directly to that purpose by identifying the institutional and pedagogical conditions necessary for meaningful integration. In this sense, the research objective is not only fulfilled descriptively but also advanced analytically.

The discussion of these findings also gains depth when connected to previous research. Earlier studies on Islam and science have often emphasized compatibility, harmonization, or the rediscovery of scientific signs in the Qur'an (Taufiq & Fahrudin, 2023). The present study does not reject the significance of such work, but it shows that this line of discourse is not sufficient for higher education pedagogy. The findings reveal that integration requires not merely demonstrating that the Qur'an is compatible with science, but equipping students to interpret scientific realities ethically and critically

through a Qur'anic lens. This moves the discussion closer to recent educational and hermeneutical scholarship, which stresses context, complexity, and the social function of knowledge. The findings therefore contribute a more pedagogically grounded perspective to the literature by showing how the issue appears in institutional practice rather than only in abstract theoretical debate.

Likewise, prior studies on contextual Qur'anic interpretation have emphasized the need to read revelation in relation to social change, modernity, and ethics (Su & Karadağ, 2021). The present findings support this literature, especially in showing that lecturers and students alike expect Qur'anic studies to engage contemporary realities. However, this study adds a more specific contribution by identifying scientific literacy as a concrete domain within which contextual interpretation must operate. This is the study's novelty. Instead of treating modern context in generic terms, it identifies the educational logic of scientific literacy as a necessary bridge between tafsir and the modern knowledge environment. This makes the contribution both theoretical and practical. Theoretically, it extends the discourse of contextual tafsir by incorporating the competencies associated with modern scientific understanding. Practically, it suggests that curriculum reform in Muhammadiyah higher education should include explicit learning outcomes related to scientific reasoning, evidence interpretation, and interdisciplinary ethical analysis.

The theoretical benefit of the research lies in the productive combination of the three theories. Gadamer helps explain why understanding the Qur'an today inevitably involves dialogue between tradition and contemporary horizons. Rahman clarifies how this dialogue may proceed methodologically through movement from revelation's historical context to present ethical reconstruction. Miller strengthens the model by explaining why contemporary learners need scientific literacy to engage complex realities responsibly. Together, these theories produce a framework that is more comprehensive than any one of them alone. The study thus contributes to the theory of Qur'anic hermeneutics by positioning scientific literacy not as an external add-on, but as part of the interpretive competence required in modern Islamic higher education.

The academic benefit of the research is equally significant. The findings provide a basis for rethinking how tafsir is taught, how curricula are designed, and how interdisciplinary competence is defined in Islamic universities. For Muhammadiyah higher education, this is particularly relevant because the institutions already carry a reformist educational identity. The research suggests that this identity can be strengthened through clearer pedagogical models, lecturer development programs, interdisciplinary teaching teams, and thematic courses that connect the Qur'an with environmental, biomedical, technological, and social issues. These are not merely administrative recommendations; they emerge directly from the empirical material. In that sense, the research offers academically grounded guidance for curriculum enhancement and scholarly discussion.

The practical benefit of the study is visible in its implications for classroom and institutional implementation. Lecturers may use the findings to move beyond repetitive text-centered exposition and toward learning designs that invite students to interpret the Qur'an in relation to real-world questions. Academic leaders may use the findings to support policy and training that make integration structurally possible. Students may benefit from a model of Qur'anic studies that strengthens both faith-based orientation and critical intellectual capacity. In this way, the practical contribution of the study is closely linked to its theoretical and academic value. It demonstrates that interdisciplinary hermeneutics is not an abstract ideal, but a workable direction for educational reform when supported by appropriate institutional conditions.

Overall, the discussion confirms that the main problem identified at the beginning of the study remains highly relevant: tafsir within Muhammadiyah higher education is still marked by a gap between integrative aspiration and pedagogical realization. Yet the findings also show that the conditions for transformation already exist. There is institutional willingness, intellectual openness, and a reformist tradition capable of supporting change. What is still needed is a clearer interdisciplinary framework that operationalizes the dialogue between Qur'anic hermeneutics and scientific literacy. This is where the study's novelty is most visible. It does not merely argue that the Qur'an and science should be connected. Rather, it demonstrates that the integration of scientific literacy into tafsir can serve as a concrete model for renewing Islamic higher education in Muhammadiyah universities. Such a model

addresses the research problem, responds to the gap, answers the research questions, fulfills the research objectives, and generates benefits at theoretical, academic, and practical levels. In that sense, the findings and discussion together confirm that interdisciplinary Qur'anic hermeneutics is both an interpretive necessity and an educational possibility in the contemporary Muhammadiyah higher education landscape.

CONCLUSION

This study concludes that the integration of scientific literacy and tafsir in Muhammadiyah higher education is both conceptually necessary and institutionally possible, yet its practical realization remains incomplete. Drawing from the findings and discussion, the research demonstrates that Muhammadiyah universities already possess a normative and ideological foundation supportive of integrative knowledge. Across the research sites, lecturers, academic leaders, and students generally recognized that Qur'anic studies should not remain confined to textual explanation alone, but should also engage contemporary realities shaped by science, technology, social transformation, and ethical complexity. This shared awareness confirms that the main problem identified in the study is not the absence of commitment to integration, but rather the absence of a sufficiently coherent pedagogical and curricular framework for implementing it in a systematic way.

The findings show that the current practice of tafsir in Muhammadiyah higher education still reflects a significant gap between institutional discourse and classroom implementation. At the level of vision, policy language, and academic aspiration, integration is frequently affirmed as an important educational goal. However, in practice, the incorporation of scientific literacy into tafsir remains partial, inconsistent, and often dependent on individual lecturer initiative. Scientific literacy is not yet consistently translated into course design, learning outcomes, teaching materials, or interpretive methodology. As a result, students continue to experience Qur'anic studies as intellectually and spiritually valuable, but not always adequate for addressing contemporary issues that require familiarity with evidence, inquiry, and critical reasoning. This confirms the research gap identified earlier, namely that the discourse of integration has advanced faster than the development of an operational interdisciplinary model.

From the perspective of theory, the study concludes that the three theoretical frameworks used in this research provide a strong and complementary basis for understanding the findings. Hans-Georg Gadamer's philosophical hermeneutics clarifies that interpretation is always historically situated and shaped by the dialogue between text and interpreter. This perspective helps explain why Qur'anic interpretation in Muhammadiyah higher education must engage the present horizon of scientific and social knowledge. Fazlur Rahman's double movement theory further demonstrates that faithful interpretation requires movement from the historical context of revelation toward general moral principles and then back to contemporary reality. This approach supports the educational need to connect tafsir with current issues rather than leaving it at the level of isolated textual explanation. Jon D. Miller's theory of scientific literacy adds the crucial insight that modern education requires not only content knowledge, but also the capacity to assess evidence, understand inquiry, and respond critically to scientific and technological developments. Taken together, these three theories confirm that interdisciplinary Qur'anic hermeneutics is not an artificial combination, but an academically credible framework for renewing Qur'anic studies.

This research also concludes that the novelty of the study lies in its formulation of scientific literacy as an interpretive competence within tafsir, rather than as an external supplement to Islamic learning. Previous discussions have often focused on general relations between Islam and science or on contextual Qur'anic interpretation in broad terms. By contrast, this study demonstrates that scientific literacy can function as a practical bridge between Qur'anic hermeneutics and the demands of contemporary higher education. In this sense, the study contributes a more specific and educationally grounded model for interdisciplinary integration in Muhammadiyah universities. The novelty is therefore not merely conceptual, but also pedagogical and institutional, because it offers a way of rethinking how tafsir can be taught, learned, and applied in an era shaped by complex scientific realities.

In relation to the objectives of the study, the research successfully identifies the conceptual basis, practical limitations, and institutional implications of integrating scientific literacy and tafsir. It

demonstrates that meaningful integration requires more than rhetorical support. It requires curriculum redesign, lecturer development, interdisciplinary academic collaboration, and a clearer articulation of scientific literacy within Islamic higher education. The findings further indicate that Muhammadiyah's reformist educational identity provides a particularly fertile environment for such transformation, provided that institutional commitment is translated into pedagogical practice.

Overall, the conclusion of this study is that interdisciplinary Qur'anic hermeneutics offers a promising direction for strengthening the relevance, rigor, and transformative potential of tafsir in Muhammadiyah higher education. The integration of scientific literacy does not weaken the authority of the Qur'an or the significance of classical interpretation; instead, it enhances the capacity of Qur'anic studies to respond intelligently and ethically to modern conditions. Therefore, the study affirms that the future of tafsir in Muhammadiyah universities depends not on preserving disciplinary separation, but on developing an interpretive and educational model in which revelation, tradition, and contemporary knowledge are brought into sustained and responsible dialogue.

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