Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia

Suwendi[1], Mesraini[2], Cipta Bakti Gama[3], Hadi Rahman[4], Teguh Luhuringbudi[5], Maslin Masrom[6]
[1,2,4,5]UIN Syarif Hidayatullah Jakarta, Indonesia
[3]STAI Sadra, Jakarta, Indonesia
[6]Faculty of Artificial Intelligence, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia

Article Info	ABSTRACT
	This study aimed to assess the readiness, attitudes, knowledge, and skills of lecturers in using artificial intelligence (AI) and electronic resources (ER) to enhance academic capacity. Understanding this adoption level is crucial for effectively integrating AI and ER into educational practices. In addition, this study contributes both theoretically and practically to digital scholarship by enhancing digital adoption and competence in education. This mixed-method study captured individual experiences and statistical trends related to digital scholarship in higher education. The qualitative method includes interviews, while the quantitative method involves survey questionnaires. The study focuses on lecturers from Islamic higher education institutions (IHEIs) in Indonesia. The results indicate that while lecturers rarely use AI and ES, they recognize the potential of digital technology in academic tasks. Despite limited exposure to AI and ER, IHEI lecturers in Indonesia can define these technologies accurately. Most lecturers actively update their knowledge and consider bias and ethical aspects in AI and ES usage. Regarding skills, over 60% of respondents reported proficiency in using AI and ES, suggesting a growing level of digital competence. These findings suggest that while many IHEI lecturers in Indonesia are prepared to adopt AI and ER, further support may be needed to ensure widespread acceptance.

Corresponding Author:

Suwendi
Graduate School, UIN Syarif Hidayatullah Jakarta
Jl. Ir. H. Juanda, No.95, South Tangerang Selatan, 15412, Indonesia.
Email: suwendi@uinjkt.ac.id

1. INTRODUCTION

The advent of digital technology has precipitated a paradigm shift in the academic landscape globally. Academicians of IHEIs encounter challenges in integrating AI and ER into their teaching and research. However, the readiness and proficiency to adopt these technologies vary. While some lecturers are already proficient, others require further development or need to enhance their skills [1]. This diversity indicates a knowledge gap in understanding the factors that influence digital literacy in terms of the readiness, use, acceptance, and adoption of digital technology [2], [3], [4], [5], [6] and addressing this gap is important to develop interventions and improve digital science among the lecturers.

The Ministry of Religious Affairs and the Ministry of Education, Culture, Research and Technology in Indonesia have issued policies to encourage the adoption of digital technology in the teaching and learning process, especially since the COVID-19 pandemic. However, the implementation of this policy varies across different educational institutions. In IHEIs, it is necessary to assess the extent to which these regulations have been effectively operationalized to determine the level of knowledge gap and the impact of digital transformation policies, in addition to providing recommendations for improvements that align with the needs of IHEIs.

The social dynamics within educational institutions have been shown to play an important role in shaping the adoption and integration of digital technology. The social context in IHEIs requires the integration of traditional Islamic values and modern educational practices, presenting both opportunities and challenges for digital adoption. Social factors such as peer influence, administrative support, and community involvement influence lecturers' attitudes toward technology [7], [8], [9]. On the other hand, digital scholarship is increasingly important for enhancing academic capacity and fostering innovation. IHEI lecturers are expected to utilize AI and ER to improve teaching, research, and community service [10], [11], [12]. However, current research mainly focuses on the availability of digital tools and their use in the scientific activities of lecturers in higher education [13], [14].

Digital scholarship emphasizes the importance of scholarly engagement with digital library tools and resources, enhancing academic productivity and innovation [15], [16]. IHEI lecturers, on the other hand, are expected to navigate the complexities of integrating AI and ES into their academic practices. Despite the availability of these technologies, significant challenges related to infrastructure, training, and resource accessibility persist [17]. Primary sources, encompassing extensive AI and ES tools, necessitate high digital literacy and adaptability from lecturers. However, many lecturers require further training and support to meet these demands [18], [19]. This highlights a knowledge gap in digital tool readiness and use. Their attitudes toward innovation greatly influence the readiness of IHEI lecturers in Indonesia to use digital technologies. Therefore, it is necessary to explore the psychological, social, and cultural factors that shape lecturers' attitudes toward digital technology through the use of the digital readiness and attitudes framework by Jan Van Dijk [20], [21], [22]. Furthermore, the Technology Acceptance Model (TAM) 3 by Viswanath Venkatesh provides an understanding of how perceptions of use, usefulness, and conditions influence technology acceptance [23], [24], [25], [26], [27], [28], [29], [30]. Despite these two theoretical frameworks, empirical research on their application in higher education contexts is limited.

This study addresses the above gap by examining how these factors emerge among lecturers. Its novelty is that it contextualizes the framework to explore attitudinal barriers within an academic climate. This approach provides a deeper understanding of the factors influencing digital readiness, offering insights into how lecturers navigate AI and ER in their academic practices. By integrating theoretical perspectives with empirical findings, this research aims to contribute to the ongoing discourse on digital transformation in higher education and inform strategies for enhancing digital competencies among lecturers in Islamic higher education institutions.

2. RESEARCH METHOD

This study used mixed methods to comprehensively understand the AI and ER adoption phenomenon among academicians in IHEIs. This method was chosen to capture the depth of individual experiences and the breadth of statistical trends related to digital scholarly in higher education. The qualitative aspect involved in-depth interviews with lecturers, giving detailed insights into their attitudes, knowledge, and skills regarding AI and ER. The quantitative component consisted of online surveys and questionnaires to collect measurable data on the same variables. The population of this study was lecturers at IHEIs in Indonesia. These lecturers play a vital role in integrating and utilizing digital tools for academic purposes, making them an ideal unit of analysis to study digital scholarch. The study's primary objective is to assess the level of readiness of lecturers' attitudes, knowledge, and skills towards AI and e-resources. The subject or sample selection process involved identifying lecturers actively engaged in digital initiatives while ensuring a representative sample of individuals with diverse experiences and expertise. This approach provides a comprehensive understanding of the challenges and opportunities in adopting digital technologies in the context of IHEIs.

The primary focus of this study was on the use of artificial intelligence and e-resources by lecturers at IHEIs in Indonesia. The data collection process encompassed documenting prevailing digital initiatives, observing classroom and administrative learning practices, and distributing questionnaires to lecturers. These sources were selected to provide a diverse view of how digital tools are integrated into academic and administrative processes. The documentation review imparted a historical perspective on digital adoption, while the observations yielded real-time insights into prevailing practices. The questionnaire assessed lecturers' attitudes, knowledge, and skills related to AI and e-library resources. Responses in the questionnaire were measured using a 4-category Likert scale, with options ranging from Strongly Agree (SA), Agree (AG), Disagree (DA), to Strongly Disagree (SD). Combining these sources ensured that the data collected was comprehensive and representative of the lecturers' experiences.

Data analysis in this study involved applying several primary frameworks for each variable studied. The first variable, namely attitudes, was analyzed using the Digital Readiness and Attitudes Framework by Jan Van Dijk [31] and the TAM 3 by Viswanath Venkatesh [24], [25], [26], [28], [30]. The Digital Readiness and Attitudes Framework explores psychological, social, and cultural factors that influence the adoption of digital technologies. TAM 3 extends the original model by incorporating additional variables, such as perceived ease of use and usefulness.

The second variable, knowledge, was examined using the Digital Literacy Framework by Renee Hobbs [32] and the AI Literacy Model by Daniela Rus [33], [34], [35], [36], [37], [38], [39]. The Digital Literacy Framework delineates essential digital skills and competencies, emphasizing critical thinking and ethical use. Meanwhile, the AI Literacy Model outlines the knowledge required to engage effectively with AI technologies.

The third variable, skills, was assessed using the Technological Pedagogical Content Knowledge (TPACK) Framework by Matthew J. Koehler and Punya Mishra [40] and the Digital Competence Framework for Educators (DigCompEdu) by Yves Punie [41]. TPACK focuses on integrating technology, pedagogy, and content knowledge, while DigCompEdu identifies the digital competencies required for effective teaching. These frameworks provide a comprehensive approach to analyzing the readiness of IHEI lecturers in Indonesia to adopt digital tools, thereby contributing to the development of sustainable academic capacity.

3. RESULT AND DISCUSSION

3.1. Respondent Profile

A total of 85 respondents completed the questionnaire in this study. In terms of gender, 72% of respondents were male, while 28% were female. This indicates that male respondents significantly outnumber female respondents. Regarding age, respondents were divided into four groups: 18–25 years, 26–35 years, 36–45 years, and 46–55 years. Most respondents were in the 46–55 age group (36%), followed by the 36–45 age group (34%). Additionally, 15 respondents (18%) fell into the 26–35 age group, while the remaining 9 respondents (11%) were over 55 years old, and only one respondent was in the 18–25 age group. Regarding university affiliation, the majority of respondents (38.55%) were from state universities. A significant portion (31.33%) came from private universities, while 18% and 12% were from colleges and institutes, respectively.

In terms of employment status (Figure 1), most respondents (71%) were private employees, while 29% (24 people) held public employee status. Regarding functional positions, 41% of respondents (35 people) were lecturers, followed by expert assistants (19 respondents) and senior lecturers (14 respondents). Only two respondents held professor positions, while 15 respondents had no assigned functional positions. Concerning expertise, the majority of respondents (51 people) had an educational background in the Religious Sciences cluster. Additionally, 12 respondents specialized in Social Sciences, while 11 were from Humanities. Notably, three respondents specialized in Formal Sciences, while only one had expertise in Natural Sciences.
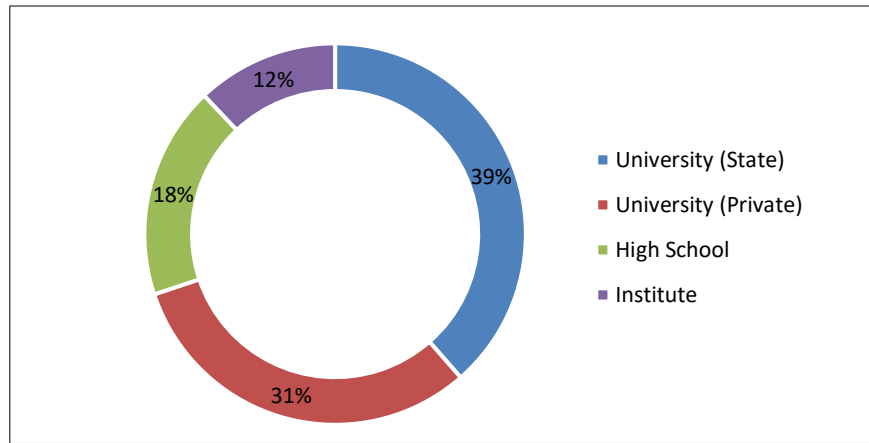
Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia
Suwendi, Mesraini, Cipta Bakti Gama, Hadi Rahman, Teguh Luhuringbudi, Maslin Masrom

44

Figure 1. The Respondents' IHEIs of Origin

3.2. *Attitude Aspect*

Drawing on the Digital Divide theoretical framework by Van Dijk (2020) and the TAM 3 model by Venkatesh & Bala [23], [24], [25], [26], [27], [28], [29], [30]. , the attitudes of IHEIs lecturers toward AI can be analyzed through four key elements: access to AI technology, perceived ease of use, perceived benefits, and self-efficacy. Data on the frequency of AI technology use shows that most respondents still have limited access to these tools. ChatGPT is the most frequently used AI tool, while Turnitin is used occasionally. Other AI tools are rarely accessed. Grammarly, Canva, and Gemini are relatively well-known, with over 25% of respondents occasionally using them. Meanwhile, TomeAI, Thinkster Math, and Heygen are used by fewer than 2% of respondents (Figure 2).
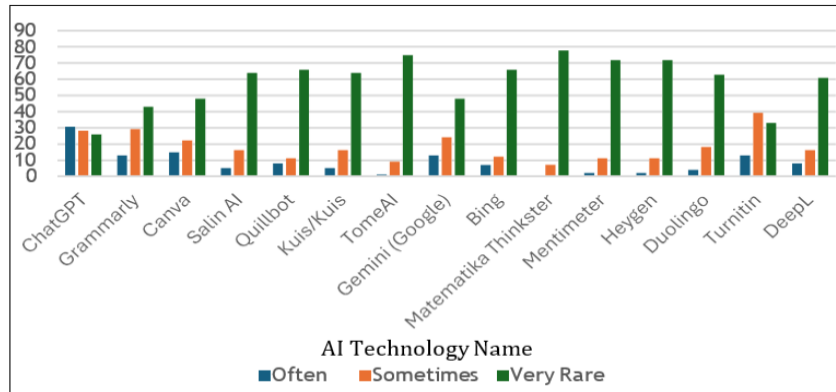

Figure 2. The Frequency of Use of Fifteen AI Technologies by Respondents

In general, the level of access to AI technology among IHEI lecturers still needs improvement. Many are familiar with ChatGPT and Turnitin, likely due to ChatGPT's global popularity as an early GenAI tool and Turnitin's requirement for plagiarism detection in academic submissions. The widespread use of these two AI tools is influenced by public popularity and government regulations. The majority of respondents agreed with statements regarding the ease of use of AI technology. Over 60% found AI relatively easy to learn and use. Additionally, 66% considered AI features for academic activities intuitive and user-friendly, while 64% believed AI does not require extensive technical expertise. Furthermore, 56% felt AI was equally accessible to both older and younger users (Table 1).

Table 1. The Perception of Ease of Use of AI Technology

Statements	Responses			
	SA	AG	DA	SD
How AI technology works is easy to learn	13	66	6	0

The AI interface and features I know are very easy to understand and operate	8	66	10	1
It doesn't take long to learn how AI is becoming a trend in the academic world	11	66	8	0
The use of AI technology does not require many technicians to operate it	12	64	9	0
The integration of AI features with other apps works well	13	62	8	0
AI can be operated for activities by lecturers regardless of age	13	56	16	0

Most respondents positively assessed AI technology's usefulness for enhancing work efficiency and productivity. 58% agreed that AI can support various academic tasks, while 63% found it highly beneficial in time-sensitive situations. Additionally, 51% expressed willingness to install AI tools on their devices, even with a paid subscription, to facilitate their work (Table 2).

Table 2. The Usefulness of AI Technology in Respondent's Work Efficiency and Productivity

Statements	Responses			
	SA	AG	DA	SD
AI technology can be used in almost all types of lecture work	7	58	18	2
AI technology is invaluable to lecturers when they are pressed for time	16	63	6	0
I will continue to use AI technology for academic purposes throughout my teaching career	8	47	26	2
I will install AI in all my tech devices	4	51	27	3
I am willing to pay for a subscription to a specific AI that facilitates the lecturer's academic tasks	3	51	26	5
I have subscribed to one or more AI technologies because they make my job as a lecturer easier	5	40	35	5
I applied for an AI subscription to boost academic productivity.	3	35	39	0

The survey revealed that 65% of respondents felt confident in using AI to complete their tasks, while 24% expressed lower confidence, and only 2% reported a lack of confidence (Figure 3)
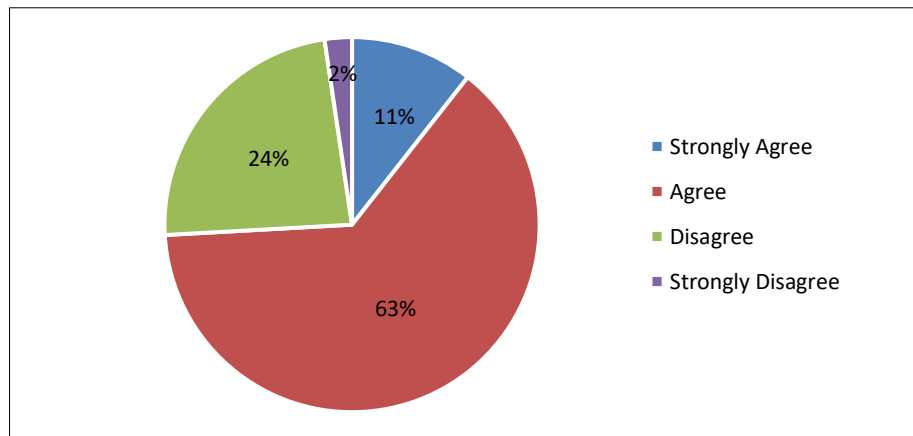

Figure 3. Confidence in Using AI to Fulfill Lecturers' Tasks

3.3. *Knowledge aspect*

Based on the Digital Literacy Framework by Renee Hobbs (32) and the AI Literacy Model by Daniela Rus, AI knowledge among IHEIs lecturers can be analyzed through five key elements: (1) knowledge of accessing AI technology, (2) understanding basic AI concepts, (3) ability to analyze and solve problems using AI, (4) awareness of AI system biases, and (5) ethical considerations in AI applications. The majority of respondents reported being highly familiar with ChatGPT and Turnitin. Additionally, 20–25% were familiar with Grammarly, Canva, Quizlet, and Gemini. However, most respondents had only heard of AI tools such as Copy AI, Quillbot, Quizlet, TomeAI, Gemini, Bing, Thinkster Math, Mentimeter, Heygen, Duolingo, and DeepL, without extensive usage.

Over 60% of respondents demonstrated an understanding of basic AI concepts. However, nearly 30% did not confidently define these concepts, though none explicitly denied their understanding.

Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia
Suwendi, Mesraini, Cipta Bakti Gama, Hadi Rahman, Teguh Luhuringbudi, Maslin Masrom

46

Additionally, over 70% of respondents reported being able to solve technical problems related to AI in academic settings. Furthermore, over 80% of respondents stated that they frequently explore new AI technologies and stay updated on their developments. Moreover, over 70% of respondents recognized that AI technology contains inherent biases that require critical evaluation in terms of accuracy and ethical considerations (Figure 4).
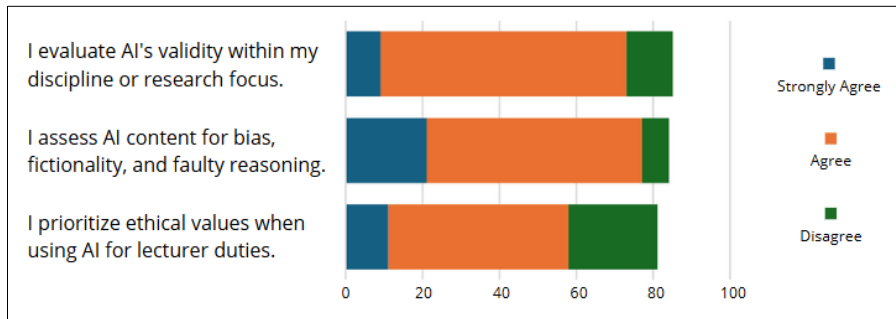

Figure 4. The Accuracy Bias and Ethical Values in AI Technology Systems and Their Use

3.4. Skills aspect

The TPACK framework by Mishra and Koehler (40) explains that educators' skills involve a complex interplay of Pedagogical Knowledge (PK), Content Knowledge (CK), and Technological Knowledge (TK). These three domains overlap to form Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and ultimately, TPACK, where all elements intersect. Conversely, Ferrari's DigCompEdu (Digital Competence of Educators) framework [42] highlights five key elements: information, communication, content creation, security, and problem-solving. Redecker later expanded the framework within the European context [43], refining it to emphasize six elements: professional engagement, digital resources, learning and teaching, assessment, learner empowerment, and learner facilitation. The first two elements relate to educators' professional skills, the third and fourth pertain to pedagogical skills, and the final two focus on learner skills [43].

Based on these two theoretical frameworks, IHEI lecturers in Indonesia responded to nine survey questions. These questions focused solely on educators' technical, pedagogical, content, and professional skills, excluding learner skills.

Table 3. The Technical, Pedagogical, Content, and Professional Skills of the Educators

	Statements	Responses			
		SA	AG	DA	SD
I.	I have the technical skills necessary to use AI technology for academic activities	7	57	19	0
II.	I am aware of the benefits and limitations of AI tools for my work as a lecturer	6	69	8	0
III.	I can explain AI variations academically by comparing their computational mechanisms	4	52	26	0
IV.	I always leverage generative AI technology to get the desired response	3	55	27	0
V.	I experiment with programming to enhance AI accuracy for academics	3	39	37	4
VI.	I present both sides of using AI in higher education with scientific reasoning	7	52	23	1
VII.	I applied for an AI subscription to boost academic productivity	3	35	39	6
VIII.	I have provided recommendations for AI feature development to developers/companies	2	33	43	7
IX.	I have done publications related to AI technology	3	29	45	8

The survey results revealed several notable findings. Approximately 57% of respondents reported having the technical skills required to integrate AI technology into academic activities. Most respondents reported being proficient in utilizing AI and distinguishing its computational mechanisms to generate desired responses. However, only a minority of respondents reported advanced skills, such as programming, recommending AI feature developments for companies, or publishing AI-related research. Furthermore, most respondents had not applied for institutional subscriptions to AI technology products to enhance their skills (Figure 5).
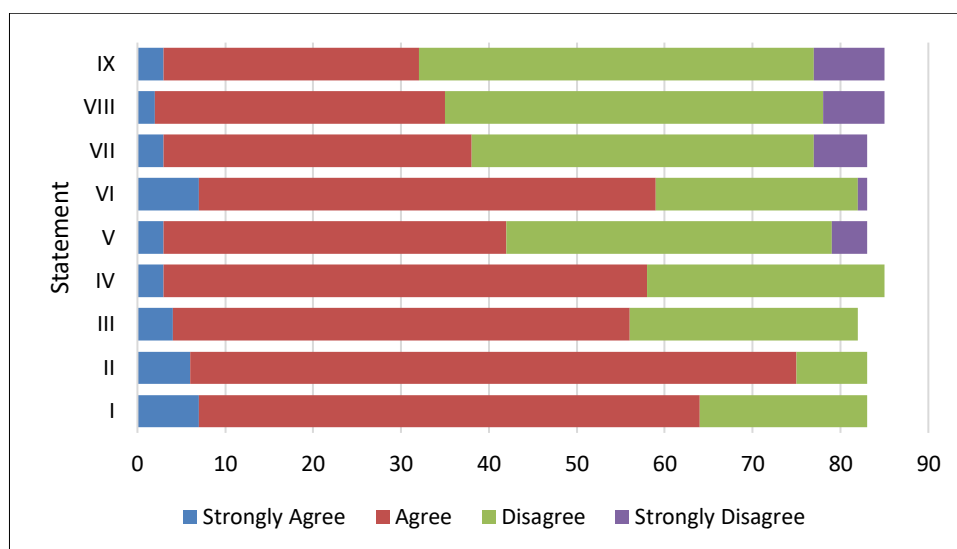
Figure 5. Possession of the Technical Skills Required to Use AI Technologies in Academic Activities

3.5.   Discussion

Firstly, the data showed that 73% of respondents were male. Based on Van Dijk's theory, gender is closely related to access to mental and material skills and digital technology, resulting in gaps [20], [21], [22], [31], [44]. Several studies support this view. Cooper (45) found that distrust and lack of interest in digital technology are more prevalent among women than men. In many countries, women have less access to digital devices and internet ownership than men [45]. Other studies have also found that women are less skilled [46] and less optimistic about the use of technology in the classroom [47] than men. Given the small number of female respondents, this study may not be sufficient to fully assess their readiness. However, these findings align with previous research on gender disparities in digital preparedness.

Secondly, 11% of respondents were over 55 years old, while the remaining participants were younger. Several studies indicate that older adults face challenges in accessing digital technology due to a lack of skills and comfort in using it [48], [49]. Courtois and Verdegem (50) also identified low digital skills among older adults as a contributing factor to the digital divide. This study found that approximately 57% of respondents considered themselves skilled in using AI technology. However, the remaining 43% who reported being unskilled included a higher proportion of older respondents. In summary, age appears to be a factor in digital readiness, though not the most dominant determinant among IHEIs lecturers in Indonesia.

Thirdly, regarding attitudes, around 60% or more of respondents perceived AI technology as valuable and easy to use in their academic work. However, this positive perception is primarily driven by the frequent use of ChatGPT and Turnitin, while tools like Grammarly, Canva, and Gemini are used with moderate frequency. Meanwhile, TomeAI, Thinkster Math, and Heygen are rarely accessed. This is understandable for Thinkster Math, as 60% of respondents specialize in religious studies. Respondents with expertise in natural, formal, and applied sciences accounted for only 10%. However, it is reasonable to expect that lecturers across disciplines would benefit from AI technologies beyond ChatGPT and Turnitin, as these tools can enhance creativity and efficiency in completing academic tasks.

Moreover, studies suggest that the perception of technology's usefulness tends to be more positive among technical professionals [51] and those open to innovation [52]. Conversely, traditional professions are more likely to exhibit negative perceptions [53]. Although religious studies maintain strong traditional elements, modern and traditionalist perspectives continue to interact within the field,

Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia
Suwendi, Mesraini, Cipta Bakti Gama, Hadi Rahman, Teguh Luhuringbudi, Maslin Masrom

48

making it more adaptable than fully traditional disciplines. The findings of this study reinforce this observation.

Fourthly, concerning attitudes, Van Dijk's Digital Divide theory suggests that digital disparities arise from not only gender and age but also material and social resources [31]. A majority of respondents (39%) were from state universities, while 71% of those from other institutions held ASN status. Studies suggest that public universities have advantages over private universities in terms of budget management, structured training programs, and government support [54], [55]. However, this does not imply that private lecturers lack resources entirely, as some studies highlight the flexibility of PTS institutions in adopting technological advancements [56].

Fifthly, in terms of knowledge, 60-80% of respondents demonstrated an understanding of AI fundamentals, problem-solving using AI, and ethical considerations in AI applications. This suggests a substantial level of digital scholarship among IHEIs lecturers.

As previously explained, the analysis of the knowledge aspect was carried out based on the Digital Literacy Framework formulated by Renee Hobbs [32]. This theoretical framework focuses on the following elements: access (identifying the correct location and target), analysis (critical thinking), creation (self-expression and effective communication), reflection (personal impact and ethical values in a broader context of influence on others), and action (collaborative global efforts in finding solutions). Of all these elements, the questions asked to the respondents of this study still focus on the elements of critical thinking and ethical values.

Regarding critical thinking and ethical values in using AI technology, several studies have highlighted aspects of education, experience, and social context. Several studies suggest specific teaching methods, such as environment-based teaching [57], to educate critical thinking using AI technology. Other studies have highlighted the importance of designing tasks that demand critical thinking and problem-solving skills [58]. Furthermore, several studies found the importance of experienced teachers in using AI technology to influence students' critical thinking [59]. In addition, the social context is pertinent to ethical awareness concerning the broader implications of AI technology utilization (Aisyah, 2024). Although the above studies target students and not lecturers, these studies are still relevant to both social groups due to their human nature.

Sixthly, by the attitudes and knowledge component of the study, the Majority (approximately 57%) of IHEI lecturers demonstrated a readiness for digital scholarly. Utilizing the TPACK and DigComptEdu frameworks, this study focused on lecturers' technical, pedagogical, and professional skills. The findings of several studies have identified the significance of data management training [60], digital literacy in evaluating and utilizing technology [61], [62], and an adaptive learning environment [63] for enhancing technical and pedagogical skills. Another study concluded the importance of time management in using digital technology [64] and continuous training on technology integration in teaching [65] for professional skills.

Finally, similar to attitudes and knowledge, the digital skills of IHEI lecturers still require improvement to enhance access to certain AI technologies. While many IHEI lecturers in Indonesia demonstrate preparedness for AI and ES adoption, additional support is necessary to achieve comprehensive readiness. Increasing access to AI platforms and enhancing lecturers' attitudes, knowledge, and skills will be essential for fully integrating digital scholarship into IHEIs.

4. CONCLUSION

This study provides substantive insights into the readiness of IHEI lecturers in Indonesia to utilize AI for academic capacity development. Based on the findings and analysis, the key conclusions are as follows. First, in general, more than 60% of lecturers demonstrate adequate readiness for specific AI platforms such as ChatGPT, Canva, Gemini, and Turnitin. However, many AI platforms essential for enhancing lecturers' academic capacity remain underutilized. Secondly, in terms of attitude, most IHEI lecturers in Indonesia recognize the potential of AI for their educational tasks. However, their actual use of AI on specific platforms remains limited. Thirdly, most IHEI lecturers in Indonesia possess adequate knowledge of AI's basic concepts, analytical applications, and ethical considerations. Despite being unfamiliar with some major AI platforms, they actively update their knowledge of AI developments. Fourthly, regarding skills, most IHEI lecturers in Indonesia are technically, pedagogically, and professionally proficient in using AI technology. However, their reliance on incomplete or limited

platforms suggests room for further skill enhancement. Thus, IHEI lecturers in Indonesia demonstrate readiness to adopt AI and ER for academic purposes, though further support may enhance their effectiveness.

ACKNOWLEDGEMENTS

REFERENCES

[1]   N. Nazari, M. S. Shabbir, and R. Setiawan, "Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial," *Heliyon*, vol. 7, no. 5, 2021.

[2]   A. Susanto, P. Rama Mahadika, and ang Subiyakto, "Analysis on Electronic Ticketing System Acceptance Using an Extended Unified Theory of Acceptance and Use of Technology (UTAUT)."

[3]   E. Firmansyah, D. Yuniarto, D. Herdiana, M. Suryadi, A. Subiyakto, and A. B. A. Rahman, "Integrating the Readiness and IS-Impact Constructs in the Rural Area Context: A Model Development," in *IOP Conference Series: Materials Science and Engineering*, 2019. doi: 10.1088/1757-899X/662/2/022064.

[4]   A. Subiyakto, N. A. Hidayah, G. Gusti, and M. A. Hikami, "Readiness and Success of Ubiquitous Learning in Indonesia: Perspectives from the Implementation of a Pilot Project," *Information (Switzerland)*, vol. 10, no. 2, p. 79, 2019, doi: 10.3390/info10020079.

[5]   A. Subiyakto, "Assessing Information System Integration Using Combination of the Readiness and Success Models," *Bulletin of Electrical Engineering and Informatics*, vol. 7, no. 3, pp. 400–410, 2018, doi: 10.11591/eei.v7i3.1182.

[6]   A. Subiyakto, A. Rahman Ahlan, M. Kartiwi, N. Hakiem, M. Q. Huda, and A. Susanto, "The Information System Project Profiles among Universities in Indonesia," *Indonesian Journal of Electrical Engineering and Computer Science*, vol. 12, no. 2, pp. 865–872, 2018, doi: 10.11591/IJEECS.V12.I2.PP%P.

[7]   T. Z. Aldahdouh, P. Nokelainen, and V. Korhonen, "Technology and social media usage in higher education: The influence of individual innovativeness," *Sage Open*, vol. 10, no. 1, p. 2158244019899441, 2020.

[8]   A. M. Al-Rahmi *et al.*, "The influence of information system success and technology acceptance model on social media factors in education," *Sustainability*, vol. 13, no. 14, p. 7770, 2021.

[9]   S. Hu, K. Laxman, and K. Lee, "Exploring factors affecting academics' adoption of emerging mobile technologies-an extended UTAUT perspective," *Educ Inf Technol (Dordr)*, vol. 25, pp. 4615–4635, 2020.

[10]   M. Mujiburrahman, Z. Zulfatmi, S. Sabirin, H. K. H. Khatimah, and F. H. Ismail, "Reformulation of competency development of lecturers of state islamic religious universities in Indonesia after covid-19," *Asian Journal of University Education*, vol. 18, no. 1, pp. 15–33, 2022.

[11]   S. Riza, M. Syarif, F. Mardatillah, A. J. Salam, W. Khafidah, and M. Yusuf, "Improving Lecturer Competence to Encourage Innovation and Creativity in Learning," *Jurnal Ilmiah Peuradeun*, vol. 12, no. 1, pp. 249–272, 2024.

[12]   W. Susiawati, "Arabic Learning Styles at State Islamic Universities in the Society Era 5.0," *Arabi: Journal of Arabic Studies*, vol. 8, no. 1, pp. 56–66, 2023.

[13]   F. Fauzan, F. Arifin, M. A. Lubis, and F. M. Firdaus, "Lecturer's Digital Literacy Ability in the Pandemic.," *Cypriot Journal of Educational Sciences*, vol. 17, no. 4, pp. 1130–1142, 2022.

[14]   A. Habibi *et al.*, "Mapping instructional barriers during covid-19 outbreak: Islamic education context," *Religions (Basel)*, vol. 12, no. 1, p. 50, 2021.

[15]   M. Y. Ali, S. Bin Naeem, and R. Bhatti, "Artificial intelligence tools and perspectives of university librarians: An overview," *Business Information Review*, vol. 37, no. 3, pp. 116–124, 2020.

[16]   N. S. Alotaibi and A. H. Alshehri, "Prospers and obstacles in using artificial intelligence in Saudi Arabia higher education institutions—The potential of AI-based learning outcomes," *Sustainability*, vol. 15, no. 13, p. 10723, 2023.

[17]   A. Cox, "How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions," *J Assoc Inf Sci Technol*, vol. 74, no. 3, pp. 367–380, 2023.

[18]   M. Huda, "Towards digital access during pandemic age: better learning service or adaptation struggling?," *Foresight*, vol. 25, no. 1, pp. 82–107, 2023.

[19]   P. Ndibalema, "Constraints of transition to online distance learning in Higher Education Institutions during COVID-19 in developing countries: A systematic review," *E-learning and digital media*, vol. 19, no. 6, pp. 595–618, 2022.

[20]   E. Van Laar, A. J. A. M. van Deursen, J. A. G. M. van Dijk, and J. De Haan, "Determinants of 21st-century digital skills: A large-scale survey among working professionals," *Comput Human Behav*, vol. 100, pp. 93–104, 2019.

Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia
Suwendi, Mesraini, Cipta Bakti Gama, Hadi Rahman, Teguh Luhuringbudi, Maslin Masrom

50

[21] A. J. A. M. Van Deursen and J. A. G. M. Van Dijk, "The digital divide shifts to differences in usage," *New Media Soc*, vol. 16, no. 3, pp. 507–526, 2014.

[22] A. J. A. M. Van Deursen and J. A. G. M. Van Dijk, "The first-level digital divide shifts from inequalities in physical access to inequalities in material access," *New Media Soc*, vol. 21, no. 2, pp. 354–375, 2019.

[23] S. Goyal, V. Venkatesh, and X. Shi, "Role of users' status quo on continuance intentions," *Information & Management*, vol. 59, no. 8, p. 103686, 2022.

[24] V. Venkatesh, "Adoption and use of AI tools: a research agenda grounded in UTAUT," *Ann Oper Res*, vol. 308, no. 1, pp. 641–652, 2022.

[25] V. Venkatesh, J. A. Aloysius, H. Hoehle, and S. Burton, "Design and evaluation of auto-ID enabled shopping assistance artifacts in customers' mobile phones," *Mis Quarterly*, vol. 41, no. 1, pp. 83–114, 2017.

[26] V. Venkatesh and H. Bala, "Technology acceptance model 3 and a research agenda on interventions," *Decision sciences*, vol. 39, no. 2, pp. 273–315, 2008.

[27] V. Venkatesh, F. D. Davis, and Y. Zhu, "Competing roles of intention and habit in predicting behavior: A comprehensive literature review, synthesis, and longitudinal field study," *Int J Inf Manage*, vol. 71, p. 102644, 2023.

[28] V. Venkatesh, R. Raman, and F. Cruz-Jesus, "AI and emerging technology adoption: a research agenda for operations management," *Int J Prod Res*, vol. 62, no. 15, pp. 5367–5377, 2024.

[29] V. Venkatesh, C. Speier-Pero, R. Aljafari, and H. Bala, "IT use and job outcomes: a longitudinal field study of technology contingencies," *J Assoc Inf Syst*, vol. 23, no. 5, pp. 1184–1210, 2022.

[30] V. Venkatesh, Q. Weng, A. Rai, and L. M. Maruping, "Guidelines for the development of three-level models: Bridging levels of analysis and integrating contextual influences in research," *J Assoc Inf Syst*, vol. 24, no. 1, pp. 65–106, 2023.

[31] J. Van Dijk, *The digital divide*. John Wiley & Sons, 2020.

[32] R. Hobbs, *Digital and media literacy: Connecting culture and classroom*. Corwin Press, 2011.

[33] Z. Liu *et al.*, "Bevfusion: Multi-task multi-sensor fusion with unified bird's-eye view representation," in *2023 IEEE international conference on robotics and automation (ICRA)*, IEEE, 2023, pp. 2774–2781.

[34] A. Chandrakasan, D. Rus, and J. D. AMA, "Science AMA Series: We see an opportunity to achieve a deeper understanding of intelligence. We are MIT faculty members," 2023.

[35] D. A. Hashimoto, G. Rosman, D. Rus, and O. R. Meireles, "Artificial intelligence in surgery: promises and perils," *Ann Surg*, vol. 268, no. 1, pp. 70–76, 2018.

[36] A. Amini, A. P. Soleimany, W. Schwarting, S. N. Bhatia, and D. Rus, "Uncovering and mitigating algorithmic bias through learned latent structure," in *Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society*, 2019, pp. 289–295.

[37] Q. Li, J. Aslam, and D. Rus, "Online power-aware routing in wireless ad-hoc networks," in *Proceedings of the 7th annual international conference on Mobile computing and networking*, 2001, pp. 97–107.

[38] B. Nordlinger, C. Villani, and D. Rus, *Healthcare and artificial intelligence*. Springer, 2020.

[39] D. Feldman, M. Volkov, and D. Rus, "Dimensionality reduction of massive sparse datasets using coresets," *Adv Neural Inf Process Syst*, vol. 29, 2016.

[40] P. Mishra and M. J. Koehler, "Technological pedagogical content knowledge: A framework for teacher knowledge," *Teach Coll Rec*, vol. 108, no. 6, pp. 1017–1054, 2006.

[41] C. Redecker and Y. Punie, "Digital competence framework for educators (DigCompEdu)," *Brussels: European Union*, 2017.

[42] A. Ferrari and Y. Punie, "DIGCOMP: A framework for developing and understanding digital competence in Europe," 2013, *Publications Office of the European Union Luxembourg*.

[43] C. Redecker, "European framework for the digital competence of educators: DigCompEdu," Joint Research Centre (Seville site), 2017.

[44] C. Y. Luk, "A Human Rights-Based Approach to Bridge Gender Digital Divide: The Case Study of India," in *Gender Gaps and the Social Inclusion Movement in ICT*, IGI Global, 2019, pp. 24–44.

[45] J. Cooper, "The digital divide: The special case of gender," *J Comput Assist Learn*, vol. 22, no. 5, pp. 320–334, 2006.

[46] L. Gurung, "The digital divide: An inquiry from feminist perspectives.," *Dhaulagiri: Journal of Sociology & Anthropology*, vol. 12, 2018.

[47] D. G. Campos and R. Scherer, "Digital gender gaps in Students' knowledge, attitudes and skills: an integrative data analysis across 32 Countries," *Educ Inf Technol (Dordr)*, vol. 29, no. 1, pp. 655–693, 2024.

[48] M. L. Fang, S. L. Canham, L. Battersby, J. Sixsmith, M. Wada, and A. Sixsmith, "Exploring privilege in the digital divide: implications for theory, policy, and practice," *Gerontologist*, vol. 59, no. 1, pp. e1–e15, 2019.

[49] H. S. Tsai, R. Shillair, S. R. Cotten, V. Winstead, and E. Yost, "Getting grandma online: are tablets the answer for increasing digital inclusion for older adults in the US?," *Educ Gerontol*, vol. 41, no. 10, pp. 695–709, 2015.

[50] C. Courtois and P. Verdegem, "With a little help from my friends: An analysis of the role of social support in digital inequalities," *New Media Soc*, vol. 18, no. 8, pp. 1508–1527, 2016.

[51] S. B. Hermanto and P. Patmawati, "Determinan Penggunaan Aktual Perangkat Lunak Akuntansi Pendekatan Technology Acceptance Model," *Jurnal Akuntansi Dan Keuangan*, vol. 19, no. 2, pp. 67–81, 2017.

[52] L. Setiyani, K. Suhada, and F. Effendy, "Investigasi Penerimaan dari Aplikasi E-Learning Menggunakan Technology Acceptance Model (TAM) 3 Case Report: e-learning STMIK Rosma," *Journal of Management and Business Review*, vol. 18, no. 2, pp. 315–326, 2021.

[53] A. B. Primanto and F. Rahman, "Perlukah Pendampingan Terhadap Pelaku Umkm Dalam Memanfaatkan Media Sosial Sebagai Saluran Pemasaran Strategis?," *Jurnal Manajemen Industri dan Logistik*, vol. 3, no. 2, pp. 119–128, 2019.

[54] E. Kristianingsih, A. Wahyudin, and S. Sukirman, "Determinan Kualitas Penyerapan Anggaran Belanja Dengan Sistem Pengendalian Internal Sebagai Variabel Moderasi (Studi Empiris Pada Perguruan Tinggi Negeri Ditjen Diktiristek Kemendikbudristek)," *Business and Economic Analysis Journal*, vol. 2, no. 2, pp. 90–107, 2022.

[55] M. Simanihuruk and B. E. Sukma, "Peningkatan Kompetensi Dosen Vokasi Perhotelan dalam Meningkatkan Kurikulum Melalui Program Pemagangan di Industri Perhotelan," *Jurnal Abdi Masyarakat*, vol. 3, no. 2, pp. 88–97, 2023.

[56]   G. A. F. Maulani and T. M. S. Mubarok, "Analisis Pengaruh Teknologi Informasi Pada Iklim Organisasi Dan Dampaknya Terhadap Komitmen Organisasi Perguruan Tinggi Swasta," *Journal Civics and Social Studies*, vol. 4, no. 2, pp. 11–24, 2020.
[57]   J. M. Spector and S. Ma, "Inquiry and critical thinking skills for the next generation: from artificial intelligence back to human intelligence," *Smart Learning Environments*, vol. 6, no. 1, pp. 1–11, 2019.
[58]   I. Dergaa, K. Chamari, P. Zmijewski, and H. Ben Saad, "From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing," *Biol Sport*, vol. 40, no. 2, pp. 615–622, 2023.
[59]   A. S. Mohammed, "Examining the Implementation of Artificial Intelligence in Early Childhood Education Settings in Ghana: Educators' Attitudes and Perceptions towards Its Long-Term Viability," *American Journal of Education and Technology*, vol. 2, no. 4, pp. 36–49, 2023.
[60]   H. Sawitri and Y. Yuziani, "Pelatihan Manajemen Data Menggunakan Software untuk Dosen Fakultas Kedokteran Universitas Malikussaleh Tahun 2020," *Jurnal Vokasi*, vol. 5, no. 1, pp. 74–78, 2021.
[61]   S. Kustini, H. Herlinawati, and Y. Indrasary, "Implementasi Pembelajaran Berbasis Project-Based Learning untuk Meningkatkan Keterampilan Literasi Digital Mahasiswa Politeknik Negeri Banjarmasin," *Jurnal INTEKNA: Informasi Teknik dan Niaga*, vol. 21, no. 1, pp. 30–40, 2021.
[62]   P. Mawarni, B. Milama, and R. N. Sholihat, "Persepsi calon guru kimia mengenai literasi digital sebagai keterampilan abad 21," *Jurnal Inovasi Pendidikan Kimia*, vol. 15, no. 2, pp. 2849–2863, 2021.
[63]   K. A. Z. Salsabilla, T. D. F. Hadi, W. Pratiwi, and S. Mukaromah, "Pengaruh penggunaan kecerdasan buatan terhadap mahasiswa di perguruan tinggi," in *Prosiding Seminar Nasional Teknologi Dan Sistem Informasi*, 2023, pp. 168–175.
[64]   F. M. Abrori, "Dosen Tidak Siap Menghadapi Pandemi: Kajian Permasalahan Isolasi Digital pada Pembelajaran Daring," *Borneo Journal of Biology Education (BJBE)*, vol. 2, no. 2, pp. 113–118, 2020.
[65]   S. Hadisaputra, A. Hakim, M. Muntari, G. Hadiprayitno, and M. Muhlis, "Pelatihan Peningkatan Keterampilan Guru IPA Sebagai Role Model Abad 21 dalam Pembelajaran IPA," *Jurnal Pendidikan Dan Pengabdian Masyarakat*, vol. 1, no. 2, 2018.

Adoption of Artificial Intelligence and Digital Resources among Academicians of Islamic Higher Education Institutions in Indonesia
Suwendi, Mesraini, Cipta Bakti Gama, Hadi Rahman, Teguh Luhuringbudi, Maslin Masrom

52