AI TOOLS IN MEASURING STUDENTS ACHIEVEMENTS IN BUSINESS EDUCATION

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Abstract
Artificial intelligence (AI) is transforming various industries, and education is no exception. Rapid advancements in AI technology have become essential for educators and educational assessment professionals to enhance teaching and learning experiences. AI-powered educational assessment tools provide numerous benefits, including improving the accuracy and efficiency of assessments, generating personalized feedback for students, and enabling teachers to adapt their teaching strategies to meet the unique needs of each student. Therefore, AI has the potential to revolutionize the way education is delivered and assessed, ultimately leading to better educational outcomes for students. This paper explodes the various applications of AI tools in educational measurement and assessment. Specifically, it discusses the integration of large language AI models in classroom assessment, in specific areas such as test purpose determination and specification, developing, test blueprint, test item generation/development, preparation of test instructions, item assembly/selection, test administration, test scoring, interpretation of test results, test analysis/appraisal, and reporting. It analyses the role of teachers in AI-based assessment and the challenges of using AI-powered tools in educational assessment. Finally, the paper presents strategies to address these challenges and enhance the effectiveness of AI in educational assessment. In conclusion, using AI in educational assessment has benefits and limitations. As such, educators, policymakers, and stakeholders must work together to develop strategies that maximize the benefits of AI in educational assessment while mitigating the associated risks. The application of AI in educational assessment can ultimately transform education, improve learning outcomes, and equip students with the skills needed to succeed in the 21st century.

Keywords: AI Tools, Measuring Students Achievement, Performance, Advantages and Challenges

Introduction

Artificial intelligence (AI) is a rapidly evolving field of technology that involves the development of intelligent machines that can perform tasks that typically require human intelligence, such as understanding natural language, recognizing patterns, and making decisions based on data. AI is the ability of machines to adapt to new and emerging situations, problem-solve, answer questions, create plans, and perform other intelligent functions typically associated with human beings. AI refers to the field of computer science that involves creating computer programs capable of imitating intelligent behavior and ideally enhancing human-like abilities (Naqvi, 2020). AI, a swiftly expanding discipline, encompasses the development of intelligence robots capable of emulating human thought processes and actions, finding utility in diverse areas such as medical diagnosis, self-driving cars, and education (Wardat et al., 2023). AI-powered tools and applications are now being used in many industries (Suh & Ahn, 2022), including education, to enhance the quality of services provided to

students and teachers. AI tools such as Bing and ChatGPT have been referred to as objects individuals cane think with, especially in the teaching-learning situation for learners to enhance their ability to think critically and reflectively, foster creativity, acquire problem-solving skills, and grasp concepts effectively (Vasconcelos et al., 2023).

The integration of AI in teaching effectively realized learner-centered learning (Huang, 2018). AI-powered tools and applications improve educational measurement, including testing, assessment, and evaluation. These tools can provide educators with valuable insights into student performance, learning outcomes, and instructional effectiveness. For example, AI-powered assessment tools can analyze student responses to assignments and provide personalized feedback to help students identify areas of strengths and weakness (Nazaretsky et al., 2022).

These tools can also provide teachers with insights into the effectiveness of their instruction and identify areas, where they may need to adjust their teaching strategies. In addition, AI-powered tools can help automate many aspects of the assessment process, saving time and reducing the burden on teachers. For example, AI-powered grading tools can analyze students essays and provide feedback on grammar, structure, and content, reducing teachers' time grading assignment (Huang et al., 2023b).

AI-powered tools can also help identify students at risk of failing behind or benefit from additional assistance or remediation (Delgado et al., 2020). These tools can analyze students' data such as test scores and attendance records, and identify patterns that may indicate a need for intervention. This can help teachers to provide targeted support to students who need it most. Therefore, the development of AI-powered tools and applications has revolutionized the field of education by providing educators with valuable insights into student performance, learning outcomes, and instructional effectiveness. As this technology continues to evolve, it has the potential to transform education by providing personalized, data-driven instruction to students and enabling teachers to optimize their teaching strategies to improve student outcomes.

Application of Artificial Intelligence Tools in Educational Measurement and Assessment

AI has been transforming education in recent years. This increasing significance of AI has garnered the interest of numerous scholars actively exploring diverse methods to incorporate various AI tools within the classroom environment (Halaweh, 2023; Mena-Guacas et al., 2023; Papapicco, 2020). With the increasing availability of data and the growing sophistication of machine learning algorithms, AI has the potential to revolutionize the way we learn, teach, and asses student progress. Several benefits of using AI in education have been advanced. For example, Adiguzel et al. (2023) presented some benefits of using AI for administrators, teachers and learners. AI has been found to play a crucial role in motivating students (Lin et al., 2021; Xia et al., 2022), raising their engagement level (Huang et al., 2023a; Nazari et al., 2021), learning interest (Hou et al., 2022), learners' interaction (Karsenti, 2019), anxiety reduction (Hawes & Arya, 2023; Ren, 2020), prediction of students' future outcomes (Kumar, 2029; Luo et al., 2022) and academic performance (Khan et al., 2021). This section discusses how AI tools can be used in educational measurement and

assessment. The following are specific ways AI can be applied in educational assessment.

1. ***Personalized learning:*** Tools and systems based on AI have the potential to customize learning experiences, boost the productivity of teachers, and heighten student engagement (Mena-Guacas et al., 2023). AI can help create personalized learning plans for individual students based on their learning progress, strengths, and weaknesses. AI can identify students' learning needs by analyzing data from multiple sources such as assessments, homework, and quizzes and provide targeted feedback. Besides preparing lesson contents and learning experiences, AI-powered adaptive learning software such DreamBox and Knewton use data analysis to create personalized learning plans for students based on their strengths and weaknesses. For example, students can complete a pre-assessment test that generates a personalized learning plan with specific goals and recommendations.
2. ***Intelligent tutoring systems (ITS):*** AI-powered tutoring systems can provide personalized support and feedback to students. These systems can adapt to students' learning styles and provide tailored instruction and support, helping students to improve their learning outcomes. These systems can help students stay motivated and engaged with their learning by providing immediate feedback. Carnegie Learning's AI-powered mathematics tutoring system provides immediate feedback and customized learning paths based on students' strengths and weaknesses. The system adapts to each student's learning pace and provides interactive instruction and practice problems. Educators can use ITS to provide individualized instruction, monitor student progress, and identify areas, where students need additional support. Examples include ALEKS, Carnegie Learning, and Knewton.
3. ***Automated grading:*** AI can help automate the grading process, saving time for teachers and providing students with immediate feedback on their assignments. AI can provide feedback on grammar, spelling, and syntax by analyzing essays, reports, and other written assignments. By using automated grading systems, teachers can focus more on essential tasks such as lesson planning and supporting students, resulting in significant time savings (Adiguzel et al., 2023). This can help students to improve their writing skills and reduce the workload for teachers. For example, Turnitin's AI-powered software uses natural language processing (NLP) to analyze essays and provide grammar, spelling, and syntax feedback. The software can also detect plagiarism, helping teachers to grade assignments more efficiently and accurately.
4. ***Predictive analysis:*** AI can analyze student attendance, engagement, and performance data to predict future outcomes. This information can be used to identify students who may need additional support, enabling teachers to provide targeted interventions. For instance, University of South Florida uses predictive analytics to identify at-risk students who may need additional support. The university's Student Success Center uses data analysis to monitor student's progress and provide targeted interventions.
5. ***Natural language processing:*** AI-powered NLP tools can help students learn languages and improve their writing skills by providing grammar, spelling, and punctuation feedback. These tools can also help students to develop their critical thinking skills by analyzing and evaluating arguments and evidence. These tools also enable educators to analyze and interpret natural language data, such as

student essays, discussions, and social media posts to gain insights into student learning and engagement.

For example, Grammarly's NLP-powered software provides real-time feedback on writing, including suggestions for grammar, punctuation, and sentence structure. This can help students to improve their writing skills and produce higher-quality written work. Other examples include Google Cloud Natural Language, IBM Waston, and Microsoft azure Cognitive Services.

6. ***Computer*-based testing (CBT) platforms:** CBT platforms allow educators to administer online assessments, including multiple-choice, true/false, and essay questions. Educators can use CBT platforms to assess student knowledge, save time on grading, and providing students with immediate feedback (Bassey et al., 2020). Examples include Exam soft, JAMB CBT, Postgraduate e-exams, Pro Profs, and Question mark.

Advantages of using AI tools in measuring students' performance

Ease of Use

Define how simple and easy AI-powered study tools for students to use. It measures how quickly and comfortably students can learn and use the tools in their studies. In the context of AI-powered study tools, visual appeal is vital in improving user experience and engagement. A well-designed interface with effective visuals can help reduce cognitive load by organizing information clearly. This allows students to focus on learning rather than struggling to navigate a cluttered or poorly designed interface (Sweller, 2021). It is also important that AI-powered study tools are consistent with their visual elements and branding because with that it fosters familiarity and ease of use. Branding elements, such as logos and color palettes, help create a cohesive experience, making the tool more recognizable and appealing (Feng et al., 2022). Overall having a positive experience from AI-powered study tools interface and visual appeals correlates with greater user satisfaction. When students enjoy using a tool visually, they are more likely to continue using it and recommend it to peers (Garcia et al., 2021).

Usefulness

Defines how helpful students find AI-powered study tools in completing academic tasks, such as improving their understanding or performance. Research indicates that students who view AI as beneficial to their educational pursuits are more likely to adopt and use these technologies (Alshahrani et al., 2022). For instance, AI can provide personalized learning experiences, adaptive feedback, and resources that cater to individual learning styles, which significantly enhances its perceived value (Deng et al., 2021). Study shows students who utilize AI-powered study tools experienced better learning outcomes due to pe4sonalized support and efficient study method (Zhou et al., 2021) which creates a more positive motivation towards AI-powered study tools which leads to repeat tool usage.

Academic performance.

In a study by Arshad et. Al (2020), it was pointed out that AI powered study tools play a transformative role in improving study habits, personalizing learning experiences, enhancing access to resources and providing timely feedback. These tools can

potentially address some of the challenges identified in the study, ultimately leading to improved academic outcomes for students. For instance, a study by Liu et. Al (2021) found that adaptive learning systems, which utilize AI to tailor content to individual student needs, resulted in higher levels of student's satisfaction and improved retention rates. This personalization not only fosters a deeper understanding of the material but also encourages students to take ownership of their learning journey (Liu et.al., 2021). Research by Chen and Huang (2022) emphasizes the role of AI in facilitating collaborative learning environments. Their findings suggest that AI tools can enhance peer interactions and provide personalized feedback, thereby promoting a sense of community among learners. This collaborative approach not only aids in knowledge retention but also cultivates essential skills such as teamwork and communication, which are crucial for academic success (Chen et.al., 2022)

Exam Scores

Defines quantitative assessments that reflect a student's performance on a particular test or examination. The study by Smith and Doe (2022) is that the integration of AI in educational practices can significantly improve students' performance, as evidenced by higher exams scores among users of these AI-powered tools. The findings suggest that leveraging technology in education can provide substantial benefits, particularly in terms of personalized learning and timely feedback (Smith et. Al., 2022). Additional research underscores the positive impact of technology on academic performance. For instance, a study by Johnson and Lee (2023) found that students who utilized Ai-based tutoring systems not only scored higher on Mathematics assessments but also reported greater confidence in their problem-solving abilities. (Johnson et. Al., 2023). Similarly, a study conducted by Thompson et. Al (2024) demonstrated that the uses of interactive educational software in science class significantly enhanced student's understanding of complex concepts, resulting in higher exams scores. The researchers noted that these tools facilitate active learning, which is crucial for student's success in standardized testing scenarios (Thompson et. Al., 2024).

Assignment Quality

AI-Freigh et. Al (2023), defines the relationship between well designed assignments in online courses and students' sense of belonging. It highlights how assignments that are clear, purposeful and aligned with course goals can positively impact engagement and the overall learning experience. Quality assignments provide meaningful learning experiences and foster a deeper connection between students and the course content, which enhances their sense of being part of a learning community (Al-freih et. al., 2023). Further the impact of assignment clarity on graduate students' learning experiences in online environments. Their findings indicated that well-structured assignments enhance student's motivation and foster a stronger sense of community among peers, ultimately contributing to improved academic performance (Anderson et. al., 2022). Additionally, this study highlighted the importance of assignment design in cultivating student engagement. The research found that assignments that are meaningful and relevant to students' academic and professional goals can significantly enhance their sense of belonging in online courses, which is crucial for sustaining motivation and achieving learning outcomes. (Zhao et.al., 2021).

Challenges Of Using Artificial Intelligence-Powered Tools In Educational Assessment.

AI powered tools in educational assessment can be beneficial in various ways including enhancing the assessment process's accuracy, speed and efficiency. However, several challenges are associated with using Ai in educational assessment. Some of these challenges include:

Lack of stakeholders' participation in developing artificial intelligence tools: The lack of Stakeholder participation in developing AI tools for education can be significant challenge in AI adoption. When AI tools are developed without input from educators, students, parents and other stakeholders, the resulting tools may not be tailored to the specific needs of the education system. This can lead to a lack of relevance or adoption of AI tools in classrooms. According to Luckin and Cukurova (2019), developers of Ai have limited knowledge about learning sciences and insufficient pedagogical understanding for the successful integration of AI into teaching. Consequently, AI developers frequently overlook the expectations of teachers, who are the end-users of AI in education (Cukorova & Luckin, 2018). Teachers are highly important in AI-based teaching (Seufert et. al., 2020); Therefore, it is essential to take their opinions, past experiences, and expectations into account to ensure the successful integration of AI in schools (Holmes et. al., 2019).

Lack of Transparency: one of the primary challenges associated with AI in educational assessment is the lack of transparency in decision-making. It can be challenging to understand how AI algorithms arrive at their conclusions, making it difficult for educators to access the accuracy and fairness of the assessments.

Bias: AI algorithms can be biased, leading to inaccurate and unfair assessments. This is because AI systems are only good as the data which they are trained. If the data used to train the AI system is biased, then the system will produce biased outcomes.

Lack of Human Interaction: The use of AI educational assessment can lead to a lack of human interaction in the assessment process, which can be detrimental to student's learning experiences. Educators may miss important cues and nuances that can only be detected through human interaction.

Inadequate training: Educators must be trained to understand how to use the technology and effectively interpret the results. Without adequate training, educators may be unable to use the tools effectively, leading to inaccurate assessments.

Integration with existing systems: Integrating AI-powered assessment tools with existing systems can be a challenge. Educators must invest in new technologies and infrastructure and ensure the new tools work seamlessly with existing assessment processes.

Cost: the development and implementation of AI-powered assessment tools can be costly. Several schools or educational institutions may not have the financial resources to invest in these technologies, which can lead to unequal access to these tools.

Resistance to change: Adopting AI-powered assessment tools may face resistance from educators, students, and parents. They may not trust the technology or may prefer traditional assessment methods. Introducing these new tools into the educational assessment process can make it challenging.

Strategies To Address The Challenges Of Using Artificial Intelligence In Educational Assessment

These are several ways to address the challenges of using AI-powered tools in educational measurement and assessment. Below are some ways in which the challenges earlier identified could be addressed to promote equity, transparency, and quality in educational assessment: **Developing transparent and ethical artificial intelligence algorithms:** To ensure that AI-powered tools are transparent, educators and developers must work together to develop algorithms free from bias and discrimination. This can involve designing algorithms based on diverse data sets and incorporating ethical considerations into the design process.

Using personalized and adaptive assessment approaches: To capture the nuance of students' learning experiences, educators should consider using personalized and adaptive assessment approaches that can account for individual differences in students' learning styles and needs. This can involve using various assessment methods, including open-ended questions and performance tasks, to better understand students' knowledge and skills

Providing training and support for educators: To use AI-powered tools effectively, educators need proper training and support. This can involve providing educators with professional development opportunities to use the technology and ongoing support to ensure they can effectively integrate it into their teaching practice.

Collaborating with students: To ensure that AI-powered tools are meeting the needs of students, educators should collaborate with them to gather feedback on their experiences with technology. This can involve soliciting student in put on the usability and effectiveness of the tools and incorporating their feedback into the design and development process.

Ensuring accessibility for all students: To ensure that AI-powered tools are accessible for all students, educators should consider the needs of students with disabilities and provide accommodation as needed. This can involve designing tools compatible with assistive technology, providing alternative formats for materials, and ensuring that the tools comply with accessibility standards.

Conclusion

In conclusion, this paper has explored the various applications of AI in educational measurement and assessment as well as the challenges that need to be addressed to enhance its effectiveness. The use of AI in educational assessment has both benefits and limitations.

On the one hand, AI-based assessment can provide more accurate, objective, and efficient grading, freeing up time for teachers to focus on more meaningful interactions with their students. It can also identify areas of weakness and strength, allowing educators to tailor their teaching methods to individual needs. However, AI-based assessment is not a panacea and should not replace human judgement entirely. AI algorithms can be biased and may not consider non-cognitive factors that can influence academic performance. Additionally, some students may be uncomfortable with being assessed by machines, which could impact their motivation and engagement. Therefore, while AI can enhance educational assessment, it should be used alongside human judgement and ethical considerations.

Recommendations

- Become familiar with AI concepts and tools. Educators do not need to master all the tools, but being AI literate is now a must. You have made a start by reading and researching about AI. The next step is to read relevant resources and follow current development.
- Try using at least one AI tool if you haven't tried it yet. Be sure that your students will have tried these. It is important that you have experience in order to speak a common language in the classroom. Trying the most popular ChatGPT might be a good start; just create a free account at http://www.openai.com and start your questions in the chat interface … Getting to know the different outputs of different programs will give you new ideas on how you can use AI tools in education (and in your professional and personal life).
- Use AI tools to lighten your load in education! While writing course learning objectives, designing educational activities, looking for examples of the topic you will teach, creating a rubric. You can save a lot of time in all these tasks with AI tools.
- Talk to other educators. With peer learning, you can benefit from your colleagues' knowledge on the subject and adapt to this process more easily.
- Ask for help from the Medical Education or Educational Technology units in your institution. These units can provide you with tips on integrating AI technology into education.
- In your higher education institution, disseminate the idea that AI tools can be used to support education and training in many fields related to education, especially to create personalized learning experiences in education, end help raise awareness on the subject among administrators.

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