FROM KITAB KUNING TO LABORATORY: THE EVOLUTION OF PESANTREN SCHOLARSHIP TOWARDS THE DIGITAL ERA

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Abstract

This article explores the transformation of scientific thought in pesantren education as a response to the demands of the digital era. Traditionally focused on the study of kitab kuning (classical Islamic texts), pesantren are now beginning to integrate religious sciences with general sciences through a unified curriculum and the adoption of digital technologies. This study employs a descriptive qualitative approach, using in-depth interviews, participatory observation, and documentation at selected pesantren that have implemented digital-based learning innovations. Findings reveal that the integration of knowledge in pesantren is a

gradual and dynamic process. The use of science laboratories, computers, and digital platforms plays a vital role in supporting more contextual and adaptive learning. Teachers and students show enthusiasm toward this approach, although challenges remain, such as limited human resources, infrastructure gaps, and institutional readiness. Adaptation strategies include teacher training, integrative curriculum development, and collaboration with external institutions. This transformation demonstrates that pesantren have significant potential to become centers of Islamic education that are relevant and competitive in the modern era, while still rooted in their traditional scholarly heritage.

Keywords: *pesantren, kitab kuning, knowledge integration, Islamic education, digitalization, unified curriculum*

INTRODUCTION

Pesantren (Islamic boarding schools) are Islamic educational institutions deeply rooted in the history and culture of Indonesia. For centuries, pesantren have been centers for moral development, the study of *kitab kuning* (classical Islamic texts), and the strengthening of Islamic values. However, amidst globalization and the advancement of information technology, pesantren face new challenges in maintaining their relevance and competitiveness. The transformation of pesantren education is a necessity—not only to keep up with the times but also to expand their contributions to the development of knowledge and civilization (Azra, 2013; Huda et al., 2020).

The integration of religious knowledge and general sciences is a strategic approach to addressing the challenges of the digital era. On one hand, pesantren maintain the authority of classical scholarship through *kitab kuning* studies; on the other, they begin to open themselves to science, technology, and modern learning methods. This transformation concerns not only the curriculum but also shifts in thinking paradigms, teaching methods, and educational facilities such as science and computer laboratories. This integration is expected to produce students who are not only religious but also scientific, critical, and adaptive to change (Zarkasyi, 2011; Ma'arif Institute, 2021).

Based on this background, the research questions of this study are: (1) What forms of scholarly transformation occur in pesantren facing the digital era? (2) How do pesantren integrate religious knowledge and general sciences in the curriculum and learning practices? (3) What

challenges and strategies are faced in the integration process? The aim of this study is to provide an in-depth description of the scholarly evolution process in pesantren, identify patterns of knowledge integration implemented, and analyze the impact on the quality of student education.

This research is significant for the development of Islamic education in Indonesia. The findings are expected to serve as a reference for policymakers, pesantren administrators, and academics in designing integrative, contextual, and competitive Islamic education models. Furthermore, this study contributes to strengthening the position of pesantren as educational institutions capable of answering contemporary challenges without losing their identity (AlAttas, 1995; Niam, 2018).

LITERATURE REVIEW

The theoretical foundation of this study starts from the understanding that pesantren are Islamic educational institutions with strong and unique scholarly traditions, especially through the study of *kitab kuning*. These texts are not only sources of religious knowledge but also shape the character and mindset of students through classical learning methods such as *sorogan* and *bandongan*. This tradition has lasted for centuries and is the epistemological foundation of traditional Islamic education.

However, in response to changing times and technological advances, there is a need to reconstruct scholarly approaches in pesantren. A relevant approach is the integration of knowledge, which unites religious sciences and general sciences within a framework of *tauhid* (monotheism). This integration is not meant to mix the disciplines technically but to build awareness that all knowledge, both *syar'i* (religious) and *kauni* (natural), originates from the same source and has the same purpose: the welfare of humanity and devotion to God. In the context of Islamic education, knowledge integration is a strategy to eliminate the dichotomy between religious and secular sciences and to encourage more contextual and multidisciplinary learning.

This transformation is increasingly relevant with the advent of educational digitalization. Information technology has changed the way of teaching and learning, including within pesantren environments. The use of digital devices, online learning platforms, and computer laboratories are part of innovations that enable pesantren to expand access and learning methods. Digitalization not only improves learning efficiency but also opens opportunities for students to develop digital literacy and 21st-century skills.

Several previous studies show that pesantren able to integrate the national curriculum and technology tend to be more adaptive to social changes and capable of producing competitive graduates. This transformation is not merely technical but also involves a paradigm shift in viewing knowledge as part of worship and community service. Therefore, the theoretical framework of this research emphasizes the importance of knowledge integration, tradition preservation, and technology adaptation as the main pillars in the evolution of pesantren education toward the digital era.

RESEARCH METHODOLOGY

This study employs a qualitative descriptive approach aimed at gaining a deep understanding of the scholarly transformation process in pesantren facing the digital era. This approach was chosen because it can depict social and educational phenomena contextually and allows researchers to capture meanings, perceptions, and dynamics occurring within pesantren environments (Creswell, 2014; Moleong, 2019).

The research locations were purposively selected, focusing on pesantren that have adopted digital technology and implemented an integrative curriculum between religious and general sciences. The selection was based on pesantren characteristics active in educational innovation, equipped with science and computer laboratories, internet access, and technology-based learning programs. Research subjects consisted of pesantren leaders, teachers, and students directly involved in learning processes and curriculum development.

Data collection was conducted through in-depth interviews, participatory observation, and documentation. Interviews explored the perspectives and experiences of informants regarding knowledge integration and technology utilization in learning. Observation involved direct participation in learning activities to observe teaching methods, teacher-student interactions, and use of digital facilities. Documentation was used to examine curricula, learning modules, activity archives, and digital media used by pesantren.

Data analysis employed the interactive model of Miles, Huberman, and Saldaña (2014), including data reduction, data presentation, and conclusion drawing. Data reduction involved filtering relevant information focused on the research. Data presentation was carried out in the form of narratives and thematic matrices to facilitate interpretation. Conclusions were drawn by formulating patterns and key findings answering the research questions. Data validity was ensured through source and method triangulation, as well as member checking to verify the accuracy and credibility of the findings.

RESULTS AND DISCUSSION

The results indicate that the pesantren studied have undergone significant transformations in scholarly approaches and learning systems. These changes are not only structural but also touch on philosophical and pedagogical aspects of Islamic education.

Curriculum transformation marks the starting point of the change. Pesantren, which previously focused exclusively on *kitab kuning* studies, have begun to implement an integrated curriculum combining religious sciences with general sciences such as mathematics, biology, and information technology. This curriculum is designed to maintain the depth of classical studies while opening space for students to understand contemporary phenomena through scientific approaches. Integration is visible in subjects like "environmental fiqh" and "science from an Islamic perspective," which combine *shari'ah* values with empirical methods. This aligns with the integration-interconnection concept developed by UIN Sunan Kalijaga (Fathurrahman, 2019).

The role of laboratories and technology is an important element supporting this transformation. Pesantren have provided science and computer laboratories as practical learning facilities. Some pesantren also utilize digital platforms such as e-learning, digital *kitab kuning* applications, and social media to expand learning access. The use of technology not only enhances learning efficiency but also strengthens students' digital literacy. As stated by Huda et al. (2020), digitalization in pesantren education opens new opportunities for developing more interactive and flexible learning methods.

Teachers' and students' perspectives on knowledge integration vary. Most teachers welcome this approach as it bridges tradition and modernity. They see integration as an effort to broaden students' horizons without erasing Islamic identity. However, some teachers express concerns about the potential blurring of classical values if not balanced with strengthening *kitab* study methodologies. On the other hand, students generally show enthusiasm for technology-based learning, although some still face difficulties adapting, especially in understanding unfamiliar scientific terminology.

The main obstacles faced in this transformation process include limited human resources, facilities, and institutional readiness. Not all teachers have educational backgrounds supporting knowledge integration, requiring ongoing training and mentoring. Facilities such as laboratories and digital devices are also not evenly distributed among pesantren. To address this, some pesantren collaborate with Islamic universities and donor agencies to strengthen capacity and procure facilities. Adaptive strategies include teacher training, integrative module development, and forming cross-disciplinary curriculum teams.

Overall, the research findings show that the scholarly evolution in pesantren is a dynamic and challenging process. However, with continuous commitment and innovation, pesantren have great potential to become centers of excellent and relevant Islamic education in the digital era.

CONCLUSION (GEORGIA 11PT BOLD)

The transformation of scholarship in pesantren is a complex but vital process to address contemporary challenges. This study reveals that pesantren have begun shifting from a traditional approach based on *kitab kuning* towards a more integrative and modern learning system. Curricula combining religious and general sciences, along with the use of technology such as science and computer laboratories, demonstrate pesantren's ability to adapt to the digital era without losing their identity.

This change impacts not only learning structures but also teachers' and students' perspectives on knowledge. Teachers increasingly recognize the importance of interdisciplinary approaches, while students show enthusiasm for technology-based methods. Nevertheless, this process is not without challenges, including limited human resources, facilities, and institutional readiness. Adaptive strategies such as teacher training, integrative curriculum development, and cooperation with external institutions are crucial steps in overcoming these challenges.

Based on these findings, several recommendations are proposed. First, pesantren should continue strengthening educators' capacity through continuous training to effectively integrate religious and general sciences. Second, curriculum development must be contextual and responsive to contemporary needs while maintaining Islamic values as the foundational principle. Third, the government and Islamic higher education institutions are expected to provide tangible support in the form of mentoring, facility assistance, and strengthening policies on integrative pesantren education.

Ultimately, the scholarly transformation in pesantren is not merely a technical change but part of a broader movement to cultivate a generation of knowledgeable, moral, and contributing students to national development. With ongoing commitment and innovation, pesantren can become centers of Islamic educational excellence that are relevant, progressive, and deeply rooted in noble traditions.

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