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Readiness for Smart Learning in Indonesia's Islamic Universities

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ABSTRACT

Technological advancements have driven significant innovations in education, notably through smart learning systems. In Indonesia, Islamic universities are increasingly adopting smart learning to enhance the quality of higher education. This study examines their readiness for smart learning implementation. A mixed-method approach combined quantitative and qualitative data collection. Questionnaires were distributed via Google Forms to 608 students, and additional insights were gathered through interviews. Quantitative data were analyzed using percentage calculations and descriptive analysis, while qualitative findings were thematically organized. The study found that the implementation of smart learning in Islamic universities is moderately effective across four key areas: learning management systems, personalized learning, assessment, and library management systems. Questionnaire scores for all aspects exceeded 6.00, indicating a generally positive perception. Nevertheless, issues such as inadequate infrastructure and insufficient faculty readiness emerged as significant challenges. The findings suggest that Islamic universities in Indonesia are adapting to technological changes but require ongoing development to integrate smart learning practices fully. Addressing infrastructure and faculty training gaps is essential to enhance educational quality, graduate competencies, and institutional competitiveness.

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1. INTRODUCTION

The advancement of technology today has driven a revolution across various sectors, including higher education. The concept of "smart learning" has emerged as an educational innovation that leverages technology to create interactive, adaptive, and personalized learning experiences tailored to the individual needs and preferences of students (Sharma et al., 2019). In many developed countries, universities have successfully adopted this concept through the use of Learning Management Systems (LMS) and other digital technologies such as Massive Open Online Courses (MOOCs) and Open Educational Resources (OER) (Molina-Carmona & Villagrá-Arnedo, 2018). Smart learning has been shown to enhance student engagement and the quality of learning outcomes, thereby strengthening graduates' competitiveness in the era of globalization (Gambo & Shakir, 2019).

However, the implementation of smart learning in Islamic universities in Indonesia faces significant challenges. Limited access to technology, particularly in remote areas, remains a major barrier to the comprehensive integration of smart learning (Muhammad et al., 2017). Data indicate that many Islamic universities in Indonesia have yet to fully adopt cutting-edge educational technology due to infrastructural limitations and a lack of supportive policies for comprehensive digital transformation (Paunović et al., 2020). This creates a stark gap between universities in Indonesia and those in more advanced countries regarding smart learning adoption (Cavanagh et al., 2020). Furthermore, Islamic universities still grapple with aligning the concept of smart learning with a curriculum based on Islamic values, which often necessitates adjustments in teaching methodologies to remain relevant to Islamic principles (Badriah et al., 2023).

In addition to infrastructure and technology access challenges, Islamic higher education institutions in Indonesia are also confronted with human resource challenges that need to be addressed, particularly regarding digital literacy and the ability to integrate technology into teaching. Sarrab & Elgamel (2013) emphasize the importance of faculty preparedness in understanding and utilizing smart learning technology to maximize its benefits. Many lecturers at Islamic higher education institutions lack adequate training in using LMS or other digital platforms, resulting in uneven technology adoption across institutions (Sulaiman et al., 2023).

The urgency of this research becomes increasingly evident given the global demand for graduates with 21st-century skills, such as digital literacy, complex problem-solving, and collaboration (Cavanagh et al., 2020). Islamic higher education institutions, as educational establishments that play a crucial role in shaping a generation of leaders grounded in religious values, must promptly adapt to these global educational trends to remain relevant and competitive (Susanto et al., 2022). Delays in adopting smart learning could exacerbate the quality gap between Islamic higher education institutions and other educational institutions, both domestically and internationally.

Previous research has highlighted the potential of smart learning in higher education. Merzon & Ibatullin (2017) found that universities that have integrated LMS, such as Moodle and Blackboard, are able to enhance learning effectiveness and expand student access to course materials, discussions, and online collaboration. However, these studies generally focus on public universities and do not consider the specific context of Islamic higher education institutions, which have their own unique challenges and needs. Sharma et al. (2019) also discuss the importance of implementing smart learning to strengthen students' competencies in the digital era, but there is a lack of research examining how smart learning can be aligned with the Islamic values taught at Islamic higher education institutions.

The novelty of this research lies in its specific focus on the readiness of Islamic universities in Indonesia to implement smart learning, a topic that has been rarely addressed in previous studies. Most existing literature primarily discusses the adoption of educational technology in public universities without considering the unique characteristics of Islamic higher education institutions regarding their curriculum and infrastructure (Sułkowski et al. 2021a). While some studies have touched upon the application of educational technology in religious institutions, they have not thoroughly explored the extent of readiness and challenges faced by Islamic higher education institutions in Indonesia to fully adopt smart learning. For instance, research by Han & Xu (2021) discusses the implementation of smart learning in educational institutions with religious backgrounds in certain countries, but their approach does not deeply account for the conditions in Indonesia, which faces very different infrastructural challenges and technology availability.

This study seeks to fill the research gap regarding the integration of smart learning in Islamic higher education institutions, which have unique characteristics in terms of curriculum, governance, and educational culture. This research not only assesses technological readiness and human resources but also examines how smart learning can be adapted within an educational environment grounded in Islamic values. This is crucial to ensure that the implementation of smart learning in

Islamic higher education institutions can support broader educational goals, namely producing graduates who are not only competitive in the job market but also possess strong moral and spiritual integrity. Thus, this research makes a significant contribution to the development of technology-based strategies in Islamic higher education that are relevant to 21st-century needs while remaining aligned with Islamic principles.

2. METHODS

2.1. Research Design

This research employs a mixed-methods approach, beginning with quantitative analysis followed by qualitative inquiry. The use of smart learning in Islamic universities in Indonesia was factually, systematically, and accurately described using quantitative measurement tools and covering the entire sample. The qualitative component was conducted to gather data on how smart learning is implemented according to the designated subcategories.

The population consisted of 608 students from Islamic universities across ten provinces in Indonesia: East Java, West Java, Jakarta, North Sumatra, Central Java, West Sumatra, South Sumatra, West Nusa Tenggara, Jambi, and Riau. The selection of these provinces was based on their geographical diversity, representation of major regions in Indonesia, and the presence of Islamic universities with active smart learning systems. However, provinces without well-established smart learning programs or with minimal technological infrastructure were excluded, as they did not meet the criteria for this study. The inclusion of ten provinces and 40 Islamic universities ensures a broad representation of regions, but it does not cover all 34 provinces in Indonesia. This limitation may affect the generalizability of the findings, as provinces with different levels of technological readiness or socio-economic conditions were not included. Future research should aim to include all provinces to provide a more comprehensive understanding of smart learning implementation in Islamic universities across Indonesia.

2.2. Instruments

The instruments used for data collection were questionnaires and interviews, which included several questions regarding the implementation of smart learning at various Islamic universities in Indonesia. The questionnaire was validated by experts in learning technology using SPSS (Version 26.00). The smart learning instrument is divided into four parts as a sample, adopting elements from Muhammad et al. (2017), where they divided it into 18 types. The first section focused on the Smart Learning Management System with three questions, labelled A1-A4. The second section addressed Personalized Learning, with four questions marked B1-B4. The third section covered Assessment, with four questions labelled C1-C4. The final section addressed the Library Management System, with four questions labelled D1-D4. A total of 15 questions were used to collect data on the implementation of smart learning in Islamic universities. Responses were measured on an 18-item scale, with options of Yes, Sometimes, and No. Student scores ranged from 18 to 45, with higher scores indicating a more effective implementation of smart learning in the universities.

Table 1. Validity and reliability instrument

Validity and Reliability Statistics		
Indicators Item	**Pearson Correlation**	**Cronbach's Alpha if Item is Deleted**
Smart Learning Management System		
A1	0.287	.816
A2	0.377	.817
A3	0.277	.816
A4	0.388	.817
Personalized Learning		
B1	0.567	.804
B2	0.574	.804
B3	0.444	.810
B4	0.582	.803
Assessment		
C1	0.556	.804
C2	0.423	.816
C3	0.641	.797
C4	0.565	.803
Library Management System		
D1	0.546	.807
D2	0.518	.812
D3	0.596	.801
D4	0.560	.803

Table 1 demonstrates that all question items are validated, as the rCount is greater than the rTable. The rTable, determined with 608 respondents at a 5% significance level, is 0.080. This indicates that all question items exceed the 0.080 threshold, confirming the instrument's validity. Additionally, instrument reliability, assessed using Cronbach's Alpha, is considered reliable when the Cronbach's Alpha value is greater than 0.6. The table reveals that the value for all question items is above 0.6, indicating the instrument's reliability.

2.3. Data Analysis

The data were analyzed quantitatively using descriptive statistics, with results presented through measures of central tendency and percentages (Sugiyono, 2019). The data from each question was collected directly after the questionnaire was distributed via Google Forms. The overall data were then analyzed through tabulation, where the respondents' answer choices were converted into scores of 1, 2, and 3 according to the instrument's scoring system. A total score was determined, followed by a percentage calculation. In addition, qualitative data were analyzed using thematic analysis to ensure a systematic interpretation of the interview data. The analysis involved identifying recurring themes and patterns from the transcripts through a coding process. Key themes were categorized and interpreted to gain deeper insights into the findings. Triangulation techniques were applied to validate the results, which included data reduction, data presentation, and drawing conclusions. The qualitative findings are presented descriptively to complement the quantitative results.

3. FINDINGS AND DISCUSSION

Innovative learning plays a crucial role in promoting educational sustainability within universities, serving as a key indicator of an institution's capacity to deliver professional

educational services aimed at producing resilient, intellectually capable, and globally competitive graduates (Gonczi, 2013). This concept underscores the vital connection between a teacher's efforts and their ability to engage students effectively through well-curated learning materials. It advocates for strategies that enhance students' cognitive development by transforming abstract concepts into concrete understanding, drawn from their learning experiences and accumulated knowledge (Sudria et al., 2018). Additionally, smart learning cultivates students' awareness of the increasingly complex global challenges, with such awareness acting as the foundation for creative problem-solving and innovation. The successful implementation of smart learning requires the integration of technological skills, as technology has become an essential tool in contemporary education (Ritonga & Desrani, 2022).

Smart learning is closely related to smart campuses as it integrates advanced technology and innovative practices to create an improved educational environment that supports connectivity, efficiency, and sustainability. In their research, Muhammad et al. (2017) identified 18 features of a smart campus, and this study will highlight four of these features as samples to assess the readiness of Islamic higher education institutions in implementing this technology. By focusing on these specific aspects, the research aims to provide insights into how well these institutions can adapt to the demands of a digital learning environment and effectively enhance the learning experience for their students. Smart learning is classified into the following four categories:

3.1. Smart Learning Management System

A Learning Management System (LMS) is a software application designed to assist teachers in creating, distributing, and managing the delivery of learning materials online. The primary goal of LMS is to facilitate educators in planning and executing online learning processes. Many universities in Indonesia have adopted LMS, which has had numerous positive impacts, especially given the limited time and space for interaction between lecturers and students. According to a survey of researchers, the use of LMS in Islamic universities in Indonesia is as follows:

Table 2. Implementation of a Smart Learning Management System

Questionnaire Statement	Yes	Sometimes	No
Campus learning has incorporated E-Learning platforms.	94.7%	2.1%	3.1%
E-Learning is utilized efficiently within the campus setting.	79%	11.7%	10.4%
In addition to E-Learning, the campus employs other similar applications or technologies.	83.7%	4.3%	12%
The campus is equipped with internet connectivity throughout its environment.	88.5%	10.7%	0.8%

The data from Table 2 above shows that the first step in fulfilling smart learning requirements is the implementation of a management system at each university (Gambo & Shakir, 2019). Several universities in Indonesia have adopted E-learning as a response to technological advancements. A total of 94.7% of respondents stated that their universities used web-based learning. An additional 2.1% of students indicated that their university was in the process of designing such a system for future use, while 3.1% stated that their university had yet to implement E-learning. As for the effectiveness of smart learning, respondents rated its utilization as 79% effective, though some areas still require improvement. According to the respondents, the ineffectiveness stems from the following:

> *"Some lecturers do not implement E-learning because they believe it does not foster student creativity, but instead encourages passivity and the copying of unverified information. They argue that face-to-face interaction allows for deeper engagement, critical thinking, and more meaningful feedback. Additionally, they express concerns that over-reliance on E-learning may diminish students' ability to collaborate effectively in real-world settings."*

However, based on additional information gathered by researchers, not all Islamic universities involved in this study have adopted E-learning. Only 83.7% of Islamic universities in Indonesia have integrated LMS and other technological applications into their educational framework, while others continue to rely on outdated technologies or have not implemented technology at all. One respondent stated:

> *"The use of technology-based media is currently more effective because it is considered more responsive and efficient. Moreover, social media enables more interactive learning and promotes active, two-way communication."*

Furthermore, 88.5% of respondents confirmed that their campuses had internet connectivity, while another 10.7% mentioned that their universities were in the process of establishing internet networks for broader access. A mere 0.8% reported that their university's internet network was insufficient to support learning. The overall analysis indicates that internet networks are generally well-implemented in Indonesian universities. As one respondent observed:

> *"The continuity of learning must be supported by a reliable internet network. Implementing E-learning requires a robust internet connection. Without stable connectivity, students and educators may face interruptions that can hinder the learning process. Additionally, institutions must invest in technical infrastructure to ensure seamless access to online resources and platforms."*

The effective implementation of E-learning and other educational technologies is fundamentally dependent on reliable internet connectivity (Guo & Zhang, 2011). A stable network is crucial for the optimal functioning of many educational systems, as highlighted by Doulai (2001). In Indonesia, Islamic universities are significantly influenced by rapid technological advancements, necessitating a transition toward digital learning models. E-learning has emerged as a widely adopted educational tool in recent years, showcasing its relevance in modern education (Magdalene & Sridharan, 2018). This approach encompasses various features that support multiple facets of the learning process, including management functions, assessment of teachers and students, content presentation, material delivery, assignment management, and reporting mechanisms (L. W. Chen et al., 2018). Furthermore, E-learning provides tools for managing device upgrades and enhancing comprehension of complex learning materials, contributing to a more streamlined educational experience.

The benefits of E-learning elucidate its widespread adoption as a medium for smart learning. One of the primary advantages is its flexibility; users can access learning materials via computers or mobile devices, facilitating a diverse range of learning experiences (Agbo et al., 2021). E-learning allows for the presentation of a variety of learning materials that can be accessed anytime and anywhere, free from the constraints of time and location. However, despite its practicality and inherent flexibility, some users still feel the need to discuss course materials with instructors to address gaps in understanding (El Mhouti & Erradi, 2018). This suggests that while E-learning can enhance accessibility and convenience, it may also lead to pedagogical challenges. Students might experience difficulties due to the lack of direct interaction with instructors, which limits real-time question-and-answer opportunities and leaves critical queries unanswered. Consequently, some users express feelings of insufficient support when engaging with E-learning platforms.

3.2. Personalized Learning

Personalized learning represents a novel approach in research aimed at identifying the most effective learning strategies for individual students. It involves tailoring learning experiences to meet the unique needs and interests of each student. Personalized learning is closely tied to

students' learning styles, which are considered critical in determining the most suitable learning methods for each student. By understanding students' learning styles, educators can more easily identify their characteristics and determine the most effective ways for them to learn. This approach is particularly relevant for higher education students, where differences in learning styles significantly impact students' independence in learning. Several studies have explored personalized learning among students, as highlighted below:

Table 3. Personalized learning for Islamic universities in Indonesia

Questionnaire Statement	Yes	Sometimes	No
Lecturers use interactive strategies, methods, and assessments according to students' needs.	84.7%	14.3%	1%
Lecturers use Ed-Tech to create a personalized learning environment.	60.7%	23%	16.3%
Learning is student-centered.	79.9%	16.8%	3.3%
Lecturers help students find new ideas inside and outside of learning.	81.6%	16.4%	2%

The findings presented in this study align with the insights of X. Chen et al., (2021), who emphasize that personalized learning is crucial in adapting educational experiences to the diverse strengths, needs, and interests of students. This adaptability is further evidenced by the 84.7% of respondents who affirmed that their lecturers implement teaching strategies and interactive methods tailored to student needs, highlighting a commitment to fostering an engaging learning environment. The additional 14.3% who noted a combination of personalized and traditional methods suggest a pragmatic approach to teaching, ensuring that varying student preferences are acknowledged. However, the 1% of respondents indicating that their learning needs were unmet raises concerns about the inclusivity of instructional practices, underscoring the necessity for ongoing assessment and refinement of teaching strategies to better serve all students. This data collectively underscores the importance of personalized learning in higher education, reinforcing the call for educators to adapt their methodologies to enhance student engagement and success continuously. Some respondents shared the following feedback:

> *"Designing and implementing engaging learning is crucial, but sometimes lecturers overlook this, assuming that because students are adults, they can learn independently. However, even in the classroom, engaging learning is still essential."*

> *"We, as students, enjoy lecturers who make classes fun and interactive. It not only sparks our interest in the subject but also makes it easier for us to understand. Engaging activities and discussions help us retain information better and apply it in real-life situations. When lecturers encourage questions and dialogue, it fosters a more collaborative learning environment. Moreover, using a variety of teaching methods keeps the lessons dynamic and prevents the content from becoming monotonous."*

The increasing integration of educational technology in Indonesia, with a reported 60.7% adoption rate, underscores the shift toward more flexible and personalized learning experiences (Sułkowski et al., 2021). However, the significant percentage of respondents, 23% noting inconsistent implementation of such technologies indicates a pressing need for universities to strengthen their educational practices. The shift towards a student-centered approach, where 79.9% of students affirm its presence, suggests that institutions are beginning to prioritize active engagement and problem-solving skills. Yet, the 16.8% of students who feel that learning is not consistently student-focused, along with the 3.3% who indicate that this approach is not yet in practice, highlights the disparities that still exist. This points to a critical area for development,

suggesting that more cohesive strategies are needed to ensure that all students can benefit from a genuinely student-centered educational environment (Purnamasari et al., 2020).

The pivotal role of lecturers in fostering a student-centered learning atmosphere cannot be overstated (Sharma et al., 2019). With 81.6% of respondents affirming that their lecturers aid in the development of new ideas, it is evident that faculty support is instrumental in enhancing student engagement and creativity. The findings also reveal a spectrum of lecturer involvement, with 16.4% of students acknowledging that while some lecturers offer assistance, they also allow for independent exploration. This approach of balancing guidance with autonomy is essential for personalization in learning, allowing students to adapt their learning processes to meet their unique needs. Furthermore, the opportunity for lecturers to experiment with diverse instructional strategies in various classes can yield valuable insights into what best enhances student performance. Such adaptability not only enriches the learning experience but also supports the broader goal of cultivating a more innovative and responsive educational landscape in Indonesian higher education.

3.3. Assessment

Assessment is a vital component of the educational system, serving to evaluate and compare students' performance and progress (Bryan & Clegg, 2019). Assessments measure abilities, skills, talents, and other characteristics. These assessments may be oral, written, or take other forms that can evaluate and justify further decisions. Assessment also helps determine whether pre-established goals have been achieved and whether improvement is necessary or if a particular level has been reached. In higher education, the purpose of assessment is to provide feedback as part of a continuous improvement cycle for students, lecturers, academic programs, and others (Arifin et al., 2023). The results of research on assessment practices at Islamic universities in Indonesia are summarized below:

Table 4. Assessment for Islamic Universities in Indonesia

Questionnaire Statement	Yes	Sometimes	No
Are learning outcomes evaluated through e-learning platforms?	62%	30.1%	7.9%
Are additional applications or technologies used alongside e-learning to assess learning outcomes?	73.7%	13%	13.3%
Is the assessment focused on higher-order thinking Skills (HOTS)?	64.3%	26.2%	9.5%
Do lecturers evaluate the learning process in addition to assessing outcomes?	84.9%	11.8%	3.3%

This study found that 62% of Islamic universities in Indonesia use e-learning platforms to assess learning outcomes. Additionally, 73.7% of respondents reported that their institutions have incorporated supplementary applications or technologies to support their learning processes. This integration has facilitated a smoother transition from traditional face-to-face instruction to online learning, a shift that was accelerated by the Covid-19 pandemic. In addition to assessing learning outcomes, the learning process itself is evaluated (Carless, 2005) to provide critical feedback for both lecturers and universities, serving as a basis for continuous improvement (Boud & Falchikov, 2007). A significant majority, 84.9% of respondents, indicated that lecturers at their institutions regularly evaluate the quality and effectiveness of the learning process, though 11.8% acknowledged that this practice is not consistently applied. These findings are consistent with Boud & Falchikov's emphasis on the necessity of ongoing assessment to enhance education, suggesting that many Islamic universities in Indonesia are adhering to these principles despite the challenges posed by the pandemic. Some respondents shared the following opinions:

"Research should be tailored to each program. Some study programs are more suited to practical assessments, while others may be better assessed through written papers. This allows for more accurate measurement of what needs to be evaluated."

"Honestly, when assessments are conducted, we, as students, prefer to be evaluated objectively. For example, tasks like writing a scientific article or reviewing previous research are more effective. On the other hand, traditional questions aren't as effective if they don't incorporate HOTS (Higher-Order Thinking Skills)."

Assessments play a crucial role in measuring students' abilities to improve the overall quality of learning. In this context, implementing assessments based on higher-order thinking Skills (HOTS) is essential for universities. Edwards & Briers (2000) emphasized that HOTS align with Bloom's Taxonomy, while Thomas & Litowitz (1986) highlighted that HOTS involve complex intellectual processes. In Indonesia, 64.3% of lecturers have adopted HOTS-based assessments, 26.2% have applied them inconsistently, and 9.5% have yet to incorporate this approach. This trend indicates a growing acknowledgement of the importance of HOTS in higher education, complementing Mohamed & Lebar's, (2017) argument that such assessments are crucial for educational enhancement. The development of HOTS-based learning and assessment is part of a government initiative aimed at improving both the quality of education and the caliber of graduates. This form of assessment can also evaluate students' competencies in the 4Cs: critical thinking, creativity and innovation, communication skills, and collaboration. Notably, the government's push for HOTS-based assessments echoes global trends in education reform, underscoring the need for a curriculum that fosters these essential skills.

Numerous studies have indicated that HOTS-based learning enhances students' capabilities. These improvements become evident when assessments are also based on HOTS. Extensive research has been conducted on HOTS-based learning and assessments (Mohamed & Lebar, 2017). The successful implementation of this approach has been shown to increase students' interest and motivation in learning. In some cases, students equipped with HOTS-related skills will find it easier to compete in the modern era (Ritonga et al., 2021). This observation is consistent with findings from earlier studies that highlighted the positive correlation between HOTS-focused education and student engagement. The ongoing development of science and technology necessitates that students master higher-order thinking skills to meet the challenges of the 21st century (Conklin, 2012). In this context, Conklin's assertion underscores the urgency for educational systems to adapt and equip students with these vital skills, reinforcing the significant strides made by Indonesian Islamic universities in implementing HOTS assessments.

3.4. Library Management System

Table 5. Implementation **of** Library Management System

Questionnaire Statement	Yes	Sometimes	No
Is the library automation system open-source and web-based?	68.8%	15%	16.3%
Does it utilize library cards for its operations?	65.3%	12%	22.7%
Is there a comfortable space for reading and discussions?	81.4%	15.3%	3.3%
Are adequate lighting, internet access, and other necessary facilities provided in the library?	77.3%	17.1%	5.6%

The library management system, as outlined by Deng & Xie, (2018), is software designed to streamline and automate various library operations. This system facilitates easy access to books, rapid publication or republication, and ensures efficient organization of data (Banu et al., 2011). Additionally, it keeps track of book borrowings and returns, manages updates, and processes

overdue fees. In Indonesia, 68.8% of students reported that their university libraries utilize web-based systems, while 16.3% noted that many institutions have not yet implemented such technology.

The shift from manual record-keeping to digital platforms, such as the use of library cards, has significantly improved efficiency (Susanto et al., 2022). This technology allows librarians to automatically record borrowing information using barcodes or QR codes, simplifying data transfer to computers (Omar & Djuhari, 2004). Library cards have been widely adopted, with 63.3% of students in Indonesia reporting their use, while 22.7% indicated that their student ID cards are integrated with the library system for seamless access.

A well-designed library space with appropriate furniture, ventilation, lighting, an appealing layout, and comfortable wall colors (Goodall & Pattern, 2011) can foster a culture of digital reading, allowing individuals to read anywhere and anytime. While these improvements make libraries more comfortable, they also present challenges (Younis, 2012). Ensuring that libraries attract visitors requires universities to innovate and provide facilities that make students feel comfortable studying, reading, and engaging in discussions (Lonsdale, 2003). In this regard, 81.4% of respondents stated that their campuses have renovated their libraries to make them more attractive and comfortable, while 15.3% reported that their campuses have not yet fully provided adequate facilities. Respondents shared their opinions and hopes for improved library services:

> *"We should look to developed countries and how they provide learning facilities, especially in libraries. There are individual study rooms, as well as larger rooms for group discussions. Additionally, the book collections are comprehensive, with clear instructions on how to find them."*

> *"Besides the technology for accessing, borrowing, and returning books, we would prefer the library to offer private rooms equipped with computers in a comfortable environment, so we can complete our assignments in peace. It would also be helpful if the library extended its operating hours, allowing students more flexibility to work during evenings or weekends. Additionally, having on-site academic support, such as writing or research consultants, would greatly enhance the overall learning experience."*

Grataridarga (2018) emphasized that technology and digital tools bridge distances and enhance learning environments. Similarly, Liu & Yu (2023) described technology as an organized system that enables users to adapt and progress. The future of education is envisioned as a collaborative effort between humans and machines, where students, educators, intelligent systems, and ideas are the key elements driving interaction and learning. A smart learning environment, as described by Zhang et al. (2023), provides tailored support to meet students' needs in both digital and physical settings. Through the implementation of smart learning technologies, students receive real-time, adaptive assistance, allowing them to assess their learning needs from various angles.

4. CONCLUSION

The findings of this study indicate that the Learning Management System (LMS) has been well-received among Islamic universities in Indonesia. More than 80% of respondents reported that their institutions have implemented LMS-based learning and rated its effectiveness as "very good." Additionally, personalized learning approaches, which integrate strategies, methods, technologies, and assessments tailored to students' needs, were also significantly adopted, with 80% of respondents providing a "very good" rating. The technology-based assessments aligned with higher-order thinking skills (HOTS) demonstrated satisfactory results, achieving a rating of

64.3%. However, while intelligent library management systems have generally been adopted, there remains a need for further innovation and development to optimize their functionality.

Despite these positive findings, the study has limitations, as it only encompasses the implementation of smart learning in universities located in 10 out of 34 provinces in Indonesia, which may reduce the representativeness of the sample. Additionally, the effectiveness of smart learning implementation at these universities was not evaluated in this study.

To address the identified gaps, universities should enhance their infrastructure, including upgrading library management systems and providing tailored training programs for faculty and staff to improve their readiness for smart learning. Policymakers are encouraged to establish national guidelines and allocate resources to support sustainable and inclusive smart learning practices across all Islamic universities. Future research should focus on assessing the comprehensive implementation of smart learning across all provinces, integrating Islamic values into digital education to ensure cultural and religious relevance. Additionally, in-depth studies on human resource readiness and its role in the success of smart learning systems are crucial. Long-term investigations into the sustainability, effectiveness, and scalability of smart learning in Islamic universities should also be prioritized to enhance the quality of higher education in Indonesia.

REFERENCES

Agbo, F. J., Oyelere, S. S., Suhonen, J., & Tukiainen, M. (2021). Scientific Production and Thematic Breakthroughs in Smart Learning Environments: A Bibliometric Analysis. *Smart Learning Environments*, *8*(1), 1–25. https://doi.org/10.1186/s40561-020-00145-4

Arifin, Z., Desrani, A., Ritonga, A. W., & Ibrahim, F. M. A. (2023). Arabic Language Learning Approach Using Smart Technology in Higher Education. *Izdihar: Journal of Arabic Language Teaching, Linguistics, and Literature*, *6*(1), 1–12. https://doi.org/10.22219/jiz.v6i1.25011

Badriah, S., Handayani, D., Mahyani, A., & Arifin, B. S. (2023). Learning Islamic Religious Education with Muhammadiyah Nuances in Universities. *Tafkir: Interdisciplinary Journal of Islamic Education*, *4*(2), 255–273. https://doi.org/10.31538/tijie.v4i2.401

Banu, A., Sameen Fatima, S., & Rahman Khan, K. U. (2011). Semantic - Based Querying Using Ontology in Relational Database of Library Management System. *International Journal of Web & Semantic Technology*, *2*(4), 21–32. https://doi.org/10.5121/ijwest.2011.2402

Boud, D., & Falchikov, N. (2007). Rethinking Assessment in Higher Education. *Rethinking Assessment in Higher Education*. https://doi.org/10.4324/9780203964309

Bryan, C., & Clegg, K. (2019). *Innovative Assessment in Higher Education* (Taylor & Francis Group (ed.)).

Carless, D. (2005). Prospects for the implementation of assessment for learning. *Assessment in Education: Principles, Policy and Practice*, *12*(1), 39–54. https://doi.org/10.1080/0969594042000333904

Cavanagh, T., Chen, B., Lahcen, R. A. M., & Paradiso, J. R. (2020). Constructing a Design Framework and Pedagogical Approach for Adaptive Learning in Higher Education: A Practitioner's Perspective. *International Review of Research in Open and Distance Learning*, *21*(1), 153–171. https://doi.org/10.19173/irrodl.v21i1.4529

Chen, L. W., Chen, T. P., Chen, D. E., Liu, J. X., & Tsai, M. F. (2018). Smart Campus Care and Guiding with Dedicated Video Footprinting Through Internet of Things Technologies. *IEEE Access*, *6*, 43956–43966. https://doi.org/10.1109/ACCESS.2018.2856251

Chen, X., Zou, D., Xie, H., & Wang, F. L. (2021). Past, Present, and Future of Smart Learning: A Topic-Based Bibliometric Analysis. *International Journal of Educational Technology in Higher Education*, *18*(1). https://doi.org/10.1186/s41239-020-00239-6

Conklin, W. (2012). Higher-Order Thinking Skills to Develop 21st Century Learners. *Shell Education*, 157.

Deng, S. T., & Xie, C. (2018). Design and Research of Mobile Phone Library Management System in Private University based on ASP.NET. *Journal of Physics: Conference Series*, *1087*(6). https://doi.org/10.1088/1742-6596/1087/6/062029

Doulai, P. (2001). Smart and Flexible Campus : Technology Enabled University Education. *Proceedings of The World Internet and Electronic Cities Conference (WIECC)*, *May*, 94–101.

Edwards, M. C., & Briers, G. E. (2000). Higher-Order And Lower-Order Thinking Skills Achievement In Secondary-Level Animal Science: Does Block Scheduling Pattern Influence End-Of-Course Learner

Performance? *Journal of Agricultural Education*, *41*(4), 2–14. https://doi.org/10.5032/jae.2000.04002

El Mhouti, A., & Erradi, M. (2018). Towards a Smart Learning Management System (Smart-LMS) to Improve Collaborative Learning in Higher Education. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3286606.3286784

Gambo, Y., & Shakir, M. Z. (2019). New Development and Evaluation Model for Self-Regulated Smart Learning Environment in Higher Education. *IEEE Global Engineering Education Conference*, *April-2019*, 990–994. https://doi.org/10.1109/EDUCON.2019.8725268

Gonczi, A. (2013). Competency-Based Approaches: Linking Theory and Practice in Professional Education with Particular Reference to Health Education. *Educational Philosophy and Theory*, *45*(12), 1290–1306. https://doi.org/10.1080/00131857.2013.763590

Goodall, D., & Pattern, D. (2011). Academic Library Non/Low Use and Undergraduate Student Achievement: A Preliminary Report of Research in Progress. *Library Management*, *32*(3), 159–170. https://doi.org/10.1108/01435121111112871

Grataridarga, N. (2018). Special Collections as Information Policy for Culture of Indonesia. *KnE Social Sciences*, *3*(11), 1042. https://doi.org/10.18502/kss.v3i11.2828

Guo, M., & Zhang, Y. (2011). the Research of Smart Campus Based on Internet of Things & Cloud Computing. *Computer Science*.

Han, Z., & Xu, A. (2021). Ecological Evolution Path of Smart Education Platform Based on Deep Learning and Image Detection. *Microprocessors and Microsystems*, *80*, 103343. https://doi.org/10.1016/j.micpro.2020.103343

Liu, M., & Yu, D. (2023). Towards Intelligent E-learning Systems. *Education and Information Technologies*, *28*(7), 7845–7876. https://doi.org/10.1007/s10639-022-11479-6

Lonsdale, M. (2003). *Impact of School Libraries on Student Achievement : A Review of the Research; Report for the Australian School Library Association*.

Magdalene, R., & Sridharan, D. (2018). Powering E-Learning Through Technology: an Overview of Recent Trends in Educational Technologies. *The Online Journal of Distance Education and E-Learning*, *6*(1), 60–65. www.tojdel.net

Merzon, E. E., & Ibatullin, R. R. (2017). Architecture of Smart Learning Courses in Higher Education. *Application of Information and Communication Technologies, AICT 2016 - Conference Proceedings*. https://doi.org/10.1109/ICAICT.2016.7991809

Mohamed, R., & Lebar, O. (2017). Authentic Assessment in Assessing Higher Order Thinking Skills. *International Journal of Academic Research in Business and Social Sciences*, *7*(2), 466. https://doi.org/10.6007/IJARBSS/v7-i2/2021

Molina-Carmona, R., & Villagrá-Arnedo, C. (2018). Smart learning. *ACM International Conference Proceeding Series*, 645–647. https://doi.org/10.1145/3284179.3284288

Muhammad, W., Kurniawan, N. B., Suhardi, & Yazid, S. (2017). Smart Campus Features, Technologies, and Applications: A Sytematic Literature Review. *International Conference on Information Technology Systems and Innovation (ICITSI)*, 384–391. https://doi.org/10.1109/ICITSI.2017.8267975

Omar, S., & Djuhari, H. (2004). Multi-purpose Student Card System using Smart Card Technology. *Proceedings of the Fifth International Conference on Information Technology Based Higher Education and Training, ITHET 2004*, 527–532. https://doi.org/10.1109/ithet.2004.1358229

Paunović, I., Dressler, M., Nikolić, T. M., & Pantić, S. P. (2020). Developing A Competitive and Sustainable Destination of The Future: Clusters and Predictors of Successful National-Level Destination Governance Across Destination Life-Cycle. *Sustainability (Switzerland)*, *12*(10). https://doi.org/10.3390/SU12104066

Purnamasari, R., Suchyadi, Y., Karmila, N., Nurlela, N., Mirawati, M., Handayani, R., Indriani, R. S., Anwar, W. S., & Kurnia, D. (2020). Student Center Based Class Management Assistance Through The Implementation Of Digital Learning Models. *Journal Of Community Engagement*, *02*(02), 41–44.

Ritonga, A. W., & Desrani, A. (2022). Framework of Smart Learning Technology in Supporting Quality of Higher Education in Indonesia. *International Journal of Multidisciplinary Research and Growth Evaluation*, 283–289. https://doi.org/10.54660/anfo.2022.3.6.11

Ritonga, A. W., Wargadinata, W., Hasan, N., & Ahmad, B. M. B. (2021). Teacher's Challenges in Implementing HOTS in Learning Arabic During Covid-19 Pandemic. *Izdihar : Journal of Arabic Language Teaching, Linguistics, and Literature*, *4*(1), 1–14. https://doi.org/10.22219/jiz.v4i1.15606

Sarrab, M., & Elgamel, L. (2013). Mobile Learning (M-Learning) and Educational Environments. *International Journal of Distributed and Parallel System*, *3*(4), 31–39.

Sharma, B. N., Nand, R., Naseem, M., Reddy, E., Narayan, S. S., & Reddy, K. (2019). Smart Learning in the Pacific: Design of New Pedagogical Tools. *Proceedings of 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering, TALE 2018*, *December*, 573–580. https://doi.org/10.1109/TALE.2018.8615269

Sudria, I. B. N., Redhana, I. W., Kirna, I. M., & Aini, D. (2018). Effect of Kolb's Learning Styles under Inductive Guided-Inquiry Learning on Learning Outcomes. *International Journal of Instruction*, *11*(1), 89–102. https://doi.org/10.12973/iji.2018.1117a

Sugiyono, C. (2019). *Penelitian Kuantitatif dan Kualitatif*. Alfabeta.

Sulaiman, T. T., Mahomed, A. S. B., Rahman, A. A., & Hassan, M. (2023). Understanding Antecedents of Learning Management System Usage among University Lecturers Using an Integrated TAM-TOE Model. *Sustainability (Switzerland)*, *15*(3). https://doi.org/10.3390/su15031885

Sułkowski, Ł., Kolasińska-Morawska, K., Seliga, R., & Morawski, P. (2021). Smart Learning Technologization in the Economy 5.0-The Polish Perspective. *Applied Sciences (Switzerland)*, *11*(11). https://doi.org/10.3390/app11115261

Susanto, Muafiah, E., Desrani, A., Ritonga, A. W., & Hakim, A. R. (2022). Trends of Educational Technology (EdTech): Students' Perceptions of Technology to Improve the Quality of Islamic Higher Education in Indonesia. *International Journal of Learning, Teaching and Educational Research*, *21*(6), 226–246. https://doi.org/10.26803/ijlter.21.6.14

Susanto, S., Ritonga, A. W., & Desrani, A. (2022). Innovation Management Plan for Quality Improvement of Madrasah in Covid-19 Situation. *Aspirasi: Jurnal Masalah-Masalah Sosial*, *13*(1), 117–133. https://doi.org/10.46807/aspirasi.v13i1.3001

Thomas, R. G., & Litowitz, L. (1986). Vocational Education and Higher Order Thinking Skills: An Agenda for Inquiry. *Opinion Papers*.

Younis, M. I. (2012). SLMS: A Smart Library Management System based on an RFID Technology. *International Journal of Reasoning-Based Intelligent Systems*, *4*(4), 186–191. https://doi.org/10.1504/IJRIS.2012.051717

Zhang, J., Jing, Q., Liang, Y., Jiang, H., & Li, N. (2023). Smart Learning Environments in School: Design Principles and Case Studies. In *Learning, Design, and Technology* (pp. 3659–3686). Springer International Publishing. https://doi.org/10.1007/978-3-319-17461-7_19