

A Multidisciplinary Approach to Integrating Islamic Values and Local Culture into STEM Pedagogy in Arabic Language Learning

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Abstrak

Pembelajaran Bahasa Arab selama ini masih didominasi metode tradisional yang menekankan hafalan dan analisis teks klasik, sehingga kurang mendukung pengembangan keterampilan abad ke-21 seperti berpikir kritis, kolaborasi, dan pemecahan masalah. Penelitian ini bertujuan untuk merumuskan dan mengembangkan model pembelajaran Bahasa Arab yang inovatif dengan mengintegrasikan pendekatan STEM, nilai-nilai Islam, dan budaya lokal, sehingga mampu menciptakan pengalaman belajar yang aplikatif, kontekstual, dan bermakna bagi siswa. Metode penelitian menggunakan kajian kepustakaan dengan pendekatan analitis-kritis terhadap literatur nasional dan internasional terkini, khususnya yang membahas pedagogi STEM, pembelajaran bahasa, pendidikan berbasis nilai Islam, serta konteks budaya lokal pada periode 2020–2025. Hasil kajian menunjukkan bahwa integrasi STEM memungkinkan Bahasa Arab dijadikan media eksplorasi, diskusi, dan produksi proyek, sementara nilai-nilai Islam seperti amanah, adab, ta'āwun, dan ṣidq membimbing aktivitas pembelajaran secara etis, dan konteks budaya lokal meningkatkan motivasi serta makna belajar. Model operasional yang diusulkan menekankan identifikasi masalah nyata, eksplorasi linguistik, integrasi lintas disiplin, produksi karya, serta refleksi dan evaluasi sesuai prinsip konstruktivisme sosial Vygotsky. Penelitian ini menawarkan kerangka pedagogis holistik yang mengintegrasikan dimensi kognitif, afektif, spiritual, dan kontekstual, sehingga pembelajaran Bahasa Arab tidak hanya meningkatkan

kompetensi berbahasa, tetapi juga membentuk karakter Islami, kesadaran budaya, dan keterampilan abad ke-21 yang relevan secara global.

Kata Kunci: Pendekatan Multidisipliner, Pembelajaran Bahasa Arab, Integrasi STEM, Nilai-Nilai Islam, Budaya Lokal

Abstract

Arabic language learning has long been dominated by traditional methods emphasizing memorization and classical text analysis, which limits the development of 21st-century skills such as critical thinking, collaboration, and problem-solving. This study aims to formulate and develop an innovative Arabic learning model that integrates STEM approaches, Islamic values, and local culture, thereby creating a meaningful, contextual, and application-oriented learning experience for students. The research employs a library research method with a critical-analytical approach, reviewing national and international literature from 2020 to 2025, particularly studies on STEM pedagogy, language learning, Islamic value-based education, and local cultural contexts. The findings indicate that STEM integration enables Arabic to serve as a medium for exploration, discussion, and project production, while Islamic values such as amanah, adab, ta'āwun, and ṣidq ethically guide learning activities, and local cultural contexts enhance motivation and the meaningfulness of learning. The proposed operational model emphasizes real-world problem identification, linguistic exploration, interdisciplinary integration, project creation, and reflection and evaluation, in line with Vygotsky's social constructivist principles. This study contributes by offering a holistic pedagogical framework that integrates cognitive, affective, spiritual, and contextual dimensions, ensuring that Arabic learning not only improves language competence but also cultivates Islamic character, cultural awareness, and 21st-century skills relevant to the global context.

Keywords: Multidisciplinary Approach, Arabic Language Learning, STEM Integration, Islamic Values, Local Culture

Introduction

Arabic language learning in various educational institutions is still dominated by a traditional, textual approach that is oriented toward memorization. The learning process generally emphasizes mastery of grammar (nahwu-sharaf), vocabulary comprehension, and analysis of classical texts, isolated from real-life contexts. This learning model treats Arabic as a stand-alone discipline and lacks alignment with 21st-century competencies, such as critical thinking, problem-solving, creativity, and collaboration (AlQbailat et al., 2025). As a result, students tend to passively understand the language, memorizing patterns without being able to apply them to communication and contextual problem-solving. This situation also reduces motivation to learn, active engagement, and a sense of Arabic's relevance to the development of science and modern life.

Changes in the educational paradigm and globalization make pedagogical renewal an urgent need. STEM Approach (*Science, Technology, Engineering, and Mathematics*) is seen as a framework that encourages problem-solving, project-based learning, and meaningful use of technology (Arifa et al., 2025). In its development, this approach was expanded to STEAM by adding elements of the arts, which emphasize creativity, expression, and cultural sensitivity as integral parts of the learning process. When applied to Arabic language learning, STEM allows language to be understood not as an object of memorization but as a medium for exploration, the delivery of ideas, collaborative discussion, and the production of project-based work (Ma et al., 2025). Thus, this approach has the potential to transform Arabic language learning into a more applicable, creative, and aligned practice with the demands of digital literacy and higher-order thinking skills.

However, learning Arabic has unique characteristics due to its status as the language of the Quran. This language carries religious and moral functions, so the goal of learning is not only to improve linguistic competence but also to instill Islamic values such as etiquette, trustworthiness, academic honesty, and spiritual awareness (Hamidah & Abdullah, 2025). STEM integration is therefore inseparable from the internalization of Islamic values, so that pedagogical innovation does not erode students' spiritual identity but instead strengthens it through meaningful, civilized learning experiences.

Furthermore, the local cultural context is a determining factor in ensuring the relevance and meaning of Arabic language learning. Each educational environment has its own unique traditions, social practices, and local wisdom, which can serve as sources of authentic learning. Learning that ignores cultural context risks alienating students and making the material feel distant from their lives. Therefore, integrating a STEM approach into Arabic language learning should be adapted to local cultural realities, so that linguistic and scientific concepts can be linked to students' everyday experiences, the language they use, and the social values familiar to them (Anderson & Deil-Amen, 2024). This approach not only delivers modern, innovative learning but is also grounded and contextual, reflecting the identity and character of the learners.

Previous research explored how Quranic values can be integrated into STEM learning in madrasas. Results showed that such integration not only supports students' STEM competencies but also improves student achievement in science competitions, demonstrating the synergy between religious values and scientific competencies (H. I. Siregar et al., 2024),

besides that, the STEM curriculum is imbued with honesty, cooperation, responsibility, discipline, able to shape students' character holistically while improving cognitive skills such as critical thinking, problem solving, and scientific attitudes (Anas & Iswantir, 2024). Implementation of STEAM combined with Islamic values in Islamic schools. Through observations, interviews, and curriculum documentation, the results show that value integration can support holistic education by combining intellectual abilities with students' spiritual and moral character (Jalil et al., 2023).

Other research shows that integrating science education and Islamic religious education can be achieved through learning that prioritizes moral and spiritual values , as well as scientific concepts, to form students who are not only academically intelligent but also have a strong Islamic character (Mahanis & Witono, 2025). The traditions of Islamic scholarship and science need not be separated but can be synthesized in an integrative curriculum that emphasizes a balance among spiritual, intellectual, and practical dimensions. This offers a strong theoretical foundation for a multidisciplinary model such as the one you propose (Jalil et al., 2023).

A recent literature review reveals that most studies still separate STEM competency development, Islamic values education, and sensitivity to local culture. Previous research tends to emphasize either the cognitive-technological or moral-spiritual aspects separately, without offering an integrative framework that unites all three in Arabic language learning. This gap highlights the need for studies that formulate an integrative pedagogical model that emphasizes not only language proficiency but also simultaneously combines STEM literacy, the internalization of Islamic values, and local cultural relevance.

Thus, this study aims to develop an applicable and contextual conceptual framework for Arabic language learning, capable of fostering 21st-century skills such as critical thinking, creativity, collaboration, and digital literacy, as well as strengthening students' spiritual and cultural identities. This integration is expected to produce a learning model that is adaptive to global challenges, yet remains rooted in Islamic values and local wisdom, so that Arabic is studied not only as an academic discipline but also as a means of character formation and cultural understanding.

Research Method

This research uses library research with a critical-analytical approach, emphasizing systematic exploration and in-depth reading of relevant scientific literature to examine,

understand, compare, and evaluate concepts related to the research focus (Adlini et al., 2022). This approach was chosen because the research aims to develop an integrative conceptual framework for Arabic language pedagogy that links STEM, Islamic values, and local culture. Therefore, this study requires a strong, comprehensive theoretical foundation, and the analysis focuses on credible, up-to-date academic literature that reflects cross-disciplinary scientific developments.

The data sources include national and international journal articles limited to publications from 2020 to 2025 to ensure the recency of perspectives and methodological alignment with the challenges of 21st-century education, particularly the integration of critical thinking skills, technology utilization, and interdisciplinary approaches that are key characteristics of STEM-based learning. This time span also allows researchers to identify shifts in contemporary pedagogical paradigms that are evolving to meet today's global demands.

Data were collected through structured searches of academic databases, including Google Scholar, DOAJ, Scopus, Web of Science, and university journal portals. Researchers used relevant keywords, including "*STEM education*", "*Islamic values in education*", "*local culture-based learning*", and "*Arabic language pedagogy*". Each article was selected based on inclusion criteria, namely topic relevance, clarity of the conceptual framework, and reliability of the research methodology. The selected literature was then grouped into four main domains: STEM pedagogy, Islamic values, local culture, and Arabic language pedagogy, using thematic categorization. This stage aimed to maintain the analysis's focus while mapping the interrelationships between domains in the formulation of an integrative model.

Data analysis was conducted using thematic analysis to identify patterns, similarities, and differences in concepts across the literature, thereby enabling the emergence of multidisciplinary integration principles (Adlini et al., 2022). After identifying the main themes, the researchers conducted a conceptual synthesis, integrating cross-disciplinary findings into a systematic, applicable implementation framework for Arabic language learning. The validity of the concept was strengthened through comparisons with Arabic language learning theory, Islamic education, and modern pedagogy, ensuring the resulting model remained aligned with the characteristics of each discipline. This process yielded a

strong conceptual foundation for integrating STEM, Islamic values, and local culture into Arabic language learning that is contextual and relevant to the demands of the 21st century.

Research Finding

Integrative Framework of STEM, Islam, and Local Culture in Arabic Language Pedagogy

To provide a comprehensive perspective on Arabic language pedagogy, this framework integrates educational approaches, cultural contexts, and religious values. It illustrates how STEM-based strategies, Islamic values, and local culture interact synergistically in the Arabic language learning process. The framework emphasizes learning as a socially mediated activity grounded in students’ real-life contexts. Guided by Vygotsky’s socio-cultural theory, teachers function as facilitators who scaffold learners’ development. Through this integration, Arabic learning becomes meaningful, contextual, and aligned with 21st-century competencies while preserving Islamic and cultural identities.

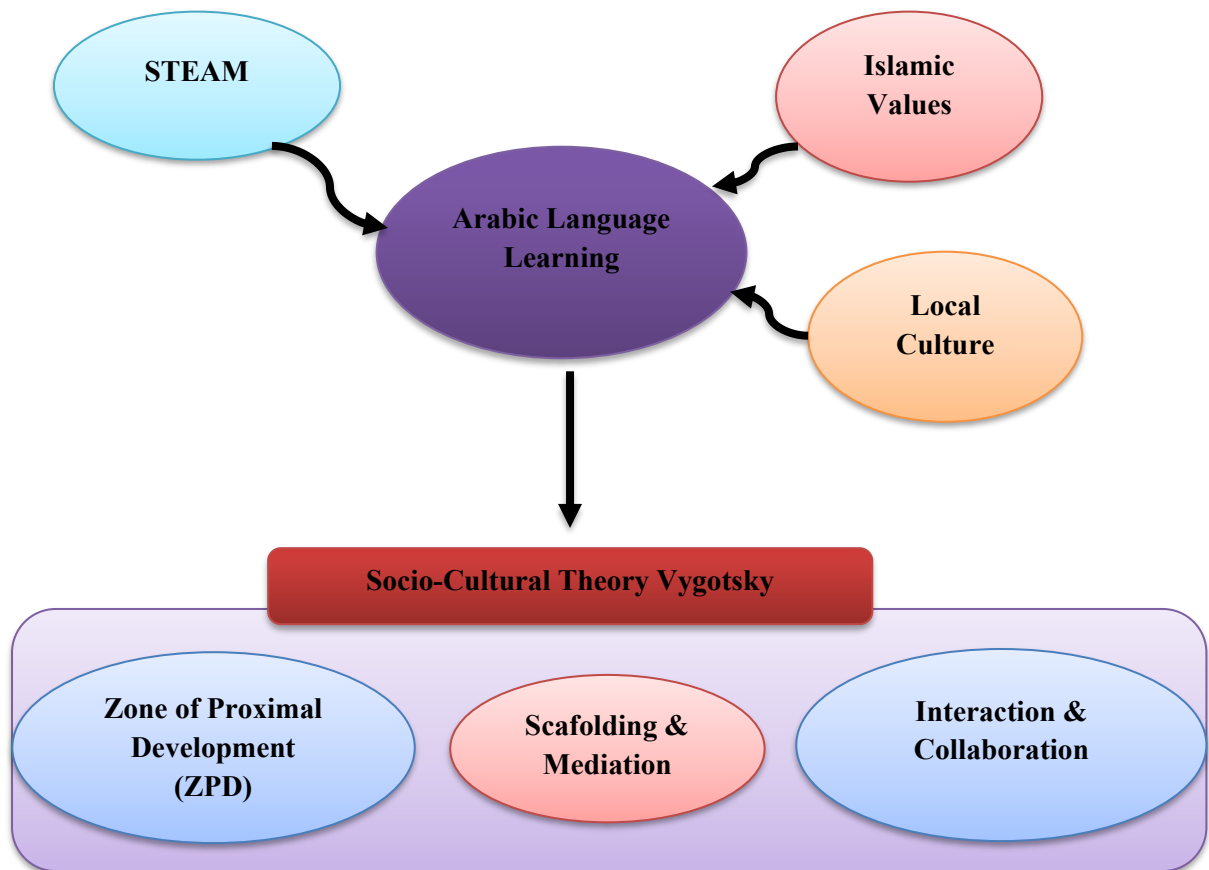


Figure 1. Integrative Framework

The integrative framework of STEM, Islam, and Local Culture in Arabic language pedagogy stems from the realization that language learning does not occur in a vacuum, but is always rooted in the social, cultural, and epistemological contexts that shape how learners understand the world. Language is understood not only as a system of phonology, morphology, and syntax, but as a symbolic means for constructing meaning, interacting socially, forming identities, and connecting values and life experiences (Arifuddin et al., 2025). Therefore, Arabic language learning needs to move from a traditional approach that emphasizes memorization to a multidisciplinary approach that positions students as active subjects in the process of thinking, creating, and interacting.

In this context, the STEM approach provides a methodological foundation that emphasizes scientific inquiry, problem-solving, technological literacy, and creative design. When applied to Arabic language learning, STEM principles encourage a shift from routine practice patterns to more exploratory, project-based, and application-oriented activities (Fauzi et al., 2025). For example, students can leverage technology to create dialogue simulations, design vocabulary infographics, or simple linguistic experiments that help them understand sentence structure through visual models. In other words, STEM provides a scientific and innovative approach that makes Arabic a cognitive tool rather than just a subject for memorization. This approach aligns with the literacy needs of the 21st century, where critical, creative, collaborative, and communicative thinking skills are key requirements (Pepilina et al., 2025).

Islamic values serve as an ethical and spiritual foundation that guides the learning process, ensuring it remains within the bounds of morality and etiquette. Concepts such as *amanah*, *adab al-ḥiwār*, *ṣidq*, *iḥsān*, *ta'āwun*, and *ijtihad* are not only normative principles, but they can also be translated into pedagogical practices. In classroom interactions, these values serve as an ethical framework that shapes students' character as Arabic language users, both in communication and in their appreciation of Islamic intellectual heritage (Idhan et al., 2024). The integration of Islamic values also maintains a connection between modern pedagogical innovation and the rich Islamic scholarly tradition, resulting in a progressive approach rooted in Islamic identity.

Local culture serves as a social context in which learners construct and negotiate meaning. Culturally responsive Arabic language learning utilizes traditions, social practices, cultural artifacts, and students' local experiences as sources of meaning in the learning

process (Irawan, 2023). When students see the connection between Arabic and local realities, whether through themes, examples, analogies, or community-based projects, they feel the learning is relevant and part of their lives. This integration of local culture strengthens motivation, enriches the learning context, and creates a harmonious relationship between religious, local, and academic identities.

During this multidisciplinary integration, Socio-Cultural Theory, as articulated by Lev Vygotsky, provided a highly strategic theoretical foundation. This theory views learning as a social process constructed through interaction, symbolic mediation, and cultural environmental support. Key concepts such as the Zone of Proximal Development (ZPD), scaffolding, and language mediation hold that students' cognitive development occurs through interaction with teachers, peers, and cultural artifacts. In Arabic language learning, Vygotsky's theory supports the use of dialogue, group work, interactive discussion, and language as a tool for thinking (language as a tool for thought). When the teacher provides scaffolding appropriately, whether in the form of examples, prompting questions, or strategic guidance. This allows students to move beyond their current abilities to their potential, thereby accelerating language acquisition in a meaningful way.

Vygotsky's theory also aligns closely with the integration of STEM, Islam, and local culture. In the STEM context, collaborative project-based learning and team-based problem-solving align with Vygotsky's idea that social interaction is the primary engine of cognitive development (Fauzi et al., 2025). In the context of Islamic values, the principles of *ta'awun* (collaboration), discussion etiquette, and Islamic traditional learning practices such as *halaqah* and *musyāwarahin* align with the view that knowledge is built through dialogue and guidance (Idhan et al., 2024). Meanwhile, local culture provides mediational tools in the form of the mother tongue, cultural symbols, folk tales, or social practices that shape how students interpret reality and build concepts in Arabic (Irawan, 2023).

Thus, integrating Vygotsky's theory further strengthens the pedagogical framework that positions Arabic language learning as a socio-cultural process. Language is not merely learned as an object, but is used as a tool for thinking, interacting, and constructing identity in concrete and meaningful contexts. In this model, the teacher acts as a facilitator who provides scaffolding, the learning environment as a rich interactive space, and students as active actors who construct knowledge through structured collaborative activities.

Overall, the integrative framework of STEM, Islam, and Local Culture is strengthened by Socio-Cultural Theory, which results in a holistic pedagogical approach. STEM provides an orientation toward innovation and higher-order thinking skills. Islam provides moral, spiritual, and epistemological direction. Local culture provides relevance and a sense of contextual closeness. Vygotsky's theory provides a scientific foundation for how all these components work through social interaction and cultural mediation. With this combination, Arabic language learning can develop into a comprehensive educational model that is scientific, character-based, contextual, innovative, and aligned with the needs of modern learners without abandoning the cultural identity and Islamic values that underpin their lives.

Discussion

Implementation of Islamic Values in STEM-Based Arabic Language Learning

The implementation of Islamic values in STEM-based Arabic language learning is a strategic step to ensure that pedagogical innovation extends beyond technical and cognitive aspects to encompass the moral, spiritual, and character dimensions of students (Anas & Iswantir, 2024). STEM-based learning that emphasizes scientific inquiry, design creativity, collaboration, and technological literacy essentially requires a solid ethical foundation so that scientific practices are not separated from human values (Juwairiyah & Fanani, 2025). It is at this point that Islamic values such as *amanah*, *adab*, *ta'āwun*, and *ṣidq* become an integrative pillar that guides the overall direction of student development (Permatasari et al., 2025). In Arabic, the integration of Islamic values becomes increasingly significant, as this language serves not only as a means of communication but also as a spiritual medium and a vehicle for Islamic civilization. Therefore, implementing Islamic values in STEM-based Arabic language learning aims to make the learning process a space for the simultaneous development of morals, scientific thinking, and religious awareness.

Mark *amanah* is the main foundation that governs how students fulfill their academic responsibilities at each stage of STEM learning (Anas & Iswantir, 2024). In Arabic language projects such as vocabulary video creation, language-based prototype design, digital linguistic experiments, or field data collection, trustworthy projects encourage students to maintain honesty in managing information, respect the contributions of team members, and complete tasks according to agreed procedures and timelines. This value not only serves as a moral ethic but also aligns with the social constructivist view that knowledge is built

through honest, valid, and responsible contributions within a learning community (Permatasari et al., 2025). Thus, trust becomes a form of epistemological responsibility: students realize that the quality of shared knowledge depends on everyone's integrity.

Mark, it plays a crucial role in academic interactions. In Islamic tradition, *adab* is not merely polite behavior, but encompasses intellectual ethics, how to behave toward teachers, respect the opinions of others, provide evidence-based arguments, and accept criticism with an open heart (Permatasari et al., 2025). When the principles of manners are integrated into STEM learning, it creates an academic environment conducive to scientific dialogue, peer review, and collaborative inquiry (Baehaqi et al., 2024). *Adab* fosters scientific humility that aligns with the ethos of Islamic science and serves as an important basis for scientific collaboration in project-based learning (I. A. Siregar, 2022). With *adab*, the classroom becomes a space where the process of thinking and interaction is not only oriented toward results, but also toward the quality of interpersonal relationships and the nobility of scientific ethics.

Mark *ta'āwun* (cooperation in goodness) enriches the collaborative aspects of STEM learning (Juwairiyah & Fanani, 2025). Collaboration, from an Islamic perspective, is not merely a means to achieve effectiveness, but rather a form of social worship that strengthens solidarity and empathy. When students work together in groups to solve linguistic problems, analyze Arabic texts, or design STEM-based products, they collaborate not only cognitively but also spiritually. The value of *ta'āwun* makes group work not just a pedagogical strategy but also a transformative experience that instills the awareness that knowledge and good deeds must be pursued together (Jalil et al., 2023). This aligns with Vygotsky's social constructivist principle that cognitive and language development emerge through meaningful social interactions (Permatasari et al., 2025).

Mark *Sidq* (honesty) helps ensure integrity in every stage of learning (Anas & Iswantir, 2024). In the STEM approach, processes such as observation, data recording, experimentation, and reporting are highly susceptible to manipulation. Implementing the value of *sidq* ensures that students uphold academic ethics in managing information and producing scientific work (I. A. Siregar, 2022). This honesty is not only religiously relevant but also a fundamental requirement for modern scientific practice. Thus, Islamic values and the scientific ethos converge on one point: integrity.

The integration of Islamic values is even stronger when linked to constructivist Learning theory, both those developed by Piaget and those modernized by Bruner (Permatasari et al., 2025). According to Piaget, learning is an active process in which students construct their knowledge through assimilation and accommodation. In the context of STEM-based Arabic language learning, Islamic values become a moral schema that helps students process new information more meaningfully. When students work in groups, explore projects, or reflect, these values, *amanah*, *adab*, and *ta'āwun* function as a cognitive and affective structure that directs the learning process (Juwairiyah & Fanani, 2025).

Bruner expanded the constructivist idea by emphasizing scaffolding, spiral learning, and enactive, iconic, and symbolic representation. Islamic values can function as scaffolding that guides how students act, communicate, and make scientific decisions (Hadi, 2025). For example, when students design Arabic-based projects, the values of *adab* and *ṣidq* become internal rules that guide their exploratory process. Furthermore, Bruner's spiral learning model allows Islamic values to be taught not just once but continuously, integrated into increasingly complex contexts, thereby fostering the development of religious character and scientific abilities in balance (Permatasari et al., 2025).

Modern constructivism, which emphasizes that knowledge is built through meaningful experiences and social interactions, is highly compatible with integrating Islamic values into the STEM approach (Anas & Iswantir, 2024). Islamic values are not only moral content but also serve as mediational tools that help students organize learning experiences, understand assignments, and interact ethically and productively (Permatasari et al., 2025). Thus, integrating Islamic values into STEM-based Arabic language learning not only enriches the religious dimension but also strengthens the cognitive, social, and methodological dimensions, in accordance with the principles of constructivism.

Ultimately, implementing Islamic values in STEM-based Arabic language learning, supported by Constructivism and Social Constructivism theories, results in a holistic educational model that is scientific, ethical, collaborative, and contextual. The learning process is no longer a mechanical activity, but rather an intellectual-spiritual journey that unites reason, morals, and experience. This integration makes Arabic language learning a space for character development and higher-order thinking skills, which are essential for addressing the challenges of 21st-century education, without losing the foundation of Islamic values and culture that underpin students' identities.

The Relevance of Local Culture as a Meaningful Context for Arabic Language Learning

Given the understanding that language learning never stands alone from learners' socio-cultural context, the relevance of local culture in Arabic learning is a key foundation for creating authentic, contextual, and meaningful learning experiences (Andini & Sirozi, 2024). Local culture provides a living, concrete, and close context to students' daily experiences, so that language is not simply learned as an abstract system of phonology, morphology, and syntax, but as a social practice related to community identity, values, and dynamics (Al Arief, 2024). Local wisdom, community traditions, social practices, and even the region's ecological landscape are rich sources of inspiration for developing learning materials, discussions, and STEM-based projects relevant to everyday life (Ji & Shapii, 2024).

When students learn Arabic vocabulary and structure through themes such as mutual cooperation, market trading, traditional ceremonial processions, or environmental conservation activities, they not only understand the language formally but also relate it to experiences that provide personal and social meaning (Sulton & Kabir, 2025). This understanding aligns with Vygotsky's social constructivism, which emphasizes that language and knowledge are formed through social interaction and the internalization of cultural values in the learning process (Hasan et al., 2024).

Local cultural integration gains theoretical legitimacy through the Integrative Curriculum Theory and the Multidisciplinary Integration approach, as developed by Beane and expanded by Drake & Burns (Andini & Sirozi, 2024). Beane emphasizes that an integrative curriculum should begin with real-life issues or experiences relevant to students, rather than a rigid disciplinary structure, so that local culture becomes the most immediate and meaningful starting point for students (Haluti et al., 2024). Meanwhile, Drake & Burns emphasize the flexibility of multidisciplinary integration, enabling teachers to holistically integrate Arabic, science, technology, and culture to foster a comprehensive, contextually grounded understanding (Fadillah et al., 2025).

In practice, local culture serves not only as context but also as a conceptual bridge connecting linguistic competence with STEM literacy, social awareness, and cultural identity (Sulton & Kabir, 2025). For example, projects documenting community traditions in Arabic-language videos, creating simple technology prototypes based on local wisdom,

or developing digital information media about regional cuisine provide concrete evidence of how multidisciplinary integration works naturally and mutually reinforcingly (Arifin, 2025).

When students engage in local cultural exploration using Arabic as a medium, they learn not just about the language but through it (Hasan et al., 2024). Language becomes a tool for understanding the surrounding reality, analyzing community issues, and creatively expressing ideas. The implementation of project-based learning integrated with STEM and local culture encourages collaboration, contextual problem-solving, and the production of products with social value. This approach creates an inclusive, relevant, and empowering learning space, making Arabic not just a school subject but also a skill that strengthens cultural understanding, social participation, and global connections (Ji & Shapii, 2024).

Thus, the relevance of local culture in Arabic language learning is not merely content enrichment, but a theory-based pedagogical strategy that emphasizes the importance of multidisciplinary integration and authentic experiences. This approach emphasizes that Arabic can be learned contextually, groundedly, and meaningfully, while strengthening students' cultural identities. This perspective supports the research objective of developing a multidisciplinary pedagogical model that integrates STEM, Islamic values, and local cultural contexts, so that learning becomes applicable, creative, critical, character-based, and relevant to global challenges and 21st-century needs.

Operational Model of Arabic Language Learning with a Multidisciplinary Approach

The operational model for learning Arabic using a multidisciplinary approach is a systematic, structured, and contextually relevant pedagogical design for students. This model moves from identifying contextual problems to producing knowledge, interdisciplinary collaboration, and internalizing Islamic values and local culture in the learning process (Arsyad & Rathomi, 2025). With this approach, learning is not merely theoretical or mechanical but becomes an operational flow that can be implemented in real-world settings by teachers and students in the classroom, is flexible, and oriented towards practical results (Bolick et al., n.d.).

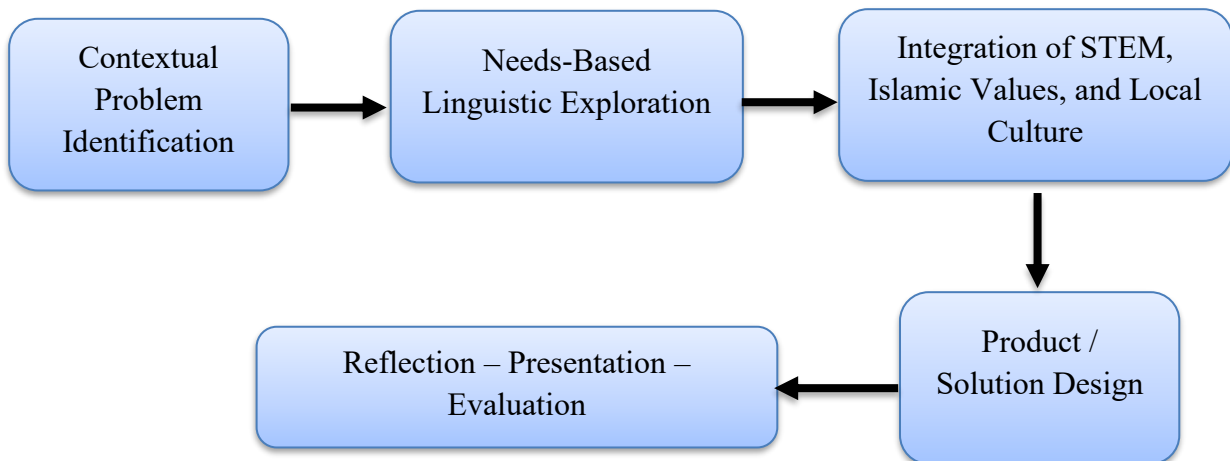


Figure 2. Flow of the Learning Operational Model

This operational model consists of five main stages as follows:

1. This operational model emphasizes the importance of real-world problems as a starting point for learning. Teachers and students work together to identify real-world problems in their local environment, such as environmental issues (e.g., waste and pollution), marginalized local traditions, community social activities, or economic dynamics in traditional markets (Zendrato et al., 2024). These problems serve not only as a gateway to language learning but also as a driving force for the entire learning process, ensuring that Arabic is used functionally and relevantly to students lived experiences (Ramadhan, 2023).

By identifying real-world issues, students are encouraged to view Arabic not simply as a formal subject but as a tool for analysis, communication, and problem-solving. This approach aligns with Vygotsky's principles of social constructivism, which emphasize that language and knowledge develop through social interactions and internalization of cultural values in real contexts (Hasan et al., 2024).

2. Linguistic exploration involves teachers guiding students to identify the Arabic language competencies needed to understand and describe the issues raised (Fuadin et al., 2023). This stage includes vocabulary development, sentence structure, expressions, and narrative or descriptive texts, all selected based on the project's needs, not a mechanical curriculum list.

Approach purpose-driven learning, which emphasizes that language must be used as a tool for thinking, analysis, and communication to solve real-world problems (Laely & Kusnawati, 2023). For example, when students raise the issue of trade in traditional markets, they learn vocabulary about transactions, merchandise, and social interactions. If the issue raised is environmental conservation, vocabulary related to flora, fauna, and conservation activities becomes the focus. At this stage, STEM literacy integration begins to be operationalized. Students collect field data, conduct simple measurements, analyze data using diagrams or graphs, and utilize digital technology to process information. This demonstrates how language, science, and technology learning can occur simultaneously, fostering holistic understanding and remaining relevant to everyday life.

3. This model is reinforced by Beane's Integrative Curriculum Theory and Drake & Burns' multidisciplinary approach. Beane emphasizes that an integrative curriculum must stem from real-world issues relevant to students' lives, rather than rigid academic disciplines (Arsyad & Rathomi, 2025). Local culture is an ideal starting point because it represents the most intimate and meaningful experience for students (Haluti et al., 2024).

Drake & Burns emphasize the flexibility of multidisciplinary integration, which allows teachers to holistically integrate Arabic, science, technology, and culture, thus enhancing students' learning experiences (Fadillah et al., 2025). In practice, learning projects serve as a platform for cross-disciplinary encounters, such as Arabic as a medium for communication and reflection, science and technology as a means of exploring data and solutions, and local culture as context and inspiration. Islamic values are internalized throughout the process, including trustworthiness, cooperation, scientific honesty, discipline, and ethical discussion (Mushlihin et al., 2025). Students learn that every action, collaboration, and scientific work must be based on moral principles in accordance with Islamic principles, so that learning not only produces academic competence but also shapes character.

4. The creative and applied phase of this operational model is the design of a solution or product. Students work in groups to produce a simple technology prototype, an Arabic-language documentary video about local traditions, an infographic about regional cuisine, an investigative report, or a digital campaign based on a specific issue. In these activities, Arabic serves as both a means of communication and a medium for creative expression. Islamic values guide the process, for example, through principles such as trustworthiness

in data compilation, etiquette in collaboration, and scientific honesty in reporting. This activity emphasizes that language learning is not merely theory or mechanical practice, but a constructive activity that demands critical thinking, creativity, and social responsibility (Mushlihin et al., 2025).

5. The final stage is reflection, presentation, and evaluation. Students reflect on the learning process, collaboration, integration of Islamic values, and the cultural sensitivity they have developed (Zendrato et al., 2024). Presenting results in Arabic provides students with the opportunity to demonstrate language proficiency as a communicative competency rather than simply memorizing rules. Evaluation is conducted not only on the final product but also on the collaborative process, the use of STEM literacy, and the internalization of cultural and spiritual values. This evaluation process helps teachers assess the success of the operational model in creating comprehensive, integrative, and meaningful learning. Thus, this model not only produces linguistic competence but also 21st-century skills, cultural understanding, collaborative abilities, and a strong Islamic character.

In the context of Arabic language learning, this model emphasizes the use of language as a tool for thinking, analysis, and communication, in line with modern principles such as Communicative Language Teaching (CLT) and Task-Based Language Learning (TBLT) (Haq, 2023). This approach allows students to learn language in a contextual and relevant way with real experiences, unlike traditional methods that emphasize memorization and mechanical grammatical rules.

In Islamic education, values such as *amanah*, *adab*, *ta'āwun*, and *ṣidq* are internalized throughout the learning process. This approach balances the cognitive, social, and spiritual dimensions, enabling students to learn not only academic competencies but also Islamic character development. This model respects classical Islamic educational traditions such as *halaqah* and *musyāwarah* but is contextualized within collaborative projects grounded in STEM and local culture.

From a modern pedagogical perspective, this model adopts STEM practices, project-based learning, team collaboration, and digital literacy, in line with 21st-century demands. Principles of constructivism (Piaget, Bruner) and social constructivism (Vygotsky) support learning based on social interaction, scaffolding, and meaningful experiences. Students are trained to think critically, creatively, and collaboratively, while using Arabic as a medium for expression, analysis, and reflection.

The integration of Arabic, Islamic education, and modern pedagogy creates a harmony that preserves the identity of each discipline. This model ensures that Arabic is learned communicatively and contextually that Islamic values serve as moral and spiritual guidelines, and that modern pedagogical practices equip students with 21st-century skills. With this approach, learning produces linguistic competence, character, creativity, collaboration, and higher-order thinking skills relevant to global and local challenges.

Conclusion

This study found that the operational model of Arabic language learning using a multidisciplinary approach effectively integrates STEM principles, Islamic values, and local culture into a problem-oriented learning flow. Teachers act as facilitators providing scaffolding, while students collaboratively engage in projects and technology-based products, enhancing language proficiency, Islamic character, and cultural awareness in alignment with 21st-century skills.

The study's limitations include its implementation in a single school, which limits the generalizability of the findings, and its largely descriptive evaluation of the model's effectiveness. Future research is recommended to test this model across various educational levels, develop more quantitative assessment instruments, and adapt the model to diverse cultural and technological contexts. Such efforts aim to optimize the relevance, applicability, and sustainability of Arabic language learning in meaningful, contextually relevant ways.

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