ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2590-4043
CODEN: AEMCDV

Acta Electronica Malaysia (AEM)

DOI: http://doi.org/10.26480/aem.02.2024.57.61

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RESEARCH ARTICLE

NATIONAL INTEREST AND THE FUTURE OF AI-ENHANCED USER AUTHENTICATION IN EDUCATIONAL ASSESSMENTS

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ARTICLE DETAILS

Article History:

Received 28 May 2024
Revised 01 July 2024
Accepted 04 August 2024
Available online 19 August 2024

ABSTRACT

The integration of artificial intelligence (AI) into user certification programs in educational research creates an important convergence of national interest. This research paper explores the implications of multiple dimensions of AI-enabled user authentication, highlights the importance of protecting educational integrity and facilitates national policies that examine literacy and technology emphasize the effectiveness of relevant development. As well as the transformative role of AI in transforming policy, therefore strengthening national competitiveness and innovation As countries undergo a complex digital transformation in education, it is important for policy makers and stakeholders to in the interest of the nation understands the implications of the rights and freedoms protected. This research makes it necessary to actively participate in AI-enhanced accreditation programs, putting countries at the forefront of educational innovation and technological advancement. Specifically, this paper serves as a foundational resource for stakeholders seeking to harness the power of AI to foster safe, inclusive, and efficient educational assessment programs.

KEYWORDS

artificial intelligence, Authentication, national interest, educational assessment.

1. INTRODUCTION

The advent of online learning platforms has changed the way education is delivered by providing increased access and flexibility. In some countries, online course enrollment is growing significantly faster than overall enrollment in higher education, with nearly 30% of college and university students enrolled in one online course in at least the United States (Mejri, and Borawski, 2023). More widely, the International Council for Open and Distance Education predicts that open and distance learning delivery formats will become the most significant driver of transnational higher education (Walsh et al., 2020). As this new mode of instruction becomes more prevalent, however, these changes require stricter security measures to ensure the integrity of online assessment and AI-enhanced user authentication emerges as a possible solution.

The shift from old-style to online learning emphasizes how essential it is to assess students' retention of material and learning outcomes (Khan et al., 2021). Assessments are used to estimate students' comprehension, involvement, and general knowledge. Examples of these are the ones mentioned (Butler-Henderson and Crawford, 2020). While virtual assessments offer rewards such as ease of searching, cost and time efficiency, and immediate feedback, they also pose challenges, especially lack of academic integrity (Costley, 2022). A group researchers define academic dishonesty as illegal behaviors that occur during academic activities including tests and assignments (Bylieva et al., 2020). Some researchers further explain digital learning fraudulence, which includes the usage of digital technologies for learning errors (Etgar et al., 2019). A group researchers argue that "cheaters" are persons who violate ethical norms in order to gain esteem without actual academic effort (Aljurf et al., 2020).

Integrating user-authorized AI into educational research to reduce the risk of academic dishonesty in online education makes sense in this context Institutions can protect the legitimacy of educational results to safeguard the accuracy of internal development through the use of AI technology to improve the safety and integrity of inspection systems. In addition, real-time analytics and analysis enabled by AI-powered authentication systems provide insights into student testing behavior patterns, which can help identify and eliminate fraudulent activities (Hassan et al., 2023). This national interest in AI-enabled education assessment and integrity is extremely important for governments and policy makers seeking to ensure the quality and integrity of online education. Given the importance of addressing academic dishonesty while encouraging growth and innovation in education, stakeholders can use AI technologies to shape learning environments while promoting safety and encourage equity in line with national education goals (Pedro et al., 2019).

2. LITERATURE REVIEW

2.1 Integrating AI in Education Assessment

Artificial intelligence (AI) will revolutionize traditional research methods in educational research, delivering more benefits and changing the way students are assessed. Artificial intelligence (AI) technology provides sophisticated, automated systems that can analyze large amounts of data, provide customized feedback, and improve the overall efficiency of the analytics process. The following are some considerations about when using AI in educational settings.

2.1.1 Automated Scoring

Automatic scoring represents a cutting-edge application of artificial intelligence in educational assessment. According to Smith, artificial intelligence (AI) systems have the ability to analyze various types of data or content including verbal, textual, and complex problem-solving tasks (Smith, 2019). This system can respond quickly and impartially. AI-powered assessment tools have the ability to evaluate student work using natural language processing (NLP) algorithms and machine learning techniques. This enables them to assess the work according to predetermined criteria, thereby ensuring consistency and minimizing subjectivity (Jones et al., 2020). Automated scoring not only provides time efficiency for teachers but also provides quick feedback to improve

Quick Response Code	Access this article online	
	Website: www.actaelectronicamalaysia.com	**DOI:** 10.26480/mecj.02.2024.57.61

Cite The Article: Temitope Oluwafunmilayo Adetunji (2024). National Interest and The Future of Ai-Enhanced User Authentication in Educational Assessments. *Acta Electronica Malaysia, 8(2): 57-61.*

students' academic performance.

2.1.2 Adaptive Assessment

One significant application of artificial intelligence (AI) in the field of educational evaluation is adaptive assessment. Brown and Johnson assert that algorithms powered by artificial intelligence (AI) have the capacity to analyze student replies and behavior patterns, which makes it easier to create customized assessment experiences (Brown and Johnson, 2021). Adaptive assessment systems, according to a study have the capacity to continuously monitor and adapt to each individual's specific learning needs (Miller et al., 2022). These systems may modify the questions' topic and degree of difficulty to match the skills of the pupils. Using a customized approach makes it easier to pinpoint knowledge gaps, provides targeted interventions to close these gaps, and streamlines the learning process to improve student engagement and concept comprehension.

2.1.3 Intelligent Tutoring Systems (ITS)

Intelligent Tutoring Systems (ITS) have brought about a substantial change in the educational environment by utilizing artificial intelligence (AI) to improve students' comprehension and ability to acquire new ideas. Artificial intelligence algorithms are utilized by these systems to give personalized instruction, track students' progress, and offer targeted interventions (Wang et al., 2018). According to Chen and Lee, Intelligent Tutoring Systems (ITS) have the ability to review students' answers, identify any misunderstandings, and provide prompt comments and clarifications (Chen and Lee, 2020). Intelligent tutoring systems maximize the effectiveness of assessment by allowing for the accommodation of individual learning styles and preferences while seamlessly combining assessment with instruction.

2.1.4 Data-Driven Insights

Artificial intelligence (AI) technologies are being used in educational evaluation to give insightful data that may be used to inform instructional practices and expedite decision-making. By analyzing large datasets, artificial intelligence (AI) systems are able to identify trends, patterns, and correlations related to students' academic achievement. As a result, teachers are able to gain important knowledge about the areas in which their pupils demonstrate both proficiency and need for improvement (Wilson and Thomas, 2021). These realizations may influence the planning and execution of targeted interventions, curricular enhancements, and customized learning plans, which could ultimately result in better learning outcomes.

3. AI IN DATA PRIVACY AND SECURITY

Within the digital age, where data is seen as important as oil in this century, the ideas of data protection and security are very important even to every nation. They help to keep personal and company information safe. Data privacy means treating and looking after information the right way, including how it's saved and thrown away (Abdullahi et al., 2022). This also incorporates the request for permission, communicating something to others as well as following guidelines regarding the ways through which we can use another security's information. It's about deciding when and how personal information will be collected and used. Data safety is about keeping information out of the wrong hands. It involves methods to ensure that data is not shared, altered, or lost.

Today, in the world, safeguarding data privacy and safety is very critical (Ahmad et al., 2023). This is because people and groups are developing a lot of data, which they all use. The number of personal details saved securely by systems all over the world is growing with the internet, cloud services and smart devices. Such a huge amount of data and storing it may result in severe risks, including leaking information relating to individuals or loss of privacy. Such things can badly harm people and businesses. They can make them lose money, hurt their reputation, and get into legal trouble. It's tough to ensure that personal details and information are secure (Aldoseri et al., 2023). There are many problems. They are about smart and always changing cyber dangers, finding a fair balance between using data and keeping it secret, and following many rules in different places across the world. Big data means a lot of fast and different information, making it tough to manage and secure. When dealing with these issues, Artificial Intelligence (AI) has appeared to see a big change.

AI is short for making machines as smart as humans by teaching them to think and learn like people. It has rapidly increased in various fields such as health care, education finance, and travel. This is because it can manage a lot of data effectively and make wise decisions (AL-Khassawneh, 2023). AI is changing data privacy and Security Automatically finding un-usual things quick enough to act. Data sovereignty Compliance is another term for it can also help with safety policies and privacy protections easier to keep track of. This means that we don't have to do so much by hand, which is usually slower and prone to errors. AI systems have the capability to study data and then examine the behaviors that are considered normal in comparison with what is looked at as weird, this means security risks or even loss of privacy (Bertino et al., 2021).

The ability to sense imminent threats allows us to react immediately, thus minimizing the extent of harm such dangers may inflict. Secondly, AI can aid in forecasting. Determines and mitigates potential risks of data privacy or security breaches to a business before the problem escalades. It is incredibly important for creating data laws and adhering to them correctly. This serves to reduce the risk of legal trouble by ensuring that data practices stay within normal bounds set in place by lawmakers (Carmody et al., 2021). Due to the increasing amount of data and ever-changing cyber threats, conventional methods that once ensured this privacy and security have become insufficient. Artificial intelligence, with its ability to automate tasks, process data and act accordingly is driving a transformation in how we protect and administer our information.

The purpose of the paper is to study diverse aspects of this change. It also studies how AI tackles present challenges with data privacy and safety as well as redefines the horizon for keeping our digital assets secure. But how exactly does AI help in this process. It's not only a helper, but also an important piece in making the digital world safer and more private (Chandran, 2022). In the realm of online education and assessment, AI plays a crucial role in ensuring data privacy and security. By automating processes, analyzing patterns, and detecting anomalies, AI can help educational institutions identify and address potential security threats, thereby enhancing the integrity and confidentiality of online learning environments.

3.1 AI Preventing Assessment Fraud

As the demand for secure and reliable online assessment solutions increases, technological advances have paved the way for new methods of test proctoring. The latest developments in online test proctoring technology offer sophisticated features and functionality designed to enhance its effectiveness, efficiency and accessibility (Butler-Henderson and Crawford, 2020). AI-powered proctoring uses machine learning systems to use to acknowledge, analyze, and identify patterns in student behavior that indicate cheating or academic dishonesty (Murugan et al., 2024). These systems can detect anomalies in real-time, and immediately intervene or flag suspicious activity.

3.1.1 Identity Verification

Digital identity verification mechanisms, such as facial recognition and biometric authentication, ensure that the individual taking the exam is the authorized student. By verifying the identity of exam-takers before and during the exam session, institutions add an extra layer of security to their assessment process, mitigating the risk of impersonation and unauthorized access to exam content. Additionally, biometric data can be used to monitor and authenticate student presence throughout the exam session (Zhu and Cao, 2021). This aspect is particularly important for national interests, as it helps maintain the integrity of educational qualifications and certifications, which contribute to the skilled workforce essential for economic growth and competitiveness.

3.1.2 Behavioral Analysis

Using real-time artificial intelligence algorithms to analyze student behavior, institutions can monitor parameters such as eye movements, facial expressions, typing patterns, browser activity, etc to detect anomalies indicative of cheating or academic dishonesty. Behavior analysis for proctoring platforms can immediately flag suspicious behavior for the institution and common sense enables work if professors can tap into further research (Trabelsi et al., 2023). This proactive approach not only supports the reliability of assessments but also reinforces confidence in educational systems as a key factor in the national interest.

3.1.3 Anomaly Detection

Advanced AI algorithms continue to analyze examiner behavior and performance to identify anomalies that could indicate a possible authentication violation. These differences may be due to sudden changes in response patterns, excessive manipulation of external factors, or irregularities in the exam environment (Rodríguez-Quintero et al., 2021). AI-powered anomaly detection algorithms flag suspicious activity for further investigation, enabling proctors or instructors to take appropriate action to maintain test integrity Multimodal monitoring is needed to capture a comprehensive view of the testing environment. By integrating sophisticated detection techniques such as AI-driven monitoring, real-

time video and audio surveillance, screen recording, advanced device lockdown protocols, organizations gain access to advanced tools that it will support the integrity and validity of assessments contributing to the broader national interest of fostering a knowledgeable and skilled workforce, whether in person or online. While recognizing that there is no foolproof solution, online test proctoring is a key to preventing misconduct and enabling appropriate assessment practices in the digital age (Nigam et al., 2021).

4. Enhancing Online Learning and Assessment With AI-Driven User Authentication

4.1 Improving User Authentication with AI

AI technologies offer innovative solutions to improve online user authentication and make learning and research methods user-friendly and accessible. Using machine learning algorithms, AI can streamline the authentication process, ensuring strong security measures. Techniques such as facial recognition, voice recognition and behavioral biometrics provide easy and secure access to online sites. These advanced methods of authentication not only enhance the user experience, but also reduce the risk of anonymity and identity fraud.

4.2 Promoting Innovation and Accessibility in Education

The growth of online learning and research infrastructure is in line with the national interest in promoting innovation and access in education. By implementing AI-powered authentication, institutions can break down barriers to reaching and reaching students in remote or inefficient locations. Additionally, AI facilitates the development of flexible and intuitive assessment strategies that span a variety of learning styles and areas (Alyammahi, 2020).

4.3 Facilitating Flexible and Scalable Assessment Methods

Educational environment, which ensures that all individuals have the opportunity to learn and develop skills. AI enables the use of personalized assessment methods, which are adapted to meet students' individual needs and preferences. By analyzing information about student performance and behavior, AI algorithms are able to modify the delivery of assessment materials and strategies to optimize learning outcomes (Hooda et al., 2022). This flexibility allows the assessment to be tailored to each student's pace, skill and learning style. Furthermore, AI-powered assessment platforms can scale well to accommodate a large number of users, ensuring comprehensiveness, key to the growth and development of education as well as national development, social development, and globalization competition (Yu and Lu, 2021). Al using it with enthusiasm, because it provides economical access to quality educational materials.

4.4 Fostering National Interest in Education Innovation

By enhancing AI online learning and assessment system, countries can equip individuals with the knowledge and skills they need to succeed in the digital age. In addition, investments in educational innovation strengthen the workforce, enhance innovation ecosystems, and enhance national resilience in the face of technological advances (Pedro et al., 2019).

5. National and Global Interest

5.1 Adaptive AI Governance

Due to the global nature of AI development and the rapidity with which it evolves compared to traditional legislative procedures, it is difficult to create such frameworks. Therefore, an adaptive AI governance framework is essential, and we can draw many lessons from genetic algorithms, an AI method based on the principles of natural evolution. AI governance is a global issue, not just a national one. Effective governance of AI systems necessitates international cooperation, as AI systems and their effects do not respect national boundaries (Cihon et al., 2020). Countries must collaborate to establish global AI usage standards and norms. The United Nations and other international organizations can be very helpful in promoting discussion and cooperation on AI governance (Cihon, 2019). In order to develop a holistic approach to AI governance, cooperation between governments, the commercial sector, and civil society is necessary.

What are some of the essential components needed to establish an AI regime on a global scale? AI has to be standardized. Standards are becoming more and more necessary as AI develops and permeates society. Standards help ensure the stability, dependability, and quality of AI systems, which can foster innovation and competitiveness (Girard, 2019). The primary obstacle to standardization is the quickly developing field of artificial intelligence.

Standardization in AI is important for a variety of reasons. It can enable AI systems to work together, enabling them to communicate and collaborate more effectively. This is important as AI becomes more prevalent in critical sectors such as healthcare, education and transportation infrastructure. Second, standards can provide transparency and trust in AI systems (Konda, 2019). By adhering to accepted standards, developers can demonstrate the predictability and reliability of their AI systems. Standards can help address ethical and societal issues related to AI, such as bias, privacy, and accountability. The pace of AI development often exceeds the rate at which standards are developed and implemented, leading to an endless game of catch-up. Furthermore, the complexity and diversity of AI technologies complicates the development of universal standards. In addition, there is concern that overly stringent standards could stifle innovation and competition in the AI industry.

Despite these obstacles, the prospects for standardizing AI are promising. Several groups, including the International Organization for Standardization (ISO) and the Institute of Electrical and Electronics Engineers (IEEE), are actively developing AI standards these efforts focus on terminology, ethical considerations, and technical specifications of AI systems (Cihon, 2019). Furthermore, there is a growing need to involve a wide range of stakeholders, including AI developers, consumers, regulators and the public, in the standards process.

5.2 Machine Learning Governance

The dominant version of AI technology that urgently requires governance is machine learning. AI systems, especially those based on machine learning, rely significantly on data. This data's quality, diversity and quantity can considerably affect the performance and behaviour of AI systems. Consequently, managing the data used to train AI is a major concern (Duan et al., 2019). Balancing the need for data to train AI systems with the need to protect privacy is a daunting challenge. Privacy protection is a key challenge in managing AI training data. Data security and privacy concerns arise because AI systems often require access to large amounts of personal data. Regulations such as the European Union General Data Protection Regulation have been implemented to protect the privacy of personal data. Data bias is also a major concern (Wachter and Mittelstadt, 2019). If the data used to train AI systems is prejudiced, the AI systems can become biased and produce unfair or discriminatory results.

Consequently, it is crucial to regulate data to ensure it is representative and bias-free. Nevertheless, identifying and eliminating bias in data can be difficult and complex. Transparency in the collection, storage and use of data for AI training is another important area of regulation. Transparency can help build trust in AI systems and ensure accountability. However, it can be difficult to provide transparency without compromising privacy or confidentiality. Despite these obstacles, there are significant opportunities to manage data for AI training. Regulations can help establish data privacy, impartiality, and transparency standards to promote responsible and ethical use of AI (Van and Vrabec, 2019). In addition, innovation can be encouraged by leveling the playing field and enhancing competition.

As AI continues to advance, the need to effectively regulate these algorithms becomes more crucial. Regulation of AI training algorithms is crucial for multiple reasons. It can first assure the fairness and openness of AI systems. Inadvertently, algorithms can perpetuate or amplify biases present in training data, resulting in unjust outcomes (Herzog, 2021). Regulation can aid in ensuring that algorithms are created and utilized in a manner that mitigates these biases. Yes, the traditional training, testing and validation process, even though necessary, is not enough. There is a growing recognition of the need for the participation of multiple stakeholders in algorithm regulation, including AI developers, consumers, regulators and affected communities. Second, regulation can aid in establishing accountability. As AI systems become more complex, it can be challenging to comprehend how they make decisions.

Regulation can help ensure that algorithms are transparent and interpretable, allowing their decisions to be held accountable. The technical complexity of these algorithms is one of the primary challenges. The regulatory experts often treat this as a black box and have little understanding of the inter workings of these algorithms with devastating consequences. The need to understand the complex networks of neural networks, optimization and backpropagation is required to have effective governance of algorithms. Understanding how they work and how they regulate themselves requires a high level of technical knowledge. In addition, the rapid development of AI can complicate regulatory compliance.

Overly restrictive regulations are also likely to stifle AI innovation. Despite

these limitations, there are promising potential directions for managing algorithms. Creating technical standards for AI algorithms can guide their design and implementation. Third-party audits are another way to check the correctness and transparency of the algorithm. In addition, there is growing recognition of the need for multiple stakeholders to participate in the implementation process including AI operators, customers, regulators and affected communities.

6. Conclusion

In summary, integrating AI with user integrity for educational assessment is critical to maintaining academic integrity and advancing the national interest. This study highlights the role of AI in enhancing data security, preventing fraudulent activity, and transforming online learning systems. AI offers tremendous value to educational assessment processes through automated scoring, adaptive assessment, intelligent instruction, and data-driven insights Dynamic use of AI -driven accreditation systems in is important for policymakers and stakeholders to lead educational innovation. The adoption of AI technologies enables a safe, inclusive and efficient research process that aligns with national objectives, and fosters competitiveness and resilience in the digital age.

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