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Bridging Spiritual and Social Dimensions in Biology Education: A Needs Analysis for the Developing STILL-aLI Model

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Abstract: This study examines the integration of the Learning Society and Learning Islam paradigms within biology learning as an empirical foundation for developing the STILL-aLI model (Stimulating, Thinking, Investigating, Listing & Reporting, Learning Society, Learning Islam). A descriptive quantitative survey design was employed involving 50 Biology Education students and five lecturers from UIN Alauddin Makassar. Data were collected through mixed format questionnaires and open-ended responses and analyzed descriptively. The results show that only 36% of students had participated in community-service–based learning, and 64% of lecturers had not yet integrated such activities into their courses. The integration of Islamic knowledge was most evident in the learning atmosphere (64%) and content (62%), yet remained limited in learning models (22%) and instructional media (16%). The study's novelty lies in articulating a pedagogical framework that simultaneously incorporates spiritual ethical Islamic values and community-oriented collaborative learning two dimensions that have been largely treated separately in previous biology education research. Practically, the findings underscore the need for contextual, value-integrated biology instruction that strengthens students' critical thinking, creative thinking, communication, collaboration, and digital literacy. Overall, this study provides an empirical basis for the development of the STILL-aLI model as an innovative, holistic, and culturally grounded approach to biology education in Islamic higher education institutions.

Keywords: Learning Islam, Learning Society, Model STILL-aLI

A. Introduction

Biology education worldwide has shifted from a narrow emphasis on conceptual mastery toward a broader agenda that integrates ethics, sustainability, and character formation within STEM learning. This transformation aligns with global movements such as Education for Sustainable Development (ESD) and the call for responsible science that cultivates learners' moral, ecological, and social awareness (UNESCO, 2020). Across international contexts, researchers have highlighted the need for STEM

education to embed ethical reasoning, cultural values, and socio-scientific sensitivity to prepare citizens capable of addressing complex global challenges, including climate change, biodiversity loss, and social inequality (Zeidler, 2016). Within this broader discourse, the Indonesian context through initiatives such as Merdeka Belajar and the Profil Pelajar Pancasila mirrors these global priorities by encouraging the integration of cognitive, affective, and character dimensions in biology learning.

Biology education in Indonesia today is no longer solely oriented toward the mastery of scientific concepts but is also directed toward the development of character, values, and 21st-century skills. In line with the *Merdeka Belajar* (Independent Learning) policy and the *Profil Pelajar Pancasila* framework, the paradigm of biology learning must integrate cognitive, affective, and social dimensions in a balanced manner to cultivate learners who are faithful, knowledgeable, and morally upright. Meta-analysis findings indicate that the integration of Islamic values into science education in Indonesia has a significantly positive effect on students' learning outcomes and spiritual attitudes, showing a moderate to strong effect (effect size ≈ 0.658)(Ardi et al., 2024). These findings affirm that the integration of Islamic values does not diminish the conceptual rigor of science; instead, it strengthens the ethical and spiritual dimensions of the biology learning process. Nevertheless, most existing studies remain focused on the general impact of value integration and have not yet developed structured and measurable instructional models specifically designed for biology education in higher education contexts.

The concept of *Learning Islam* in science education has been pursued through various approaches, one of which is the Pedagogical Content Islamic Knowledge (PCIK) framework. This approach emphasizes the systematic interconnection between biological content, pedagogical strategies, and Islamic values (Herlanti et al., 2022). This approach demonstrates that value integration should not be merely cosmetic for instance, by simply inserting thematic Qur'anic verses into the material but must be realized through instructional syntax that internalizes the values of *tawhid* (monotheism), ethics, and ecological responsibility. Nevertheless, Herlanti et al. (2022) found that classroom practices are still largely dominated by partial value integration, which has not yet comprehensively linked spirituality with students' investigative and reflective activities within real communities. This condition opens an opportunity for the development of a more operational learning model one that not only instills values but also fosters the scientific and social *habitus* of biology students.

Meanwhile, the concept of the *Learning Society* is rooted in the idea of a lifelong learning community, as described by Eraut (1997) and (Stiglitz & Greenwald, 2014). The Learning Society emphasizes the importance of community engagement and social networks in supporting collaborative and contextual learning processes. In the context of higher education, this approach is relevant for cultivating students who can learn through social interactions, collaborative practices, and the resolution of

environmental and social problems. However, existing studies have largely focused on the macro policy level and have not yet addressed the implementation within biology classrooms for example, through community-based activities integrated with Islamic values. Consequently, a gap persists between the conceptual ideal of a Learning Society and the contextual practice of biology learning within students' social environments.

Recent empirical studies have reinforced the urgency of integrating the Learning Society concept into biology education, particularly as it aligns with well-established learning theories emphasizing collaboration, social participation, and community engaged knowledge construction. The Learning Society ideal is conceptually rooted in Social Constructivism, which posits that learning emerges through socially mediated interactions and shared meaning-making (John-Steiner & Mahn, 1996; Vygotsky, 1978). It also resonates with Situated Learning Theory, where learning is understood as participation in authentic, real-world communities of practice rather than as isolated cognitive activity (Lave & Wenger, 1991). Within this theoretical landscape, service-learning provides a pedagogical bridge by positioning students as active contributors to community well-being while simultaneously strengthening disciplinary understanding. Research by Abbas et al., (2024) emonstrated that the implementation of service-learning in biochemistry courses can enhance biology education students' problem-solving skills and social responsibility. Similarly, Nida et al. (2021) revealed that the use of socio scientific issues (SSI) in instruction effectively connects biological concepts with real-life contexts and social values within the community.

Previous studies have emphasized that strengthening 21st-century skills in biology education including critical thinking, collaboration, and digital literacy must be accompanied by value based and character education grounded in spirituality (Pamungkas et al., 2023). However, no existing instructional model has yet systematically integrated the two major frameworks Learning Society (community, social reflection, and collaboration) and Learning Islam (values, spirituality, and ecological ethics) within the context of higher education biology learning. This study presents a needs analysis that empirically maps the points of convergence, gaps, and integration opportunities between these two dimensions as the foundation for developing the STILL-aLI model (*Stimulating, Thinking, Investigating, Listing & Report Result, Learning Society, Learning Islam*). This study is expected to provide an overview of the integration between *Learning Society* and *Learning Islam* within biology learning at UIN Alauddin Makassar, thereby serving as a foundation for the development of the STILL-aLI learning model.

B. Methods

This study employed a quantitative descriptive research design using a survey

method (Creswell, 2015). The study utilized a mixed-format questionnaire comprising dichotomous (yes/no) items and open-ended questions to capture both categorical responses and explanatory insights. Considering the instrument's straightforward structure and the study's descriptive–exploratory orientation, empirical pilot testing was not conducted. Accordingly, instrument validation was limited to content validation through an expert appraisal process. Two domain experts with established expertise in research methodology and the relevant subject matter evaluated the questionnaire for content relevance, item clarity, and alignment with the intended constructs. Their assessments and recommendations were subsequently integrated to enhance the rigor and coherence of the final instrument prior to data collection. The research subjects consisted of 50 Biology Education students and 5 lecturers from the Department of Biology Education at UIN Alauddin Makassar.

The data were analyzed descriptively by percentageing respondents' choices. The open-ended responses were examined using qualitative content analysis to identify salient categories and thematic patterns. The analytical process involved initial familiarization with the data, generation of descriptive codes, consolidation of similar codes into higher order themes, and interpretation of thematic structures to enrich and contextualize the dichotomous findings.

C. Results and Discussion

Integration of Lectures with the Learning Society

One form of *Learning Society* integration in the learning process is through the incorporation of community service activities. The survey results are presented in Figure 1.

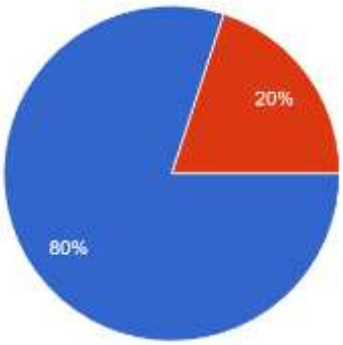

Figure 1. Integration of Lectures with Community Service

Based on Figure 1, it is shown that 80% of students indicated that lectures were integrated with community service activities. Meanwhile, only 20% of lecturers reported integrating their courses with such activities. The extent of student involvement in community service activities is presented in Figure 2.

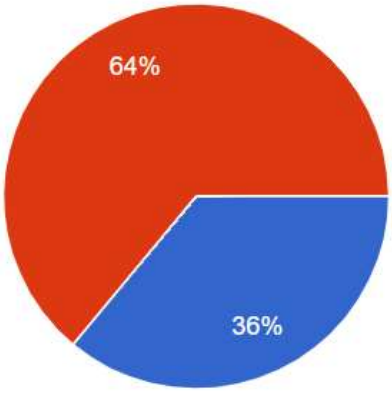

Figure 2. Student Involvement in Community Service Activities

A total of 18 students (36%) have participated in community service activities, while the remaining students have not yet been involved. Examples of integration implemented by lecturers include the Plant Ecology course, which involves forest conservation activities at the foothills of Mount Bawakaraeng, and the Animal Ecology course, which engages students in sea turtle conservation in Pinrang Regency. Additionally, efforts to enhance students' eco-literacy have been carried out through ecobrick-making projects on Barrang Lompo Island, Makassar City.

The survey results indicate that only 36% of students were involved in community service activities, while 64% had not yet participated. This finding suggests that student engagement in social educational activities outside the campus remains relatively low. In fact, integrating community service into biology learning carries strategic significance in fostering students' holistic competence, encompassing cognitive, affective, and social dimensions. Through direct participation in such activities, students have the opportunity to apply biological concepts to real-life contexts, such as environmental conservation, the utilization of medicinal plants, or the management of organic waste. This approach aligns with the principles of context-based learning, which emphasize the connection between scientific theory and social as well as ecological realities (Gilbert, 2006). Thus, biology learning extends beyond conceptual mastery to become a means of community empowerment and environmental preservation.

The integration of community service plays a crucial role in fostering students' ecological awareness and social responsibility. Through activities such as environmental education, reforestation, and biodiversity conservation, students learn to become agents of change who are committed to ecosystem sustainability. This aligns with the goals of Education for Sustainable Development (ESD) as outlined by (UNESCO, 2020), which aims to cultivate a generation capable of contributing to sustainable development through tangible actions at both local and global levels.

In addition to strengthening character and social values, community service also serves as a medium for developing 21st-century skills, which encompass critical thinking, creativity, communication, and collaboration (Trilling & Fadel, 2009). In the context of biology education, students are not only expected to master scientific concepts but also to identify environmental issues, propose innovative solutions, and communicate their findings to the community. Through service-learning or project-based learning approaches, the learning process becomes more meaningful, as students take on dual roles as both practitioners and active learners engaged in problem solving (Eyler & Giles Jr, 1999).

The integration of community service into biology learning also represents a tangible realization of the Tri Dharma of Higher Education, in which education, research, and community service function synergistically. Universities thus serve not only as centers for scientific knowledge development but also as strategic partners in empowering communities through science-based innovations. Therefore, the low level of student participation, as reflected in the data, serves as an important reflection for educational institutions to strengthen contextual, collaborative, and sustainability-oriented learning designs. The integration of community service into biology learning is an essential step in shaping graduates who are scientifically knowledgeable, ecologically minded, and socially responsible. Through this approach, students are not merely recipients of knowledge but also active contributors to fostering environmental awareness and enhancing community well-being.

1. Integration of Lectures with Islamic Knowledge

The integration of Islamic knowledge into lectures has been implemented by lecturers, although it has not yet been fully optimized. The forms of this integration are presented in Figure 3.

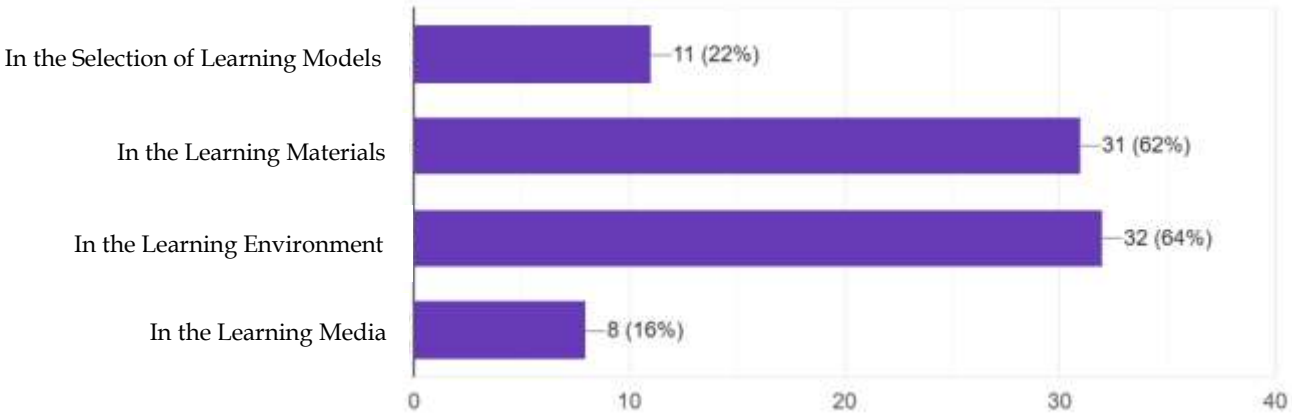

Figure 3. Implementation of Islamic Knowledge Integration in Learning

The implementation of Islamic knowledge integration in learning activities by lecturers is presented in Table 1.

Table 1. Implementation of Islamic Knowledge Integration in Learning

Integration Aspect	Forms of Activity / Integration Practice
Learning Model	Memorizing and interpreting Qur'anic verses related to the lesson.
	Assigning students to find relevant verses or Hadiths.
	Connecting scientific concepts with Islamic interpretation and values.
	Developing critical thinking based on Islamic values.
Learning Environment	Starting lectures with prayers, *basmalah*, *shalawat*, or short surahs
	Delivering short sermons (*kultum*) at the beginning or end of class.
	Encouraging modest dress and cleanliness.
	Creating a religious atmosphere that promotes mutual encouragement in doing good.
Learning Media	Displaying Qur'anic verses or Hadiths in PowerPoint slides and teaching materials.
	Using Islamic literature as supporting references.
	Including Qur'anic quotations in assignments, papers, or student presentations.
Learning Materials	Linking scientific topics with Islamic teachings.
	Explaining scientific phenomena as evidence of Allah's greatness.
	Instilling awareness that knowledge originates from Allah and should be used for the benefit of humanity
	Connecting scientific theories with Islamic perspectives.

The integration of Islamic knowledge into biology learning represents a strategic effort to connect scientific concepts with the spiritual and ethical values of Islam, resulting in learning that is intellectually and spiritually meaningful. Based on the data presented in the figure, the integration of Islamic values is most frequently implemented in the learning environment (64%) and learning materials (62%), whereas the aspects of learning model selection (22%) and learning media (16%) remain relatively low. This condition indicates that, in general, educators find it easier to integrate Islamic values within classroom interactions and content, yet still face challenges in designing models and media that are fully grounded in Islamic value integration.

Recent studies have emphasized the importance of designing instructional models that explicitly integrate science and Islamic values, developed the RQANI (Religious Qur'anic Affective Natural Inquiry) model, which combines biological concepts with Islamic principles and has been proven effective in enhancing students' conceptual understanding and spiritual awareness. In this context, the STILL-aLI model currently being developed can serve as a conceptual framework to bridge the cognitive and affective dimensions with Islamic values through the stages of *Stimulating, Thinking, Investigating, Listing & Reporting Results, Learning Society,* and *Learning Islam*. The low percentage of integration within the learning model aspect may be attributed to the lack of empirical references and training opportunities for lecturers to develop instructional models based on the integration of Islamic values in science education (Desfita et al., 2024).

Meanwhile, the high level of integration in learning materials indicates that biology instructors have frequently linked scientific topics with Qur'anic verses. For example, the concept of photosynthesis can be related to the value of *tawhid* (the oneness of Allah) as the Creator who regulates the life systems of plants, while discussions on water, soil, and plant nutrition reflect the values of *trustworthiness* (*amanah*) and *gratitude* (*shukr*) for natural blessings that humans are obliged to protect. A study by (Syam et al., 2024) evealed that integrating Qur'anic values into an evolution module enhanced students' learning outcomes and religious character. This aligns with the findings of Fitriyah et al. (2020) who affirmed that integrating science and Islam can simultaneously strengthen students' scientific literacy and spiritual identity.

The high percentage of integration within the learning environment aspect (64%) demonstrates lecturers' success in creating an Islamic-oriented learning atmosphere through activities such as reading Qur'anic verses before class, engaging in reflective scientific discussions, and promoting academic ethics aligned with Islamic values such as *amanah* (trustworthiness), honesty, and responsibility. A learning environment that emphasizes spiritual values has been shown to enhance students' motivation and engagement, particularly among younger generations who tend to seek religious meaning in their academic activities (Latjompoh et al., 2025). . Integration at this level also plays a vital role in fostering a collaborative and civilized learning society, as emphasized in the *Learning Society* and *Learning Islam* components of the STILL-aLI model.

The low percentage observed in the learning media aspect (16%) indicates that efforts to integrate Islamic values into the development of instructional tools and resources remain limited. In fact, media play a strategic role in shaping students' perceptions and creating holistic learning experiences. Interactive digital media such as videos, simulations, or augmented reality applications that showcase the wonders of Allah's creation can serve as effective means of integrating Islamic values within scientific contexts. Moreover, learning media grounded in Islamic philosophy have the potential to enhance students' moral sensitivity and digital literacy, thereby fostering both ethical awareness and technological competence in the learning process (Sutiana & Nugraha, 2025).

The findings of this study indicate that the integration of Islamic values in biology learning has been relatively well implemented in the domains of learning materials and learning environment, yet it still requires strengthening in the aspects of learning models and learning media. Therefore, the development strategy of the STILL-aLI model should focus on designing an instructional model that explicitly embeds Islamic value integration and on developing digital media that contextually reflect Islamic principles. Such efforts will lead to biology learning that not only emphasizes the mastery of scientific concepts but also cultivates learners with Islamic character, equipped with critical, creative, and collaborative thinking skills, as well as digital

literacy, all aligned with the values of *tawhid* (oneness of God), *amanah* (trustworthiness), and *rahmatan lil 'alamin* (mercy for all creation).

D. Conclusions

The integration of the *Learning Society* approach into biology learning at UIN Alauddin Makassar has been implemented through community service activities involving several students. However, this integration has not yet been fully adopted by all lecturers. Meanwhile, the integration of Islamic knowledge in biology learning has been carried out by lecturers, though it remains suboptimal. The existing integration is predominantly observed in the learning material and learning environment aspects. Therefore, it is necessary to develop a STILL-aLI model that explicitly incorporates the syntaxes of Learning Society and Learning Islam to ensure a more comprehensive and systematic implementation in biology education. This research is limited to UIN Alauddin Makassar. Further research on a larger scale is needed.

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