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Impact of AI-Based E-Testing on Grade 8 Students' Academic Achievement and Motivation: Exploring Challenges and Opportunities: A Qualitative Study

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ABSTRACT

Educational practices are changing rapidly in AI especially in the area of evaluation and assessment. More and more educational institutes are using AI based testing. It provides automated assessment, adaptive learning help, immediate feedback, and personalized evaluation experiences. This study is qualitative in nature and it investigates the impact of AI based e-testing on academic motivation and achievement of 8th grade students. It also discusses the challenges and opportunities for these systems. The objective of this study is to understand students' experiences with AI-supported e-testing environments and to investigate the effect of technologies on students' learning outcomes and engagement in classrooms. The research will be based on a qualitative research design and will mainly use semi-structured interviews and student reflections as data collection methods. The target population is Grade 8 students who are regular users of AI-based e-testing systems within the school context. Data will be analysed thematically to identify key patterns, perceptions and experiences regarding the use of AI-based assessment practices. The findings should demonstrate that AI-based e-testing has the potential to enhance students' motivation, engagement, self-confidence, and academic achievement via instant feedback, personalized learning, and interactive evaluation approaches. However, factors such as technical problems, dependence on the Internet, lack of digital literacy, distraction, and overdependence on AI technologies may affect the students' learning experience. The results of this study can offer useful recommendations to teachers, school administrators and policy makers for the effective implementation of AI-based e-testing systems in support of Student Learning Outcomes (SLOs).

Introduction

Artificial Intelligence (AI) is one of the most influential technological breakthroughs in modern education. Global educational institutions are increasingly using AI powered technologies for teaching, learning and assessment practices to improve quality of education and student performance (Chai, 2026). Among these innovations, AI-based e-testing systems have attracted much attention, providing automated assessment, adaptive questioning, real-time feedback, personalized learning support, and performance analytics. These features have changed the traditional assessment methods into more interactive and technology-based learning experiences.

"E-testing" refers to the use of digital platforms to administer assessments on computers, tablets, or online systems. These systems can analyze the student responses, identify learning gaps, change the difficulty levels, and give instant feedback based on the

students' performance when combined with artificial intelligence. Researchers have noted that AI-supported assessment systems can boost student engagement, learning efficiency, and academic achievement by making assessments more personalized and responsive to individual learning needs.

In the last few years, digital assessment systems have become popular in schools, especially after the rapid growth of online and blended learning environments. The AI-driven e-testing systems are now being used to assess student comprehension, track progress and support Student Learning Outcomes (SLOs). Studies indicate that AI-supported educational technologies have a positive effect on students' motivation and academic performance through promoting active participation, self-regulated learning, and immediate correction of errors . Research has also shown that higher levels of student engagement in digital learning environments are often linked to better academic performance and learning outcomes.

Motivation and academic achievement are important in determining future success in school, especially in Grade 8 in middle school. At this stage, students are developing independent learning habits, confidence, and digital literacy skills. The employment of AI-based e-testing systems might enhance students' interest and motivation in learning through interactive quizzes, gamified assessments, adaptive feedback, and personalized support. Studies in AI-supported classrooms have shown that when teachers guide the use of AI appropriately, it can boost students' motivation, engagement in learning, and self-efficacy.

However, despite these opportunities, there are also some challenges with the use of AI-based e-testing. Students may face technical issues, internet connectivity issues, lack of digital skills, examination anxiety, or over-reliance on AI technologies (Dai et al., 2025). Concerns on academic honesty, critical thinking, and abuse of AI tools have also been important issues in educational assessment . New research raises concern that excessive dependence on AI may diminish students' independent thinking and pose ethical issues for assessment systems (Holmes et al., 2022). Moreover, experts contend that education systems must reimagine assessment practices to ensure that use of AI tools is done in ways that support learning, not replace students' authentic understanding and effort.

The implementation of e-testing systems based on AI is still in its early stages in Pakistan and many developing educational environments. Although some schools are beginning to use digital assessments, there is very little research examining students' personal experiences with these systems, especially at the Grade 8 level. Most of the existing studies have focused on the quantitative measures of performance and achievement but not enough on students' feelings, perceptions, challenges, and learning experiences. Hence, there is a great need for qualitative research to study the experience of the Grade 8 students with AI-based e-testing and the effect of these systems on their academic achievement and motivation.

The current qualitative study seeks to examine the effect of AI-based e-testing on academic achievement and motivation of Grade 8 students through exploring students' experiences, challenges, and opportunities with AI-supported assessments. The study further aims to suggest recommendations to improve the effectiveness of AI-based e-testing systems for the enhancement of Student Learning Outcomes (SLOs) and the provision of meaningful learning experiences for students.

Problem Statement

The rapid development of artificial intelligence (AI) in education has revolutionized traditional assessment methods into digital and AI-supported e-testing systems . Schools are increasingly using these systems to test students' knowledge, provide instant feedback and increase the efficiency of learning. The potential for AI-based e-testing to improve students' academic achievement and motivation by developing interactive, personalized, and adaptive assessment experiences. However, the use of such technologies at the middle-school level, especially with Grade 8 students, presents significant concerns regarding accessibility, technological abilities, student interest, and the overall effectiveness of these systems in promoting learning outcomes.

In many schools, AI-based e-testing is being introduced without fully knowing students' experiences, perceptions and difficulties using these systems. Features such as instant feedback and gamified assessment can encourage and build confidence for some students. Some may get anxious, run into technical problems, get distracted or become too dependent on AI tools. Moreover, there are few studies of good quality that explore students' subjective experiences of AI-based e-testing, and its impact on academic achievement and motivation.

Most of the existing studies have focused on the quantitative measurement of performance rather than exploring students' voice, feelings and lived experiences. Therefore, a qualitative study is required to understand the opportunities and challenges of AI based e-testing among Grade 8 students. This study aims to fill this gap by exploring students' perceptions towards AI-based e-testing and the degree to which such systems enhance Student Learning Outcomes (SLOs), motivation, and academic success.

Research Objectives

1. To explore the challenges, experiences and opportunities of AI-based e-testing systems among students of grade 8.
2. To find out the effect of AI-based e-testing on students' academic motivation and achievements.
3. To suggest improvements in the efficiency of AI-based e-testing systems for Student Learning Outcomes (SLOs).

Research Questions

1. What are the challenges, experiences, and opportunities of AI-based e-testing systems among students of grade 8?
2. Identify the impact of AI-based e-testing on the academic achievement and motivation of Grade 8 students.
3. What are the methods that can be used to enhance AI-powered e-testing systems to promote better student learning outcomes (SLOs)?

Significance of the study

The significance of this study is to explore the contribution of AI-based e-testing in improving grade 8 students' academic achievement and motivation. The results will help teachers, school administrators, curriculum developers and policy makers to understand how students experience AI-supported assessments. The study will also examine students' challenges and opportunities to enhance digital assessment practices.

In addition, the study can help in designing more effective AI based e-testing systems to meet Student Learning Outcomes (SLOs). It can also assist schools to adopt student-friendly and motivational assessment strategies that encourage meaningful learning experiences.

Limitation of the Study

- This study is limited to grade 8 students only.
- It has received only qualitative responses.
- The findings are based on students' experiences and perceptions.
- No numerical data is collected.
- The study is conducted only in a small frame and in educational settings.

Literature Review

Introduction to Literature Review

Artificial Intelligence (AI) is now an essential part of the modern era, especially in the areas of learning and assessment practices. AI-based e-testing systems are increasingly adopted in educational institutions to improve assessment, accuracy, and engagement that support better learning outcomes (Chai, 2026). Assessment automation, adaptive questioning, and real-time feedback to make assessment more efficient and student-centered. It is found that AI-based educational technologies have positive effects on learning outcomes by enhancing personalized learning and self-regulated learning behaviors (Pervaiz et al., 2025). AI systems can also spot learning gaps and offer immediate feedback, which can lead to better academic results and greater classroom engagement. However, their effectiveness could be compromised by challenges such as technical limitations, digital literacy deficits, and over-reliance on technology (Dai et al., 2025).

E-testing systems based on artificial intelligence use artificial intelligence to assess students' knowledge, monitor performance and adjust difficulty levels according to the ability of the learner (Holmes et al., 2022). These systems are based on machine learning and data analytics to improve the assessment process and provide timely feedback (Zawacki-Richter et al., 2019). One of the major benefits of these systems is personalized learning. Students are given personalized questions and instant feedback that helps them to quickly find and fix errors (Luckin et al., 2016). Gamified and interactive features also promote greater student engagement and participation. However, challenges including poor internet connectivity, lack of access to devices, limited digital skills, and concerns

regarding academic integrity continue to hinder effective implementation, especially in developing contexts such as Pakistan (Selwyn, 2019).

Academic achievement is the performance of students with regard to knowledge, skills, grades and overall learning outcomes. AI-based e-testing helps to enhance academic achievement by providing immediate feedback and identifying gaps in learning, which allows students to improve constantly (Luckin et al., 2016). Immediate feedback is strongly related to better learning outcomes and helps students to correct their errors more quickly (Hattie & Timperley, 2007). Moreover, adaptive testing offers students tasks that match their ability level, encouraging differentiated learning and enhancing overall performance (Zawacki-Richter et al., 2019). However, issues such as unequal access to technology and excessive dependence on AI tools could negatively affect critical thinking and the ability to learn independently.

Student motivation is a function of both intrinsic and extrinsic factors, where intrinsic motivation is derived from personal interest and extrinsic motivation is derived from external rewards (Deci & Ryan, 2000). AI-based e-testing systems can enhance motivation through interactive assessments, gamified quizzes, and instant feedback. These systems are based on self-determination theory, which says that to keep motivation alive it is necessary to support autonomy, competence and engagement. Immediate feedback also increases students' confidence and promotes continuous improvement (Hattie & Timperley, 2007). However, some technical issues, lack of familiarity with digital platforms and system errors can decrease motivation and cause frustration for learners. An over-reliance on technology may also undermine independent learning habits.

Overall, the literature suggests that AI-based e-testing systems have a great potential to improve academic achievement and student motivation by providing personalized learning and timely feedback. But they require correct implementation, teacher support, digital readiness and equal access to technology to be effective. Although this practice is increasingly adopted globally, very little is known about the lived experience of the students of this practice, especially at the middle school level in developing countries like Pakistan, and more research is needed.

Opportunities of AI-Based E-Testing

The modern era provides various educational opportunities to enhance teaching and learning as well as assessment practices by using an AI-based e-testing system. One of the biggest opportunities is to create personalized learning experiences. These systems use artificial intelligence to analyze the students' answers and adjust the level of difficulty of the questions according to their individual performance. This adaptive feature allows students to learn at their own speed, which can improve understanding and increase overall academic success (Holmes et al., 2022).

Another significant opportunity is the provision of immediate feedback. Traditional assessment approaches are time-consuming, and AI-based e-testing systems provide instant results, which allows students to identify their errors and improve their learning process instantly. Research indicates that timely and specific feedback is important for enhancing student learning and academic performance (Hattie & Timperley, 2007). This immediate feedback mechanism helps the students to improve their understanding of the concept and reduce the repeated mistakes.

AI-based e-testing systems also encourage self-regulated learning. Continuous feedback and tracking of performance makes students more conscious of their strengths and weaknesses. This self-awareness promotes goal setting, reflection, and independent learning. According to Zimmerman (2002), self-regulated learners are more likely to achieve higher academic success because they actively monitor and control their learning process.

Moreover, AI-based assessment systems also help in reducing teachers' workload through automated grading and evaluation processes. This allows teachers to teach more, to interact with the classroom and support individual students. AI technologies like reducing administrative burdens and increasing assessment accuracy, can improve educational efficiency (Zawacki-Richter et al., 2019).

Gamified assessments, interactive quizzes and multimedia-based questions in AI-based e-testing systems also offer opportunities for increased engagement for Grade 8 students. These features encourage the fun and motivation of learning and can have a positive impact on students' participation and academic performance.

The benefits of these opportunities are clear but it is also important to understand that their success depends on the quality of their execution, with teacher guidance and access to digital resources. Students need the right infrastructure and digital literacy to fully utilize AI-based e-testing systems.

In general, AI-based e-testing systems can significantly contribute to the improvement of learning, assessment practice and Student Learning Outcomes (SLOs) through offering personalized, interactive and efficient educational experiences.

Challenges of AI-Based E-Testing

However, there are some challenges that might hinder the successful implementation of the AI based e-testing systems even though it provides increasing benefits in education especially in the school context. Technical difficulties are among the most frequent problems. Students may experience problems such as poor internet connection, system errors, software glitches or lack of access to appropriate digital devices. Such technical barriers can interfere with the assessment process and negatively affect students' performance and confidence.

Another major challenge is the digital literacy gap among students. Not all learners are familiar with digital tools and online assessment systems to the same extent. Students with low technology skills may have difficulty using AI-based e-testing platforms, which may result in inequitable assessment outcomes. Limited access to digital resources remains a major problem in technology-oriented education systems (Selwyn, 2019).

Another major challenge for AI based e-testing systems is Examination Anxiety. Students might feel extra pressure when interacting with computer-based assessments due to lack of familiarity or fear of making technical errors. Such anxiety can impact their concentration and reduce their academic performance. Furthermore, stress levels may be increased by system errors or delays during exams.

Another concern is the dependence on Artificial Intelligence (AI) tools. While the immediate feedback and support provided by AI systems is beneficial, over-reliance on such tools may lead to a decline in students' independent thinking, problem solving and critical analysis skills. Researchers have cautioned that reliance on AI in education may impede students' ability to learn without technological assistance (Luckin et al., 2016).

Another aspect of academic integrity that is a matter of great concern is the AI-based e-testing environments. Assessments may be susceptible to cheating, unauthorised assistance or misuse of digital tools. Fairness and transparency of AI-based evaluation systems continues to be a challenge for educators and policymakers.

These challenges are more so in developing countries like Pakistan owing to infrastructural constraints. Too many schools don't have the digital infrastructure, trained teachers and stable internet connections needed to make AI-based e-testing systems work successfully. Such limitations compromise the validity and utility of digital assessment practices.

In summary, AI-based e-testing systems offer significant educational opportunities, but it is essential to address these challenges to ensure that all students have access to fair, effective, and meaningful assessment.

Research Gap

The use of artificial intelligence (AI) in education has attracted significant global attention, but a clear gap exists in understanding to what extent AI-based e-testing systems affect students' learning experience at the school level, especially in developing countries. Much of the research has so far been done in higher education contexts, or concentrated on quantitative outcomes like test scores, academic performance and system efficiency. These studies have gained valuable insights but often do not consider students' personal experiences, emotions, and perceptions of AI-based assessment systems.

Research has been limited, especially among Grade 8 learners who are in a crucial stage of academic and cognitive development. Students at this age are developing their foundational learning habits, motivation patterns, and digital literacy skills. However, there is little research on the lived experiences of these students and AI-based e-testing systems.

Furthermore, most of the existing studies focus on AI-based e-testing from a technological perspective or a performance perspective, instead of exploring its psychological and behavioural impact on students, such as motivation, engagement, anxiety and learning confidence. There is also a paucity of qualitative research that captures students' voices on challenges and opportunities they face when using AI-supported assessment systems.

Research on AI based e-testing is still in nascent stage in Pakistan. Schools are gradually adopting digital assessment tools, however, there is little empirical data available on the effect of such systems on Student Learning Outcomes (SLOs) at the middle school level.

Therefore, there is a gap in exploring the experiences of Grade 8 learners with AI-based e-testing in terms of academic achievement, motivation, challenges and opportunities.

This study aims to fill this gap by employing a qualitative method to investigate students' experiences, in order to gain deeper insights into how AI-based e-testing impacts learning processes beyond numerical performance data.

Theoretical Framework

The present study is guided by the Deci and Ryan (2000) Self-Determination Theory (SDT). SDT explains human motivation by three basic psychological needs: autonomy, competence, and relatedness. When these needs are met, individuals are more likely to be intrinsically motivated and involved in learning activities.

In the case of AI-based e-testing systems, autonomy is supported by allowing students to learn at their own pace in the context of adaptive assessments . Students increase their competence when they receive immediate feedback that helps them understand their performance and improve their learning. Relatedness can be fulfilled when students engage with teachers and peers in digital learning environments that promote collaboration and feedback sharing.

SDT suggests that when these psychological needs are satisfied, students will demonstrate higher levels of motivation, engagement, and academic achievement . Therefore, this theory is applicable to study the impact of AI-based e-testing systems on Grade 8 students' motivation and learning outcomes.

Conceptual Framework

The theoretical framework of this study is based on the relationship of AI-based e-testing systems with the academic achievement and motivation of students. The independent variable is AI-based e-testing with instant feedback, adaptive assessment, and personalized learning support.

The dependent variables are:

- Academic success
- Motivation of Learners

Additionally, the study considers challenges and opportunities as mediating variables between AI-based e-testing and student outcomes. The challenges are technical challenges, gaps in digital literacy, and anxiety and the opportunities are personalized learning, instant feedback, and engagement.

The general framework indicates that the positive impact of the AI-based e-testing systems on academic achievement and motivation is moderated by the enabling opportunities and limiting challenges experienced by students.

Research Methodology

Research Methodology This study was conducted to find out the effect of AI based E-testing on academic achievement and motivation of grade 8 students and its challenges and opportunities. The methodology discusses research design, population and sample, methods of data collection and procedures of data analysis. The study aims to understand students' experiences lived, perceptions and viewpoints. Thus, this study is a qualitative research.

This study is qualitative in nature since it deals with meanings, experiences and interpretations rather than with numerical measures. Qualitative research is employed when researchers want to explore how people perceive and experience a phenomenon in its natural environment (Creswell, 2014). Thus, this approach allows for a deeper understanding of students' experiences of AI-based e-testing systems.

Research Design

The study was designed as descriptive qualitative research. A descriptive design is used to gain detailed information on students' experiences, challenges, and opportunities with AI-based e-testing. It helps to understand how and why students respond to AI-based assessment systems in real classroom contexts.

Study Population

The study is based on the use or experience of Grade 8 students with AI-based e-testing systems in school settings. These students are the target group whose academic achievement and motivation are influenced by digital assessment practices.

Data Collection Instrument

Data for this study were primarily collected through semi-structured interviews. Semi-structured interviews were used as they are appropriate for qualitative research. They allow for flexibility in responses, but make sure that key topics are covered. The interview questions were mainly regarding students' experience, challenges, opportunities, academic achievement and motivation regarding the AI-based e-testing systems.

Data Collection Procedure

Data were collected through interviews with selected Grade 8 students in a school setting. Prior permission from the school authorities and the participants was obtained. The interviews are held in a relaxed environment, allowing students to freely express their experiences and opinions. All responses were recorded with permission for the purposes of accurate transcription and analysis.

Data Analysis Technique

The data are analyzed through thematic analysis. Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. Braun and Clarke (2006) claim that thematic analysis is a flexible and popular method for analyzing qualitative information.

The data are coded and organized into themes such as:

- Academic achievement
- Student motivation
- Challenges of AI-based e-testing
- Opportunities of AI-based e-testing

These themes helped in interpreting students' experiences and understanding the overall impact of AI-based e-testing systems.

Data Analysis and Findings

Theme 1: Improvement in Academic Achievement

The majority of the participants thought the AI-based e-testing had a positive impact on their academic performance. Students said that the instant feedback, quick correction of mistakes and better understanding of concepts helped them to improve their marks.

For example, Talha said the AI-based testing "helped me in English grammar by correcting my mistakes and explaining topics more efficiently." Similarly, Uzair said AI made it easier to learn difficult history dates.

Moreover, students reported that AI-based systems were helpful in terms of identifying weak areas and learning through repeated practice. Anabia said AI "makes my study better" and helps students to get immediate feedback to understand topics.

The findings favor the proposition that AI-based assessment systems are beneficial to Student Learning Outcomes (SLOs) through the enhancement of conceptual understanding and academic achievement.

Theme 2: Increased Motivation and Engagement

Another important theme was increased motivation and engagement. Most students characterized the AI-based testing as fun, interactive and interesting.

AI-based tests are "fun like a friendly competition," said Emania, while AI-based learning makes "understanding and work easy," said Uzair. Students liked the quick responses and interactive environment of AI-based systems.

Talha said the key to his improvement was seeing progress and receiving quick feedback. The results show that the AI-based e-testing makes the students more motivated because it creates an interesting learning environment compared to the traditional paper-based assessments.

Yet, not all students demonstrated complete motivation towards AI systems. Anabia said, "Sometimes the AI responses are not in line with our understanding." This implies that students may lose trust and engagement when they receive inconsistent feedback from AI.

Theme 3: Personalized Learning Opportunities

The students identified a number of opportunities that AI-based e-testing systems can offer. An important opportunity was self-paced learning. Students said they could practice topics according to their learning needs.

"AI-based testing allows me to practice and review topics whenever I need to," Talha said, while Emania said, "AI systems use adaptive learning paths." Students also stated that AI helped them identify weak areas through instant feedback and practice questions.

Another opportunity that was found was the availability of learning support. The AI tools were user-friendly and students enjoyed the immediate feedback, encouraging independent learning and self-correction.

The results indicate that AI-based e-testing systems can support personalized learning and enhance students' ability to monitor their own progress.

Theme 4: Technical and System Challenges

Generally, students had positive perceptions of AI-based e-testing. However, some challenges remained. The most common problems were internet connectivity issues.

Talha, Anabia, Emania, and Uzair all reported internet or technical difficulties while taking AI-based tests. Factors that interrupted students' assessment experience included slow internet, glitches and system distortion.

Some students also said they had difficulty understanding some of the questions or navigating the system. Talha said, "Sometimes, some questions are hard to understand." "The questions are overloaded and there is no time," said Anabia.

These results suggest that technical limitations can limit students' experiences and decrease the effectiveness of AI-based assessment systems in schools.

Theme 5: Confidence and Anxiety

The majority of students said they felt confident and comfortable with AI-generated tests. If assessments were corrected immediately and if they could easily understand the assessment, students said their fear of assessments would be lessened.

For instance, Talha said he felt confident because the AI "corrects my mistakes immediately." Anabia said she also feels "relaxed and assured while taking AI tests."

But there were also some worries about pressure and confusion. Students could find it frustrating at times when there were technical issues and vague questions. This implies that while AI-based e-testing alleviates the stress of traditional exams, system problems may also make some learners anxious.

Theme 6: Recommendations for Improvement

Students came up with a variety of useful ideas to improve AI-powered e-testing systems.

The most common suggestions were the following:

- Improved internet and tech support
- More easy explanations
- More classroom activities with AI

- Personalised feedback
- Interactive and gamified tests
- Video support for learning

Emania suggested making tests more fun by turning them into "game-like" activities, while Talha suggested "personalized feedback and interactive questions." Anabia suggested that topics should be broken into smaller subtopics to understand better.

These suggestions show that students like AI-based systems that are interactive, easy to understand, and technically trustworthy.

Discussion

In this chapter, the findings of the study are discussed in relation to the research objectives, theoretical framework and previous literature. The aim of this research was to investigate the effect of AI-based e-testing on the academic achievement and motivation of Grade 8 students, as well as the opportunities and challenges encountered by students during the use of AI-supported assessment systems. Results indicated positive experiences of students with AI-based e-testing and its impact on their learning, engagement and understanding of concepts. However, some technical and system issues had also been recognized.

The study results show that AI-based e-testing has positive impact on the academic performance of the students. The immediate feedback helped most of the participants to identify and correct their mistakes immediately. Students said that quick responses and multiple opportunities to practice helped them grasp concepts better and do better in subjects such as English, Mathematics and History. For example, Talha stated that AI-based testing helped him to improve his English grammar with instant correction and explanation of errors. Likewise, as Uzair said, AI helped him to learn historical dates and concepts better. The results are in line with the study of Hattie and Timperley (2007) who claim timely feedback is a great contributor to the learning outcomes and student achievement. These results are also in line with the findings of Luckin et al. (2016) who argued that AI-supported education systems improve students' academic performance through personalized learning support and adaptive feedback.

The use of AI-based e-testing also increased the motivation and engagement of students in the learning process. Most students described the AI-based tests as interactive, fun and less stressful compared to conventional paper-based tests. Testing through AI is "fun as a friendly competition," Emania said, and Uzair said learning through AI makes understanding easier. Students liked features such as instant scoring, quick responses and interactive learning environments. These findings offer compelling support for the Self-Determination Theory of Deci and Ryan (2000) that students are more motivated to learn when they feel competent, autonomous and engaged in learning activities. Instant feedback in this study increased competence, whereas self-paced learning opportunities enhanced autonomy. Thus, AI-based e-testing seems to create a more motivating learning environment for Grade 8 students.

The study also revealed that personalized learning could be achieved. AI-based e-testing helped students to identify their weak areas and practice topics as per individual needs, students reported. Talha said, "AI-powered testing allows me to come back to topics as needed," and Emania pointed to adaptive learning routes as a helpful aspect of AI systems. These results are consistent with the findings of Holmes et al. (2022), who claimed that AI in education facilitates learner-centered instruction by adapting content to students' performance and learning styles. The results are also consistent with Zimmerman (2002) who emphasized that self-regulated learning is enhanced when students can monitor and control their own learning progress.

The positive results were encouraging, but the study had several challenges. Internet connectivity and technical glitches were the most frequently reported problems by students. Four out of five participants mentioned problems like slow internet, distortion in the system or technical disruption during tests. Some students also said that some questions generated by AI are difficult to understand or are not quite in line with their concepts. For instance Anabia said, "Sometimes the answers of AI do not match with our concept." These results support the argument made by Selwyn (2019) that technological limitations and unequal digital access are still key barriers to the successful implementation of AI-based education systems.

The results also indicated that the majority of the students were confident about the use of AI-based tests but some students faced pressure due to technical issues or confusing questions. But overall anxiety was less than traditional exams as students felt AI-based systems were easy and supportive. The finding is partially supported by the findings of Elsayed et al. (2024) who found that teacher support and AI-assisted assessments can reduce exam-related anxiety and improve learning experiences.

Students also provided valuable suggestions for improving AI-based e-testing systems. Participants suggested better internet facilities, simplified explanations, individualised responses, gamification of learning and more interactive questions. Emania suggested the idea of gamifying tests, while Talha suggested adding more features of personalized feedback. These recommendations suggest students want AI systems to be engaging, trustworthy and understandable.

In summary, the findings of this study suggest that AI-based e-testing has a generally positive effect on the academic achievement and motivation of Grade 8 students. The system supports personalized learning, self-paced learning and instant feedback, which leads to improved learning. But technical issues, internet problems and sometimes the confusion with AI generated answers are still a big hurdle schools will need to overcome. Thus, the study concludes that the AI-based e-testing systems can be effective in supporting the Student Learning Outcomes (SLOs) when implemented with proper infrastructure, teacher guidance and student support.

Conclusion

This study investigated the effect of AI-based e-testing on the academic achievement and motivation of 8th grade students. The results of the study indicate the positive impact of the use of AI-based e-testing systems on students' learning experiences. Most students said AI-enabled assessments could help them better understand concepts, detect mistakes early on and perform better academically by receiving immediate feedback and opportunities to practice again.

The AI-based e-testing has also enhanced the students' motivation and engagement in learning. The system was found by students to be interactive, interesting, and easier to use than traditional paper based exams. The results showed that immediate feedback, fast response, adaptive learning and self-paced learning helped to increase students' confidence and interest in learning activities.

At the same time, the study also identified some challenges in AI-based e-testing. The most common issues were Internet connectivity, technical glitches, confusing questions and system interruption. Some students also reported that AI-generated answers were not always consistent with their understanding of concepts. These challenges indicate that the effectiveness of AI based e-testing largely depends on the technological infrastructure, digital literacy and appropriate implementation in schools.

The study findings further revealed the possibilities of AI-based e-testing for personalized learning and self-regulated learning. The students liked that they could work at their own pace and get immediate help on weak areas. Hence, AI based e-testing systems have high potential to improve Student Learning Outcomes (SLOs) with the help of effective educational strategies and technological resources .

The findings of the study concluded that the AI-based e-testing can be an effective educational tool to enhance the academic achievement and motivation of the Grade 8 students in general. But schools will have to overcome technical and instructional barriers to provide equal, reliable, and meaningful learning for all students.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Schools need to upgrade their internet and digital infrastructure so as to reduce the chances of technical glitches in AI-based exams. A stable internet connection and working devices are the prerequisites for a smooth assessment experience.
2. The teachers should give proper training and guidance to the students on how to use the AI based e-testing systems in a proper manner. Practice activities and orientation sessions will help students become more comfortable with digital assessments.
3. AI based e-testing systems should provide simplified explanation and clear instructions so that students can easily understand the questions and feedback.
4. To increase student engagement and motivation, schools should embed more interactive and gamified AI based assessments. Some features that can make assessments more fun for students are quizzes, rewards and visual learning activities.
5. AI systems should provide more personalized feedback to help students better identify their weaknesses and what they need to learn.
6. Educational institutions should provide AI-based e-testing for Student Learning Outcomes (SLOs) and not only objective testing but also conceptual understanding.

7. Teachers and schools should supplement AI-based assessments with traditional modes of learning to ensure continued development of independent thinking and problem solving skills.

8. Implications of the Study:

9. This study is significant to teachers, school administrators, policy makers and researchers. The results contribute to the understanding of the effects of AI-based e-testing on middle school students' learning experience and motivation. The findings of the study can serve as a guide for schools in improving their digital assessment practices and can also inspire policymakers to strengthen the technological infrastructure in educational institutions.

10. The study also adds to the growing literature on Artificial Intelligence in education especially with respect to school level students in Pakistan.

Limitations of the Study

There are some limitations of this study. First, the study was limited to five Grade 8 students and this limited the generalizability of the findings. Secondly, the research was based on qualitative responses and hence the results are based on students' perceptions and experiences not on numerical performance data. Third, the study was conducted in a small time and educational setting.

Suggestions for Future Research

Future researchers may investigate the AI-based e-testing using quantitative or mixed method with a larger sample size. More comparative studies of public and private schools may shed more light on the practices of AI-based assessment.

Future research can explore the effect of AI-based e-testing on different age groups, subjects and levels of education. Future research could also explore the teachers' views on the effectiveness of AI supported assessment systems in enhancing learning outcomes.

References

Chai, Q. (2026). A correlational study of AI usage, motivation, self-efficacy, and learning engagement in education: Based on expectancy-value theory. European Journal of Education, 61(2), e70633. https://doi.org/10.1111/ejed.70633

Dai, X., Wen, Z., Jiang, J., Liu, H., & Zhang, Y. (2025). How students use AI feedback matters: Experimental evidence on physics achievement and autonomy. arXiv. https://arxiv.org/abs/2505.08672

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Elsayed, A. M., Kholikov, A., & Abdullayeva, I. (2024). Teacher support in AI-assisted exams: An experimental study to inspect the effects on demotivation, anxiety management in exams, L2 learning experience, and academic success. Language Testing in Asia, 14(53). https://doi.org/10.1186/s40468-024-00328-7

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487

Holmes, W., Bialik, M., & Fadel, C. (2022). Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Center for Curriculum Redesign. https://curriculumredesign.org/artificial-intelligence-in-education/

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence Unleashed: An Argument for AI in Education. Pearson Education. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/about-pearson/innovation/open-ideas/Intelligence-Unleashed-Publication.pdf

OECD. (2019). Trends shaping education. Organisation for Economic Co-operation and Development. https://www.oecd.org/education

Pervaiz, Z., Bakar, A., & Saddique, S. (2025). Enhancing learning outcomes through AI-based tutoring systems: A study on student motivation and academic achievement. ACADEMIA International Journal for Social Sciences, 4(3), 5427–5449. https://doi.org/10.63056/ACAD.004.03.0805

Popenici, S., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. Research and Practice in Technology Enhanced Learning, 12(22). https://doi.org/10.1186/s41039-017-0062-8

Selwyn, N. (2019). Should Robots Replace Teachers? AI and the Future of Education. Polity Press. https://policy.bristoluniversitypress.co.uk/should-robots-replace-teachers

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. International Journal of Educational Technology in Higher Education, 16(39). https://doi.org/10.1186/s41239-019-0171-0

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. Theory Into Practice, 41(2), 64–70. https://doi.org/10.1207/s15430421tip4102_2

Appendices

AI-Based E-Testing Interview Questionnaire (Grade 8)

This questionnaire explores Grade 8 students' experiences, motivation, academic achievement, challenges, and suggestions regarding AI-based e-testing.

Section A: Basic Information

1. Participant's Name:
2. Your age:
3. Do you use AI-based e-testing in your school? Yes/No
4. Which subjects use AI-based tests?
5. How often do you take AI-based e-tests? Weekly/Monthly/Rarely

Section B: Experience

6. How do you feel when using AI-based tests? Why?
7. How is AI-based testing different from paper-based tests?
8. Is AI-based testing easy or difficult for you? Why?

Section C: Academic Achievement

9. Do AI-based tests help improve your marks? How?
10. Give one example where AI-based testing helped you learn better.
11. How does instant feedback help you improve your mistakes?

Section D: Motivation & Confidence

12. Do AI-based tests make learning more interesting for you? Why?
13. Do they make you more motivated to study? Why or why not?
14. Do you feel more confident during AI-based tests compared to paper tests? Why?

Section E: Opportunities

15. What is the best benefit of AI-based e-testing for you?
16. How does AI-based testing help you learn at your own speed?
17. How does it help you find your weak areas?

Section F: Challenges

18. What problems do you face during AI-based tests?
19. Do you face any technical issues (internet, device, system)? Explain.
20. Do you feel stressed or nervous during AI-based tests? Why?

Section G: Recommendations

21. What changes would make AI-based tests better for students like you?
22. What should teachers or schools do to improve AI-based testing?
23. If you could design AI-based tests, what would you add or change?
24. Is there anything else you want to share about your experience?