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Challenges in the Effective Implementation of Artificial Intelligence in Assessment Practices: Teachers' Perspective

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Abstract

The purpose of this research study was to examine the perceptions of teachers regarding challenges of using AI in assessment practices. This is exploratory (pilot) quantitative study and the sample was selected from four faculties by consensus sampling technique in virtual university of Pakistan; forty-one teachers from four faculties were selected. Five-point Likert scale was developed by researchers for data collection. The items were divided into nine challenges; workload, large class size, ethical, technical, pedagogical, inefficiency of AI, training, resources and institutional support. The instrument was validated from three experts who were teaching at university level. The reliability of the instrument was .844. The date was collected from teachers through google form. The findings stated that teachers were using AI based tools in assessment methods with plagiarism detection program and generative artificial intelligence tools as often used ones. The results showed the insignificant difference in challenges i.e., workload, large class size, ethical, inefficiency of AI, training and institutional support, faced by faculty members based on their academic qualification. This study suggests that regular training sessions, technical resources and digital infrastructure, proper guidelines from institute should be arranged for faculty members.

Keywords: *AI, challenges, effective implementation, assessment practices, teachers*

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Introductıon

Artificial intelligence (AI) in education has been found useful to support learning and teaching, assessment and management in education (Chen et al., 2020; Zhang & Aslan, 2021; Chiu et al., 2023). Faculty can benefit in various ways from the application of AI-enhanced pedagogy in higher education. There are several educational newest technologies powered by Artificial Intelligence, for instance, Learning Analytics, LLMs, etc. These latest technologies help in resource management and organization. They aid in deeper insight into student learning. Also, they provide data feedback on teaching strategies. Such advancements could make the teaching procedure more successful and efficient (Bond et al., 2023; Crompton & Burke, 2023; Zheng et al., 2024).

The adoption and implementation of educational technologies enabled by AI in teaching and learning has posed numerous challenges such as infrastructure, curriculum, ethics and technical competence of teachers (Bond et al., 2023). The growing number of publications in this field reflects how the potential of AI applications in education has been acknowledged over the last few years. As a result, AI is making its way in different educational settings (Chiu, 2023; Crompton & Burke, 2023; Grassini, 2023; Ouyang et al., 2022). The results of the study differ from those of Zawacki-Richter et al., (2019) educators needed to step in when research on artificial intelligence was being done mostly by the sciences, technology, engineering and mathematics fields. The public introduction of OpenAI's ChatGPT language model in late 2022 significantly increased the awareness of artificial intelligence among the general populace and, to a considerable degree, within academic institutions. Scholarship becoming increasingly aware of ChatGPT because of its user-friendly interface and convenient access. This has resulted the academic community to completely ban it, cautiously accept it or progressively adapt to it (Kasneci et al., 2023; Mah, 2023). It is important that new disruptive technology is adopted in a growing digital age (Redecker, 2017; Vuorikari et al., 2022).

Higher education institutions bear a significant responsibility to effectively influence the digital future of artificial intelligence in education, ensuring a human-centered approach. Between the administration, the students, and the faculty opinions of all the parties involved is essential. Digital and artificial intelligence (AI) literacy is supported by the use of technological means, communication and continuing professional development (Chiu et al., 2023; Ifenthaler & Yau, 2019; Redecker, 2017). Due to the unnecessarily rapid and complex developments that have taken place in artificial intelligence (AI), not to mention the ethical and privacy issues, evaluation and effective

implementation of AI in colleges and universities may not take place adequately (Ifenthaler, 2017; Kohnke et al., 2023)

In order to ensure the successful integration of AI into higher education, it is essential to consider the perspectives of all stakeholders. While there is an increasing amount of research regarding student viewpoints and the implementation of AI in teaching and learning (Delcker et al., 2024; Gašević, 2023; Hornberger et al., 2023; Johnston et al., 2024), there remains a significant gap in evidence pertaining to the perspectives of faculty members. Research on faculty attitudes towards the utilization and application of AI in their teaching methodologies, as well as their needs for professional development related to AI for educational purposes, has been limited (Liu et al., 2020). The role of faculty members in the schools and colleges is not just of instructors. They also set an example for the students by using artificial intelligence in the classroom rightly (Bećirović, 2023; Pratschke, 2024). Students must be prepared, skilled and confident in artificial intelligence (Bandura, 1977) in order to acquire AI literacy skills for the 21st Century (Long & Magerko, 2020; Ng et al., 2021; Pinski & Benlian, 2024). In this regard, educators an important part of universities can create a space for dialogue about artificial intelligence in class. The conversation could cover benefits, challenges, privacy and ethical issues, implications for assessments, fears and objectives. Due to the limited number of individuals available to assess students in a teacher-led instructional environment, the evaluation process within the higher education system has consistently been slow and labor-intensive (Broadbent, 2017; Knight & Drysdale, 2020; Penny & Coe, 2004).

Nonetheless, GenAI is starting to change these constraints and present new challenges by offering innovative approaches to evaluate student performance, tailor learning experiences, and improve the overall quality of educational outcomes (Moorhouse et al., 2023; Chiu, 2023; Chiu et al., 2023). Assessments that are aligned with the goals of programs and courses greatly influence the educational experiences of both students and teachers (Heeneman et al., 2015; Popham, 2009). To ensure equal access to artificial intelligence (AI) and adapt to changing educational needs, higher education institutions should adjust their policies and curriculum to reflect changes in GenAI (i.e. generated AI) (Perkins, 2023; Rajabi et al., 2023). Nonetheless, research regarding its application in higher education evaluation techniques remains limited, and it is a subject of debate since most of it was conducted in 2023. Future higher education must coexist with developing AI technology as well as adapt to an AI-focused

environment as a necessity for daily living as well as employment (Chiu, 2024).

The incorporation of artificial intelligence in the assessment processes of higher education requires further research to be undertaken. The main objective of this proposed research is to examine the perceptions of teachers regarding the challenges in effective implementation of artificial intelligence in assessment practices. This objective is achieved through three questions:

RQ1. What are the perceptions of teachers towards the use of AI in assessment?

RQ2. Is there any significance difference in the perceptions of teachers regarding the challenges of effective implementation of artificial intelligence in assessment practices from gender perspective?

RQ3. Is there any significance difference in the perceptions of teachers regarding the challenges of effective implementation of artificial intelligence in assessment practices from education perspective?

Literature Review

The investigation into the effects of artificial intelligence on higher education is advancing swiftly, as evidenced by the notable study conducted by Dale et al. (2021) and other prominent research (Al-Zahrani, 2023; Al-Zahrani, 2024a; Bozkurt et al., 2021; Chu et al., 2022; Dai & Ke, 2022; Laupichler et al., 2022; Zawacki-Richter et al., 2019). The application of AI-related technologies in the university setting has attracted the attention of researchers across multiple disciplines including education, computer science, psychology, and ethics. The first 50 research articles published on Web of Sciences (WoS) database on artificial intelligence in higher education were analyzed by Chu et al., (2022). The analysis reveals that each of the studies focuses on predicting students' learning environments with respect to drop out and retention, students' characteristics and their academic achievements. Nonetheless, there is a clear lack of consideration for the difficulties encountered by teachers in the effective utilization of artificial intelligence in assessment techniques. This literature review outlines significant research topics and enhances understanding of existing studies.

Theoretical Framework

Understanding the individuals' behavioral reactions to emerging technologies constitutes a fundamental aspect of research on technology adoption. Nevertheless, the swift advancement and extensive utilization of AI technologies have introduced new challenges concerning ethical, psychological, and situational factors. This research is grounded on

Diffusion of Innovations Theory; which offers a comprehensive insight into how AI can improve educational practices. In order for educators to effectively implement AI, it is essential for them to comprehend not only the functioning of the technology but also how to seamlessly integrate it into their teaching methodologies and specific subject areas. The Diffusion of Innovations Theory by Everett M. Rogers explains how new technologies, including AI, disseminate within educational institutions. Rogers identifies several critical factors that affect the adoption of innovations, such as perceived advantages, challenges, and institutional support. The willingness of teachers to adopt AI in their classrooms is influenced by these factors.

Furthermore, the theory addresses the significance of communication channels and social dynamics in promoting the adoption of innovations, including peer influence and institutional backing for technological initiatives. Additionally, Rogers posits that the perceived benefits of AI, such as enhanced efficiency and personalized learning experiences, are pivotal in its acceptance by educators. The greater the perceived advantages of AI by educators, the more inclined they are to integrate it into their teaching practices (Rogers, 2020). The Diffusion of Innovations Theory sheds light on the dissemination of AI within educational systems. This theory presents a detailed roadmap for the incorporation of AI into education, aiming to maximize its influence on teaching and learning. This unified approach offers a more profound comprehension of the challenges and opportunities associated with AI adoption in the educational sector. By emphasizing the effective utilization of technology, particularly innovations such as AI, to enhance learning experiences, the research seeks to give valuable insights for educators and policymakers striving to promote assessment practices.

Faculty Perspectives on AI Literacy and Digital Transformation

Educational institutions worldwide have been addressing the challenges posed by digital transformation which include the incorporation of digital tools, changes in pedagogical design, digital examination and the demands of COVID-19 (Singh et al., 2021; Xie et al., 2021). In this regard, the academics should be in the front line and will need support to adapt to the changes. Numerous colleges and universities have predominantly returned to traditional teaching and learning methods, particularly in-person formats, whereas some institutions have embraced blended learning approaches and others integrate online components to promote enduring enhancements (Broadbent et al., 2023; Cobo-Rendón et al., 2022). The shift to digital formats in higher education is a multifaceted process that necessitates sophisticated change management by various stakeholders.

Faculty members play a crucial role in the change process (McCarthy et al., 2023; Mohamed Hashim et al., 2022).

The issues and concerns they face include acceptance, trust, fear, and questions around the ethicality of using artificial intelligence at school. In addition, there are concerns about cheating which warrants a careful consideration of the views of lecturers. A crucial factor underlying lecturers' willingness to accept AI and digital transformation is their confidence in their ability (Ajzen, 2002; Bandura, 1977) and it is how to use (Ng et al., 2023; Wang et al., 2023). Teachers who have a sound knowledge of technology and AI topics, who are confident about the same, are typically more willing to embrace technology and AI-using learning tools and approaches (Venkatesh & Davis, 2000).

Consequently, investing in the training and development of educators is increasingly vital (Eickelmann et al., 2021; Sanusi et al., 2024). It is crucial to provide effective professional development programs aimed at equipping faculty with the necessary knowledge and skills. Such programs ought to present a comprehensive overview of AI, its potential applications in education, the associated legal considerations, and the specific roles of AI in teaching and learning. It is imperative to emphasize that AI, in particular, should serve as a tool to support lecturers rather than to supplant them. Teachers can enhance their professional talents with the help of the online courses centered on artificial intelligence within education offered by digital learning platforms like Coursera and edX. Frequently, a more customized strategy specifically crafted to address the needs and challenges faced by educators in higher education institutions is necessary (Laupichler et al., 2022). In light of the existence of certain professional development courses, it is necessary to investigate further the views of faculty members regarding their actual needs for successfully integrating AI into teaching and learning strategies so that suitable and tailored support could be provided.

Assessment and Grading

Another significant area of interest is how AI can simplify the process of assessment and grading. Researchers assess the effectiveness of human grading methods. They also look at the accuracy of the AI-based grading system by contrasting it with the advantages and disadvantages of automated grading (Lockwood, 2014; McNulty, 2023; Chen, 2023). With the assistance of Artificial Intelligence in evaluation, such as Natural Language Processing (NLP) and plagiarism detection, grading may be automated. As a result, the workload may be reduced. Furthermore, data-driven decision making might be assisted with the help of AI (Lockwood, 2014; McNulty, 2023; Chen, 2023). Although AI can bring a variety of

benefits when it comes to assessing and grading, it is worth examining how it works in the real world and what impact it has on students. An illustration can be found in the research conducted by Susilawati et al. (2022), which examines the impact of digital assessment and trust on students' character development and academic performance. Furthermore, a study by Hooda et al. (2022) focused on AI-driven evaluation and assessment methods that positively influenced students' academic outcomes. Learning analytics provides higher education institutions with various opportunities to improve the learning environment.

Effects of Artificial Intelligence on the Assessment

Artificial Intelligence is influencing not only the processes of learning and teaching but also the methods of assessment and grading in contemporary education. To give you an example, artificial intelligence grades the assignments and research projects with the help of Turnitin which helps through its software by checking billions of resources almost instantly. As a result, it is easier to make a comparison to determine whether the student has plagiarized or not. The grading procedure has also been simplified by incorporating digital rubrics and grading templates into the tasks assigned to pupils with distinct benchmarks or scales. This enables the simple allocation of final grades to work submitted (Mahana et al., 2012). Finally, artificial intelligence provides students with interesting feedback tools, making them easy to access in a relaxed atmosphere any time and place, thus improving privacy and autonomy. The teacher may also opt to provide feedback in writing or audio to enable a learning from errors.

Furthermore, a study by Stanford University (2019) found that AI interpretation of students' answers supports the construction of a computer model which matches the guiding rules from the tutor's grading choices. The unique aspect of AI is that it enables more learning and not more authoritative decision-making. The user found Collins to be more trustworthy, transparent and useful than its competitors. In this regard, Tovia Smith in her essay titled, "More States Opting to Robo-Grade Student Essays by Computer" argues that robo-graders (robots that read and score students' writing) has now become more common in utah, ohio, and soon massachusetts as well (Brad Rose Consulting, 2019). Just like that, the AI of Peter Foltz, professor researcher in University of Colorado can check up to 100 different criteria and the essay grading is very accurate (Brad Rose Consulting, 2019). To sum up, artificial intelligence is becomingly more increasingly important in evaluating and classifying higher education in the US.

Challenges with the Implementation of AI in Assessment

Methods of formative assessment can be enhanced through the use of artificial intelligence (Swiecki et al., 2022). One significant challenge that must be addressed before educators can successfully integrate AI into their formative assessment practices is their limited understanding of AI technology and their restricted access to large datasets. Consequently, while AI has the potential to reduce the burden on teachers by managing certain aspects of formative assessment (such as automatic grading and monitoring the learning development of learners), it can also create new burdens because it needs training to use (Engeness, 2021). One more challenge raised by using AI for formative assessment is dealing with important questions which concern the best ways of integrating AI to formative assessment types. The issue of whether artificial intelligence will supplant teachers is frequently discussed. We believe that AI should not replace teachers, but rather enhance their formative assessment methods and encourage the implementation of formative assessments to aid teaching and learning processes. As noted by Murphy (2019), "the optimal application of AI in education is to enhance teachers' abilities to deliver effective lessons in the classroom." It is essential for educators to understand the constraints of AI technologies when interpreting test outcomes. Automated scoring systems have been critiqued for failing to rate creative ideas in essays or argumentation and reasoning in writing tasks (Gardner et al., 2020).

The goal of formative assessment is to recognize student gaps using a simple understanding of measurement scales. Still, many methods use machine learning to predict an outcome have been developed. These methods often rely on complex models that enhance accuracy but compromise interpretability. Therefore, conclusions derived from formative assessments utilizing AI techniques should only be drawn after evaluating the assessments for their accuracy and clarity (Bejar et al., 2016; Scalise et al., 2021). Educators must thoroughly examine the process by which assessment results are produced and identify any potential biases that may emerge from employing AI techniques in evaluations, which ultimately adds to their workload (Murphy, 2019). In conclusion, it is crucial to guarantee the ethical use and implementation of AI within school environments and educational contexts.

Moreover, despite big data offering a good perspective for the formative assessment that could collect process data from the learning experience of students, a new problem emerges as to which part of these data is more useful for the improvement of learning of students needs to be determined. The advanced characteristics of contemporary big data,

specifically time-stamped process data and sparse information, significantly contrast with traditional assessment data. These differences present a challenge for the statistical methods employed in analysis. In response, researchers have been exploring the application of innovative methods that integrate data science, machine learning, and psychometrics (e.g., von Davier et al., 2022). Researchers assert that it is essential to engage in discussions with students regarding the positive, ethical, and critical relationship with AI and other technology oriented towards the future (Bearman et al., 2023). Further, children's understanding of data privacy also needs to be improved (Johnston, 2023).

Methodology

The purpose of this research is to examine the perceptions of teachers regarding challenges of using AI in assessment. This is exploratory (pilot) quantitative study rather than full generalizable investigation due to small sample size. The population for this study consisted of all teachers that are teaching in the virtual university of Pakistan. The sample was selected from four faculties by consensus sampling technique. The consensus sampling technique was appropriate because the target population was small and accessible. The total number of teachers in these four faculties were limited, so it was feasible to include all willing participants rather than subset selection. The sample was selected from four faculties; Social science, Natural science, Arts and Humanities and Informational technology by consensus sampling technique. The sample of the study was 41 teachers from four faculties in virtual university of Pakistan.

Instrumentation

In this study the five point Likert scale was used that was developed by researchers. The questionnaire was based on demographic variables and items related to Challenges assessed using a five-point Likert scale ranging from strongly agree to strongly disagree. The items were divided in to nine challenges; workload, large class size, ethical, technical, pedagogical, inefficiency of AI, training, resources and institutional support. The instrument was validated from three experts who were teaching in online and distance learning environment. These teachers were involved in assessment practices and had exposure of AI in educational context. The instrument was improved as per their suggestions. After the finalization of content validity of instrument, the pilot study was done. The items' reliability was assessed using Cronbach's alpha value.

Table 01
Reliability of the instrument

Challenges	Statements	Reliability
Workload	01	.850
Large class size	01	.842
Ethical	07	.809
Technical	08	.790
Pedagogical	08	.807
Inefficiency of AI	05	.808
Training	02	.839
Resources	02	.846
Institutional support	05	.832
Overall	39	.844

Data Collection

After pilot testing the instrument was generated in google form. The date was collected from teachers through online questionnaires. Google form link was sent to all teachers via email from VU administration.

Ethical Consideration

For data collection the formal permission was taken from the administration of virtual university of Pakistan. Researchers requested the administration for data collection via email. The responses of participants were kept secure and findings were presented objectively with accordance to ethical research standards.

Limitation of the study

The limitation of this study includes that the response rate was lower from Virtual University of Pakistan. Furthermore, the data was just received from four faculties which may limit the generalizability of the study.

Findings

The gathered data underwent analysis through the application of both descriptive and inferential statistics. In the realm of descriptive statistics, frequency was computed, and for comparison of groups, t-test was applied.

RQ1. What are the perceptions of teachers towards the use of AI in assessment?

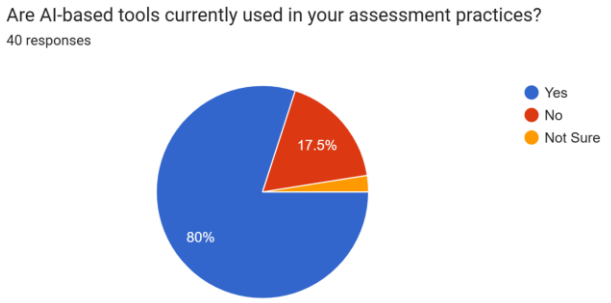

Figure 01. AI-based tools ever used in assessment practices

Teachers were asked have they ever used AI based tools in their assessment practices. Almost 80% teachers agreed that they used AI tools in their assessment practices.

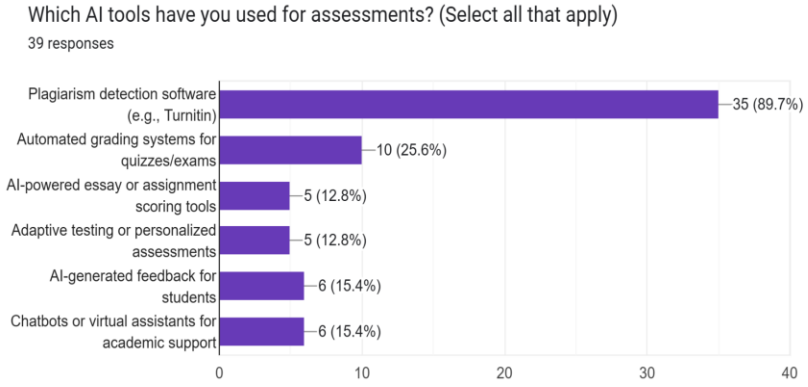

Figure 02. AI tools used in assessment

Figure 02 shows that majority of the teachers 89% said that they use Turnitin software and 10% automated grading system for exams in their assessment practices.

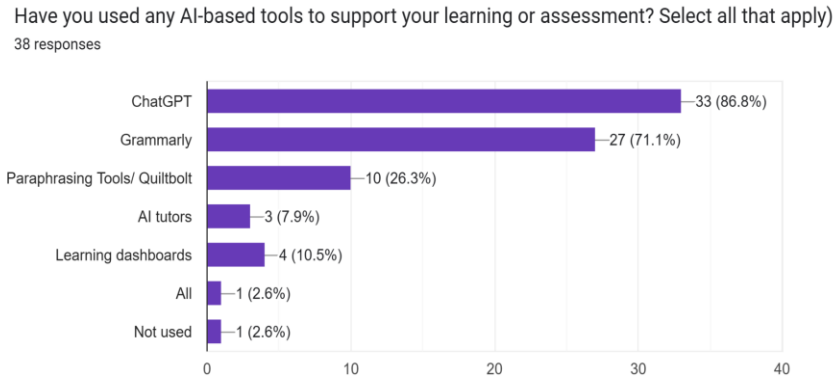

Figure 03. AI tools used in to support learning

Majority of the teachers 86% use AIA tools such as ChatGPT, Grammarly and quilt bolt to support their learning or assessment.

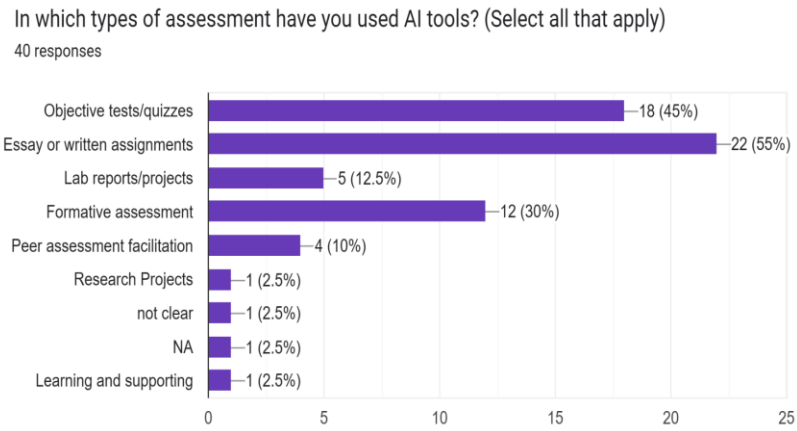

Figure 04. Types of AI tools used in assessment

Figure 04 shows that 45% teachers use different types of AI tools for tests, assignments, projects and formative assessment.

RQ2. Is there any significance difference in the perceptions of teachers regarding the challenges of effective implementation of artificial intelligence in assessment practices from gender perspective?

Table 02
Comparison of Challenges Faced by Teachers on Basis of Gender

Challenges	Groups	N	M	SD	df	t-value	Sig
Workload	Male	19	2.78	.91	-1.463	31.07	.152
	Female	19	3.15	.60			
Large Class size	Male	19	3.15	.89	-.367	36	.716
	Female	19	3.26	.87			
Ethical	Male	17	24.52	4.51	-1.316	32	.197
	Female	17	26.64	4.85			
Technical	Male	18	25.61	3.85	-2.844	31	.008
	Female	15	29.46	3.90			
Pedagogical	Male	17	24.88	4.18	-2.787	31	.009
	Female	16	28.81	3.90			
Inefficiency of IA	Male	19	16.21	3.75	-.540	34	.593
	Female	17	16.82	2.96			
Training	Male	19	7.10	1.48	-1.776	36	.084
	Female	19	7.89	1.24			
Resources	Male	19	5.68	1.63	-3.515	36	.001
	Female	19	7.36	1.30			
Institutional Support	Male	19	17.42	2.45	-1.696	35	.099
	Female	18	18.88	2.80			

N=41

Table 02 shows the comparison of challenges faced by teachers during their assessment practices. The results showed the insignificant difference as $p>.05$ in workload, large class size, ethical, inefficiency of AI, training, and institutional support between the male and female teachers. The statistical significant difference as $p<.05$ found in technical, pedagogical and resources between the male and female. The mean scores indicate that the female teachers face more challenges in effective implementation of artificial intelligence in assessment practices as compared to male.

RQ3. Is there any significance difference in the perceptions of teachers regarding the challenges of effective implementation of artificial intelligence in assessment practices from education perspective?

Table 03
Comparison of challenges faced by teachers on basis of education

Challenges	Groups	N	M	SD	df	t-value	Sig
Workload	M .Phil	22	3.04	.78	.653	36	.518
	PhD	16	2.87	.80			
Large Class Size	M. Phil	22	3.31	.94	.887	36	.381
	PhD	16	3.06	.77			
Ethical	M .Phil	20	24.85	4.78	-1.088	32	.285
	PhD	14	26.64	4.65			
Technical	M. Phil	20	27.00	4.65	-.599	31	.554
	PhD	13	27.92	3.75			
Pedagogical	M. Phil	19	25.94	4.76	-1.274	31	.212
	PhD	14	27.92	3.87			
Inefficiency of IA	M. Phil	20	16.35	3.93	-.295	34	.770
	PhD	16	16.68	2.60			
Training	M. Phil	22	7.45	1.47	-.230	36	.819
	PhD	16	7.56	1.36			
Resources	M. Phil	22	6.45	1.81	-.303	36	.763
	PhD	16	6.62	1.54			
Institutional Support	M. Phil	21	17.95	2.99	-.467	35	.644
	PhD	16	18.37	2.33			

N=41

Table 03 shows the comparison of challenges faced by teachers during their assessment practices. The results showed the insignificant difference as $p>.05$ in workload, large class size, ethical, technical, pedagogical, inefficiency of AI, training, resources and institutional support between the M. Phil and PhD teachers. The mean scores indicate that the PhD teachers face more challenges in ethical, pedagogical and institutional support as compared to M.Phil. teachers in effective implementation of artificial intelligence in assessment practices.

Discussion

The study reveals that teachers are making high adoption of artificial intelligence-based tools in their assessment practices. The use of AI tools by around 80% of teachers indicates that AI is becoming a key feature of

modern assessment. The use of digital tools for assessment is on the rise for enhancing efficiency and integrity in the academic output. The findings additionally reveal frequent use of Turnitin which tops the list of AI-powered assessment tools used by teachers as 89% of teachers use Turnitin. Only 10% of teachers use automated grading. This signifies that AI usage is more towards plagiarism detection and originality verification rather than totally automated evaluation of students' performance. The findings are supported with other studies by (Lockwood, 2014; McNulty, 2023; Chen, 2023), with the assistance of Artificial Intelligence in evaluation, such as Natural Language Processing (NLP) and plagiarism detection, grading may be automated. As a result, the workload may be reduced.

Furthermore, the research found that 86% of teachers used AI tools like ChatGPT, Grammarly, QuillBot, and other similar tools for learning and assessment. The role of generative AI and language-enhancement tools is increasing. Nonetheless, merely 45% of teachers reported the use of AI tools in more than one assessment format, such as tests, assignments, projects and formative assessments, indicating partial integration rather than complete integration.

There was no gender-based differences in challenges experienced with workloads, large-sized classes, issues of ethics, inefficiency of AI, training and institutional support. On average, female teachers face greater challenges in effective implementation of AI, despite similar teacher issues. However, the application and integration of educational and AI-backed technologies into teaching and learning presents various challenges mainly related to infrastructure, curriculum, ethics, and the technical competency of teachers (Bond et al., 2023). Educational institutions across the globe have been coping with the challenges of digital transformation which include the incorporation of digital tools, changes in pedagogical design, digital examination and the demands of COVID-19 (Singh et al., 2021; Xie et al., 2021).

Similarly, teachers of different academic qualifications were found to be statistically insignificant differences on M.Phil. as well as PhD throughout most challenge dimensions. Nonetheless, M.Phil teachers' mean scores for workload and large class size were higher implying that the teachers might be receiving a greater pressure to teach and assess. The study found statistically insignificant differences in technical, educational, and resource-related challenges. The average scores show that teachers with PhDs found ethical issues, curriculum integration, and institutional support more difficult. PhD faculty may be held to a higher standard regarding the quality of assessment, research integrity, and compliance

with institutional policy when using AI tools. One of the primary obstacles that must be addressed before educators can successfully integrate AI into their formative assessment practices is their limited understanding and knowledge of AI technology, coupled with insufficient access to large datasets. Consequently, while AI has the potential to alleviate some of the burdens on teachers by managing certain aspects of formative assessment (such as automatic grading and monitoring the learning development of learners), it can also create new burdens because it needs training to use (Engeness, 2021). In essence, the findings indicate that while AI tools are used for assessment practices, teachers continue to face significant challenges regarding infrastructure, pedagogy, ethics, and institutional preparedness. Gender and academic qualification impact these difficulties, demonstrating a request for specific measures.

Conclusion

The findings suggest that educators are engaging more and more with assessment practices using AI-based tools, with plagiarism detection software and generative AI software being the most used. Despite the high levels of acceptance of artificial intelligence as a general idea, this attitude to use is not reflected uniformly in the assessment in the many different formats that exist. The findings show that the teachers faced challenges in the effective application of AI. This was especially due to technical, pedagogical, and resource issues.

Though much focus was on gender and education-based differences, which were insignificant in various dimensions, however, in certain dimensions, significant differences were found. According to the findings, female teachers and PhD faculty faced particular challenges in AI integration. The findings suggest that in the case of AI being used for assessment, both having access to the tools and being trained adequately and receiving the right pedagogical support and institutional policies informing the right ethics and technical matters are important. In summary, the use of AI has considerable potential for assessment. However, teachers need adequate assistance with the contextual and professional problems they face.

From the study's results, following recommendations are; institutions should hold regular and planned training sessions that focus on the technical and pedagogical application of AI tools in assessment and special attention should be given to less experienced faculty and female teachers. Technical resources and digital infrastructure should be ensured for proper application of AI technologies in assessment methods. Teachers should be provided clear instructions and best practices on the thoughtful

integration of the usage of AI tools within several assessments, including formative assessments and summative assessments.

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References

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 665–683. https://doi.org/10.1111/J.1559-1816.2002.TB00236.X

Bandura, A. (1977). Self-e_cacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191-215. https://psycnet.apa.org/fulltext/197725733001.pdf?auth_token=3b8119f5e21d_864ebd5b9fdd961c99bb2a675a&returnUrl=https%3A%2F%2Fpsycnet.apa.org%2Frecord%2F1977-25733-001

Bearman, M., Ajjawi, R., Boud, D., Tai, J., and Dawson, P. (2023) *CRADLE suggest assessment and gen AI*. Centre for Digital Learning, Deakin University, Melbourne, Australia.

Bejar, I. I., Mislevy, R. J., and Zhang, M. (2016). Automated scoring with validity in mind. In A. A. Rupp & J. P. Leighton (Eds.), *The Wiley handbook of cognition and assessment: Frameworks, methodologies, and applications* (pp. 226–246). John Wiley & Sons.https://onlinelibrary.wiley.com/doi/10.1002/9781118956588.ch10

Bond, M., Khosravi, H., De Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S. W., & Siemens, G. (2023). A meta systematic review of artificial intelligence in higher education: A call for increased ethics, collaboration, and rigour. *International Journal of Educational Technology in Higher Education*, *21*(1), 4. https://doi.org/10.1186/s41239-023-00436-z

Bozkurt A, Karadeniz A, Baneres D, Guerrero-Roldán AE, Rodríguez ME. (2021). Artificial intelligence and reflections from educational landscape: A review of AI studies in half a century. *Sustainability* *13*(2), 800, https://www.mdpi.com/2071-1050/13/2/800

Broadbent, J. (2017). Large class teaching: How does one go about the task of moderating large volumes of assessment? *Active Learning in Higher Education*, *19*(2), 173–185. https:// doi. org/ 10. 1177/ 14697 87417 721360

Chen, C. (2023). *AI will transform teaching and learning. Let's get it*

right. Stanford Institute for Human-Centered AI. https://hai.stanford.edu/news/ai-will-transform-teaching-and-learning-letsget-it-right

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, *8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

Chiu T. K. F. (2024). Future research recommendations for transforming higher education with generative AI. *Computer & Education: Artificial Intelligence, 6*, 100197. https://doi.org/10.1016/j.caeai.2023.100197

Chiu, T. K. F. (2023). The impact of Generative AI (GenAI) on practices, policies and research direction in education: A case of ChatGPT and Midjourney. *Interactive Learning Environments, 32*(10), 6187–6203. https://doi.org/10.1080/10494820.2023.2253861

Chiu, T. K. F., Xia, Q., Zhou, X-Y, Chai, C. S., & Cheng, M-T (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computer & Education: Artificial Intelligence, 4*, 100118. https://doi.org/10.1016/j.caeai.2022.100118

Chiu, T. K. F., Xia, Q., Zhou, X-Y, Chai, C. S., & Cheng, M-T (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education, *Computer & Education: Artificial Intelligence, 4*, 100118. https:// doi. org/ 10. 1016/j. caeai. 2022. 100118

Chu HC, Hwang GH, Tu YF, Yang KH (2022) Roles and research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles. Australasian *Journal of Educational Technology 38*(3), 22–42.

Cobo-Rendón, R., Bruna Jofre, C., Lobos, K., Cisternas San Martin, N., & Guzman, E. (2022). Return to university classrooms with blended learning: A possible post-pandemic COVID-19 scenario. *Frontiers in Education*, *7*. https://doi.org/10.3389/feduc.2022.957175

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, *20*(1), 22. https://doi.org/10.1186/s41239-023-00392-8

Dai C-P, Ke F (2022) Educational applications of artificial intelligence in simulation-based learning: A systematic mapping review. Computers and Education: *Artificial Intelligence 3*,100087. https://doi.org/10.1016/j.caeai.2022.100087

Delcker, J., Heil, J., Ifenthaler, D., Seufert, S., & Spirgi, L. (2024). First-year students AI-competence as a predictor for intended and de facto use of AI-tools for supporting learning processes in higher education. *International Journal of Educational Technology in Higher Education*, *21*(1), 1–13. https://doi.org/10.1186/S41239-024-00452-7

Eickelmann, B., Drossel, K., & Heldt, M. (2021). ICT in teacher education and ICT-related teacher professional development in Germany. In X. Zhu & J. Liu (Eds.), *Quality in teacher education and professional development: Chinese and German perspectives* (pp. 107–123). Routledge. https://doi.org/10.4324/9781003197973-8

Engeness, I. (2021). Developing teachers' digital identity: Towards the pedagogic design principles of digital environments to enhance students' learning in the 21st century. *Eur. J. Teach. Educ. 44*, 96–114. doi: 10.1080/02619768.2020.1849129

Gardner, J., O'Leary, M., and Yuan, L. (2021). Artificial intelligence in educational assessment: 'Breakthrough? Or buncombe and ballyhoo?'. *J. Comput. Assist. Learn.* 37, 1207–1216. doi: 10.1111/jcal.12577

Gašević, D. (2023). Empowering learners for the age of artificial intelligence. *Computers and Education: Artificial Intelligence, 4*, Article 100130. https://doi.org/10.1016/j.caeai.2023.100130.4.

Grassini, S. (2023). Shaping the future of education: Exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences*, *13*(7). https://doi.org/10.3390/educsci13070692

Heeneman, S., Oudkerk Pool, A., Schuwirth, L. W., van der Vleuten, C. P., & Driessen, E. W. (2015). The impact of programmatic assessment on student learning: theory versus practice. *Medical education, 49*(5), 487-498. https:// doi.org/ 10.1111/ medu. 12645

Hooda M, Rana C, Dahiya O, Rizwan A, Hossain MS (2022). Artificial intelligence for assessment and feedback to enhance student success in higher education. *Mathematical Problems in Engineering, 20*(2), 521-5722. https://doi.org/10.1155/2022/5215722

Hornberger, M., Bewersdorff, A., & Nerdel, C. (2023). What do university students know about artificial intelligence? Development and validation of an AI literacy test. *Computers and Education: Artificial Intelligence*, 5, Article 100165. https://doi.org/10.1016/J.CAEAI.2023.100165.5.

Ifenthaler, D., & Yau, J. Y. K. (2019). Higher education stakeholders' views on learning Analytics Policy recommendations for supporting Study Success. *International Journal of Learning Analytics and Artificial Intelligence for Education (IJAI)*, *1*(1), 28–42. https://doi.org/10.3991/IJAI.V1I1.10978

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. *International Journal for Educational Integrity*, *20*(1), 1–21. https://doi.org/10.1007/S40979-024-00149-4/TABLES/10

Johnston, S. -K. (2023). *Privacy considerations of using social robots in education: policy recommendations for learning environments*. United Nations, Department of Economics and Social Affairs, Sustainable Development. https://sdgs.un.org/sites/default/files/2023-05/A5%20-%20Johnston%20-%20Privacy%20challenges%20and%20social%20robots%20in%20education.pdf

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models

for education. *Learning and Individual Differences*, *103*, 1–13. https://doi.org/10.1016/j.lindif.2023.102274

Knight, G. L., & Drysdale, T. D. (2020). The future of higher education (HE) hangs on innovating our assessment – but are we ready, willing and able? *HIGHER EDUCATION PEDAGOGIES*, *5*(1), 57-60. https://doi.org/10.1080/23752 696.2020.1771610

Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). Exploring generative artificial intelligence preparedness among university language instructors: A case study. *Computers and Education: Artificial Intelligence,* 5, Article 100156. https://doi.org/10.1016/j.caeai.2023.100156. *5*.

Laupichler, MC, Aster A, Schirch J, Raupach T (2022) Artificial intelligence literacy in higher and adult education: A scoping literature review. *Computers and Education: Artificial Intelligence 3,* 100101. https://doi.org/10.1016/j.caeai.2022.100101

Liu, Q., Geertshuis, S., & Grainger, R. (2020). Understanding academics' adoption of learning technologies: A systematic review. *Computers & Education*, *151*, 103857. https://doi.org/10.1016/J.COMPEDU.2020.103857

Lockwood, J. (2014). Handbook of automated essay evaluation: Current applications and new directions (M. D. Shermis & J. Burstein, Eds.). *Writing & Pedagogy,* *6*(2), 437–441. https://doi.org/10.1558/wap.v6i2.437

Long, D., & Magerko, B. (2020). What is AI Literacy? Competencies and Design Considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. https://doi.org/10.1145/3313831.3376727

Mah, D. K. (2023, June 3). *Beyond the hype: Integrating ChatGPT and co. into university teaching AI Campus*. https://ki-campus.org/ blog/chatgpt-hochschullehre?locale=en

Mahana, M., Johns, M., & Apte, A. (2012). *Automated Essay Grading Using Machine Learning* [Course project report, CS229 Machine Learning, Stanford University]. Stanford University.

https://cs229.stanford.edu/proj2012/MahanaJohnsApte-AutomatedEssayGradingUsingMachineLearning.pdf

McCarthy, A. M., Maor, D., McConney, A., & Cavanaugh, C. (2023). Digital transformation in education: Critical components for leaders of system change. *Social Sciences & Humanities Open*, *8*(1), 100479. https://doi.org/10.1016/j.ssaho.2023.100479

McNulty N (2023) Using AI for Auto-Marking of Assessment: Revolutionising the Grading Process. https://www.niallmcnulty.com/2023/05/using-ai-for-automarking-of-assessment-revolutionising-the-grading-process/

Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, *27*(3), 3171–3195. https://doi.org/10.1007/s10639-021-10739-1

Moorhouse, B. L., Yeo, M. A., & Wan, Y. W. (2023). Generative AI tools and assessment: Guidelines of the world's top-ranking universities. *Computers and Education Open*, *5*, 100151. https:// doi. org/ 10. 1016/j. caeo. 2023. 100151

Murphy, R. F. (2019). Artificial intelligence applications to support K-12 teachers and teaching. *Rand Corp, 10*, 1–20. doi: 10.7249/PE315

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence, 2,* Article 100041. https://doi.org/10.1016/j.caeai.2021.100041

Ng, D. T. K., Wu, W., Leung, J. K. L., Chiu, T. K. F., & Chu, S. K. W. (2023). Design and validation of the AI literacy questionnaire: The effective, behavioural, cognitive and ethical approach. *British Journal of Educational Technology*, 55(3), 1082–1104. https://doi.org/10.1111/bjet.13411

Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, *27*(6), 7893–7925. https://doi.org/10.1007/s10639-022-10925-9

Penny, A. R., & Coe, R. (2004). Effectiveness of Consultation on student

ratings feedback: A Meta-analysis. *Review of Educational Research*, *74*(2), 215–253. https://doi.org/10.3102/00346543074002215

Perkins, M. (2023). Academic Integrity considerations of AI large Language models in the post-pandemic era: ChatGPT and beyond. *Journal of University Teaching and Learning Practice*, *20*(2). https://doi.org/10.53761/1.20.02.07

Pinski, M., & Benlian, A. (2024). AI literacy for users – A comprehensive review and future research directions of learning methods, components, and effects. *Computers in Human Behavior: Artificial Humans*, *2*(1), 100062. https://doi.org/10.1016/J.CHBAH.2024.100062

Popham, W. J. (2009). Assessment literacy for teachers: Faddish or fundamental? *Theory into practice,* *48*(1), 4-11. https://doi.org/10.1080/00405840802577536

Pratschke, B. M. (2024). *Generative AI and education*. Springer Cham. https://doi.org/10.1007/978-3-031-67991-9

Rajabi, P., Taghipour, P., Cukierman, D., & Doleck, T. (2023). Exploring ChatGPT's impact on post-secondary education: A qualitative study. In Proceedings of the *Western Canadian Conference on Computing Education (WCCCE '23)* (pp. 1–6). Association for Computing Machinery. https://www.scopus.com/inward/record.uri?

Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu. *Joint Research Centre (JRC) Science for Policy Report*, *95*. https://doi.org/10.2760/159770

Rogers, E. M. (2020). *The diffusion of innovations* (5th ed.). Free Press. https://www.freepress.com/diffusion-of-innovations

Sanusi, I. T., Ayanwale, M. A., & Tolorunleke, A. E. (2024). Investigating pre-service teachers' artifcial intelligence perception from the perspective of planned behavior theory. *Computers and Education: Arti_cial Intelligence*, *6*, 100202. https://doi.org/10.1016/j.caeai.2024.100202

Scalise, K., Wilson, M., and Gochyyev, P. (2021). A taxonomy of critical

dimensions at the intersection of learning analytics and educational measurement. *Front. Educ.* 6:656525. doi: 10.3389/feduc.2021.656525

Singh, J., Steele, K., & Singh, L. (2021). Combining the best of online and face-to-face learning: Hybrid and blended Learning Approach for COVID-19, Post Vaccine, & Post-pandemic World. *Journal of Educational Technology Systems*, *50*(2), 140–171. https://doi.org/10.1177/00472395211047865

Stanford University. (2019). *Artificial intelligence assessment | Teaching Commons*. https://teachingcommons.stanford.edu/resources/teaching/evaluating-students/assessing-student-learning/artificial-intelligence-assessment

Susilawati E, Lubis H, Kesuma S, Pratama I (2022) Antecedents of Student Character in Higher Education: The role of the Automated Short Essay Scoring (ASES) digital technology-based assessment model. *Eurasian Journal of Educational Research, 98*, 203–220. https://doi.org/10.14689/ejer.2022.98.013

Swiecki, Z., Khosravi, H., Chen, G., Martinez-Maldonado, R., Lodge, J. M., Milligan, S., et al. (2022). Assessment in the age of artificial intelligence. *Comp. Educ., 3*, 100075. doi: 10.1016/j.caeai.2022.100075

Venkatesh, V., & Davis, F. D. (2000). *A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies* (Vol.46, Issue 2). https://www.jstor.org/stable/2634758?seq=5

von Davier, A. A., Mislevy, R. J., and Hao, J. (2022). *Computational psychometrics: New methodologies for a new generation of digital learning and assessment: With examples in R and Python*. Springer. https://doi.org/10.1007/978-3-030-74394-9

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The digital competence framework for citizens*. Publications Office of the European Union. https://doi.org/10.2760/115376

Wang, B., Rau, P. L. P., & Yuan, T. (2023). Measuring user competence

in using artificial intelligence: Validity and reliability of artificial intelligence literacy scale. *Behaviour and Information Technology, 42*(9), 1324–1337. https://doi.org/10.1080/0144929X.2022.2072768

Xie, J., A, G., & Rice, M. F. (2021). Instructional designers' roles in emergency remote teaching during COVID-19. *Distance Education*, *42*(1), 70–87. https://doi.org/10.1080/01587919.2020.1869526

Zawacki-Richter O, Marín VI, Bond M, Gouverneur F (2019) Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0

Zheng, L., Fan, Y., Gao, L., Huang, Z., Chen, B., & Long, M. (2024). Using AI-empowered assessments and personalized recommendations to promote online collaborative learning performance. *Journal of Research on Technology in Education, 57*(4), 727–753. https://doi.org/10.1080/15391523.2024.2304066

Asghar, S. & Haleem, B. (2025). Challenges in the effective implementation of artificial intelligence in assessment practices: Teachers' perspective. *Pakistan Journal of Distance and Online Learning, 11*(2), 32-57.