Implementing AI-Powered oral exams in Higher Education: Implications for plagiarism prevention and academic integrity

Gerard Miret. Universitat Abat Oliva CEU
ORCID: 0009-0000-1174-1451

Resum
L'article article analitza les oportunitats i els reptes que planteja la implementació d'exàmens orals potenciats amb intel·ligència artificial (IA) en l'educació superior, especialment pel que fa a la promoció del pensament crític i la prevenció del plagi. Tot i que la IA pot millorar l'eficiència de les avaluacions i personalitzar els exàmens orals, també presenta riscos importants, com la pèrdua d'interacció humana, la disminució de les habilitats de pensament crític i possibles biaixos algorítmics. L'article examina marcs conceptuals per a la integració de la IA, proposa estratègies innovadores per preservar la integritat acadèmica i defensa un enfocament híbrid que combini IA i avaluació humana. A més, s'assenyala la necessitat de recerca futura en l'impacte cognitiu de la IA, el desenvolupament de sistemes de detecció i l'establiment de marcs ètics per garantir una aplicació justa i responsable.

Paraules clau
exàmens orals, intel·ligència artificial, pensament crític, integritat acadèmica, educació superior, plagi, avaluació digital

Abstract
The article explores the opportunities and challenges of implementing AI-powered oral exams in higher education, focusing on their role in fostering critical thinking and preventing plagiarism. While AI can enhance assessment efficiency and personalize oral exams, it also presents significant risks, including reduced human interaction, diminished critical thinking skills, and algorithmic bias. The article reviews conceptual frameworks for AI integration, proposes innovative strategies to uphold academic integrity, and advocates for a hybrid approach that combines AI with human evaluation. Additionally, it highlights future research directions related to the cognitive impact of AI, detection tools, and the development of ethical frameworks to ensure fair and responsible implementation.

Keywords
oral exams, artificial intelligence, critical thinking, academic integrity, higher education, plagiarism, digital assessment

1. Introduction

1.1 The Growing Use of AI in Higher Education: A Brief Overview

The integration of Artificial Intelligence (AI) in higher education is no longer a futuristic concept but a rapidly expanding reality. From personalized learning platforms to AI-driven tutoring systems, AI applications are becoming increasingly diverse and sophisticated (Al-Zahrani, 2024). This rise in AI adoption is driven by its potential to enhance learning outcomes, streamline administrative processes, and offer students more personalized and engaging educational experiences (Chu et al., 2024). Institutions are exploring AI's use to automate tasks such as exam grading, student support, and curriculum development, allowing educators to focus on more strategic and creative aspects of teaching (Hassan et al., 2022).

Moreover, AI plays a fundamental role in expanding access to education, particularly for students with disabilities or those in remote areas. AI-based tools can provide real-time language translation, adaptive learning modules, and virtual learning environments tailored to diverse educational needs (Laupichler et al., 2022). As AI technology continues to evolve, its role in higher education is expected to grow exponentially, making it essential to take a proactive approach to understanding its implications and leveraging its benefits while mitigating potential risks (McKinsey and Company, 2023). The challenge lies in effectively integrating AI within the educational ecosystem in a way that complements human instruction and fosters critical thinking (UNESCO, 2021).

1.2 The Importance of Critical Thinking in Contemporary Education

In an era dominated by instant access to information and rapidly evolving technologies, critical thinking has become an essential skill for students. Critical thinking enables individuals to analyze information objectively,

evaluate arguments, identify biases, and formulate well-reasoned judgments (Wang et al., 2022). It goes beyond mere memorization and recall, encouraging students to question assumptions, explore alternative perspectives, and solve complex problems. As AI tools like ChatGPT become more widespread, the ability to think critically is even more crucial to discern reliable information from misinformation and to use AI as a tool rather than be replaced by it (Zawacki-Richter et al., 2019).

Additionally, critical thinking fosters creativity, innovation, and adaptability—qualities highly valued in today's job market. Educators must prioritize the development of critical thinking through engaging pedagogical approaches such as problem-based learning, case studies, debates, and collaborative projects (Laupichler et al., 2022). By enhancing these skills, higher education institutions can empower students to become informed citizens, effective problem-solvers, and lifelong learners capable of thriving in an ever-changing world. Therefore, the integration of AI in education must be carefully managed to enhance, rather than diminish, these essential cognitive skills (Hassan et al., 2022).

1.3 The Role of Oral Exams in Assessing Critical Thinking

Traditional assessment methods, such as written exams and essays, are often insufficient for measuring students' critical thinking abilities. Instead, oral exams provide a dynamic and interactive platform to evaluate students' depth of understanding, analytical skills, and ability to articulate ideas coherently (Wang et al., 2022). In an oral exam, students must respond to questions in real time, defend their arguments, and engage in critical discussions with examiners. This format encourages them to think quickly, apply their knowledge to new situations, and demonstrate their ability to synthesize information from various sources.

Furthermore, oral exams offer valuable opportunities for examiners to explore students' level of understanding, identify areas for improvement, and provide

personalized feedback. They also enhance communication skills, active listening, and the ability to engage in constructive dialogue—essential qualities for professional success (Zawacki-Richter et al., 2019). As AI tools become more sophisticated, oral exams can serve as a robust assessment method that is difficult to replicate or automate, ensuring that students are evaluated based on their genuine understanding and critical thinking abilities (Laupichler et al., 2022). Incorporating oral exams into assessment strategies can help higher education institutions foster a culture of intellectual rigor and prepare students for the challenges of the 21st century (McKinsey and Company, 2023).

2. Academic review

2.1 The Concept of Critical Thinking

Critical thinking is a fundamental skill in higher education that involves the ability to analyze, evaluate, and synthesize information (Nitze, 2023). It encompasses cognitive processes such as examining arguments, identifying assumptions, and drawing logical conclusions. The importance of critical thinking extends beyond academia, as it is essential for problem-solving, decision-making, and managing complex issues in both professional and personal life (Eachempati et al., 2025).

Theoretical frameworks provide a structure for understanding and developing critical thinking skills. Bloom's Taxonomy, a widely recognized model, categorizes cognitive skills into six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation (Nitze, 2023). This hierarchical structure guides educators in designing assessments that foster higher-order thinking skills.

The Paul-Elder model offers another perspective, focusing on elements of thought such as purpose, questions, and assumptions (Eachempati et al., 2025). This approach emphasizes the importance of clarity, accuracy, and depth in reasoning, providing a comprehensive methodology for developing critical thinking.

2.2 AI and Its Impact on Learning

Artificial Intelligence (AI) has become a transformative force in education, offering both opportunities and challenges. AI-powered tools can provide personalized feedback, automate exam grading, and grant students access to vast amounts of information (Hung et al., 2024). However, integrating AI into learning environments presents a double-edged sword.

While AI can enhance learning experiences through adaptive technologies and instant feedback, it also raises concerns about potential drawbacks. These include excessive reliance on AI for tasks students should perform independently, which may hinder the development of critical thinking skills. Additionally, there is a risk that students may become less engaged in analytical thinking and overly dependent on AI-generated answers.

2.3 AI and Assessment: A Critical Analysis

AI-powered assessment tools, such as Automated Essay Scoring (AES) systems and AI-driven proctoring platforms, have gained significant traction in educational settings, offering efficiency and scalability in evaluating student performance (Nitze, 2023). These technologies promise to revolutionize assessment by providing rapid feedback and managing large volumes of student work. However, their implementation is not without criticism and substantial concerns.

Issues of validity and reliability are at the core of the debate over AI-mediated assessments (Schön et al., 2023). Serious doubts exist regarding whether these tools can accurately measure intended learning outcomes, particularly for complex skills like critical thinking and creativity. For instance, a study by the International Society for Technology in Education found that 30% of teachers believed AI assessments were incapable of measuring critical thinking skills (Nitze, 2023).

The potential bias in AI algorithms is another critical concern, as it may unfairly favor or disadvantage certain demographic groups (Nitze, 2023). AI systems may inadvertently penalize students from diverse backgrounds due to challenges in processing nuanced language use and cultural references, thus exacerbating existing educational inequalities.

Furthermore, the lack of transparency in AI decision-making poses significant challenges for educators attempting to understand and justify assessment results (Hung et al., 2024). The "black box" nature of many AI systems makes it difficult for teachers to explain how grades are determined—an essential aspect of providing constructive feedback and maintaining trust in the evaluation process.

2.4 Oral Exams in the AI Era

Oral exams have experienced a resurgence as a method for assessing critical thinking skills in the AI era (Nitze, 2023). This format offers unique advantages in evaluating students' ability to articulate complex ideas, defend arguments, and demonstrate a deep understanding of the subject matter in real-time (Eachempati et al., 2025). Oral exams encourage active participation and can reveal nuances in students' comprehension that might go unnoticed in written assessments.

The dynamic nature of oral exams allows for immediate follow-up questions and clarifications, providing a more comprehensive view of students' knowledge and reasoning skills. This format can be particularly effective for assessing higher-order thinking skills and the application of knowledge to real-world situations.

However, conducting and evaluating oral exams presents significant challenges (Eachempati et al., 2025). Time constraints are a key factor, as oral exams typically require more time per student compared to written assessments. This can be particularly problematic in large classes or institutions with limited resources.

Subjectivity in grading is another concern, as different examiners may interpret responses differently or be influenced by factors unrelated to the student's actual knowledge. To mitigate this, specific training for examiners is necessary to ensure consistency and objectivity across multiple assessments.

Moreover, oral exams may disadvantage students with anxiety or communication difficulties, potentially leading to an inaccurate representation of their true abilities. Institutions must consider how to provide accommodations and support to ensure a fair assessment for all students.

2.5 Integrating AI into Oral Exams: Opportunities and Risks

The integration of AI into oral exams presents intriguing potential benefits that could enhance the assessment process (Hung et al., 2024). AI-generated questions, tailored to each student's knowledge level, could provide a more personalized and adaptive exam experience, allowing for a more accurate evaluation of individual understanding and abilities.

Automatic transcription and AI-based response analysis could significantly streamline the grading process and provide objective feedback (Hung et al., 2024). This could help address some of the time constraints associated with traditional oral exams and potentially reduce human bias in evaluation.

However, the risks associated with AI integration in oral exams are considerable and require careful analysis. One of the most pressing concerns is the potential erosion of human interaction and personalized feedback, which are fundamental elements of oral examinations. The nuanced understanding and empathy that human examiners bring to assessments cannot be easily replicated by AI systems.

Reliance on technology may introduce or exacerbate algorithmic biases, potentially creating unfair advantages or disadvantages for certain students (Nitze, 2023). For instance, AI systems may struggle with accents or speech patterns from diverse linguistic backgrounds, leading to inaccurate

transcriptions or misinterpretations of responses.

Ethical concerns also arise regarding data privacy and security when considering the collection and analysis of student responses (Hung et al., 2024). Recording and processing oral exams through AI systems raise questions about data ownership, storage, and potential misuse of information. Institutions must ensure that strong safeguards are in place to protect student data and maintain the integrity of the examination process.

Finally, there is a risk of excessive dependence on AI-generated metrics, which may not fully capture the complexity of a student's understanding or communication skills. Educators must be cautious not to reduce the richness and multidimensionality of oral exams to a set of quantifiable data points that could overlook important qualitative aspects of student performance.

2.6 Addressing Challenges: Innovative Strategies

To tackle these challenges, universities can implement innovative strategies. Designing AI-resistant tasks that focus on application, synthesis, and evaluation of knowledge can help maintain the integrity of assessments (Nitze, 2023). Incorporating real-world scenarios and complex problem-solving exercises can further enhance the effectiveness of oral exams in evaluating critical thinking skills.

Encouraging critical engagement with AI is essential. Educators should teach students how to critically assess AI-generated content and promote the ethical use of these tools. This approach not only prepares students for a technology-driven world but also reinforces the importance of human critical thinking.

Combining AI with human expertise offers a balanced approach. Using AI for initial assessment and feedback, followed by human evaluation, allows for the strengths of both systems to be leveraged (Hung et al., 2024). Training educators in the effective use of AI tools is crucial for successful implementation.

2.7 The Conceptual Framework for AI Assistants in Higher Education

Schön et al. (2023) propose a conceptual framework for integrating AI assistants in higher education, focusing on the interaction between humans, learning processes, and organizational factors (Foley et al., 2025). This framework provides a comprehensive approach to understanding the impact of AI on educational systems.

Applying this conceptual framework to oral exams highlights potential areas where AI can enhance assessment processes while also revealing challenges that need to be addressed. For example, AI could help analyze students' responses to identify patterns and depth of understanding, but the human element remains essential for interpreting nuanced communication and providing contextualized feedback (University of Sydney, n.d.).

By using this framework to guide the development of AI integration strategies, universities can adopt a more holistic approach to incorporating AI in oral exams while maintaining the integrity and effectiveness of critical thinking assessments.

3. Challenges

3.1 Erosion of Critical Thinking Skills

The implementation of AI in oral exams to assess critical thinking skills paradoxically risks eroding these very skills in students. Critical thinking, a crucial skill for career success, involves analyzing information, evaluating its reliability, and making judgments based on it (Paul, 1993). However, the integration of AI in assessment processes may inadvertently lead to a reduction in students' cognitive engagement and depth of reasoning.

A 2024 study by Stadler et al. found that while AI use for research reduced cognitive load and simplified answer-finding for university students, it also

weakened reasoning and reduced the depth of engagement that comes with searching through diverse sources and critically evaluating them (Stadler et al., 2024). This finding raises concerns about the long-term impact of AI-assisted learning on students' critical thinking abilities.

Moreover, the ease of access to AI-generated responses may create a dependency that hinders the development of independent thought. Students might become reliant on AI for formulating answers, potentially stunting their ability to engage in spontaneous, creative problem-solving during oral exams. This reliance could lead to a superficial understanding of complex topics, as students may prioritize quick, AI-generated responses over deep, reflective thinking.

To mitigate this risk, universities must design AI-assisted oral exams that explicitly challenge students to go beyond surface-level understanding. This could involve incorporating follow-up questions that require students to apply concepts to novel situations or defend their reasoning in real-time, skills that are essential in a rapidly changing technological era where mere memorization or AI-assisted responses are no longer sufficient (Eachempati et al., 2025; Nelson, 2024).

3.2 Academic Integrity Concerns

The integration of AI in oral exams raises significant academic integrity concerns. As AI technologies become more sophisticated, there is an increased risk of students using AI-powered tools to generate responses during oral exams, potentially compromising the authenticity of their performance.

The rise of AI in education has already escalated concerns about the authenticity of student work, particularly in relation to written assignments influenced by AI-powered tools (Eachempati et al., 2025). This challenge extends to oral exams, where students might attempt to use AI-generated content or real-time AI assistance during the examination process.

To address these concerns, universities must develop robust strategies to ensure the integrity of AI-assisted oral exams. This may involve implementing strict proctoring measures, designing questions that require personal insights and experiences, and using AI detection tools to identify potential instances of AI-generated responses.

Furthermore, institutions need to foster a culture of academic integrity that emphasizes the value of original thinking and authentic engagement with course material. This cultural shift is crucial in an era where technology can assist or even bypass traditional assessment methods (Eachempati et al., 2025).

3.3 Validity and Reliability of AI Assessments

The validity and reliability of AI-assisted assessments in oral exams present another significant challenge for universities. While AI has the potential to enhance the assessment process, ensuring that these assessments accurately measure critical thinking skills and provide consistent results across different students and contexts is complex.

One of the primary concerns is the potential bias in AI algorithms. AI systems are trained on datasets that may contain inherent biases, which could lead to unfair assessments of certain student groups. For instance, AI might struggle to accurately interpret responses from students with diverse linguistic backgrounds or those who express ideas in non-standard ways.

Moreover, the dynamic nature of oral exams, where follow-up questions and discussions often arise spontaneously, poses a challenge for AI systems. The ability of AI to adapt to the nuanced and context-dependent nature of human conversation in real-time is still limited, potentially affecting the accuracy of assessments.

To address these challenges, universities must invest in rigorous testing and validation of AI assessment tools. This includes conducting comparative studies between AI and human assessors, regularly updating AI algorithms to

reduce bias, and implementing human oversight to ensure fair and accurate evaluations (Peregrine Global, n.d.).

3.4 The Role of Humans vs. AI

Determining the appropriate balance between human involvement and AI assistance in oral exams is a critical challenge for universities. While AI can offer efficiency and consistency in certain aspects of assessment, the nuanced understanding and adaptability of human examiners remain invaluable.

Human examiners bring unique qualities to the assessment process, such as the ability to pick up on subtle cues, adapt questions based on student responses, and provide immediate, contextual feedback. These qualities are particularly important in assessing critical thinking skills, which often involve complex, multifaceted reasoning that may not be easily quantifiable by AI systems (Paul, 1993).

However, AI can complement human examiners by providing data-driven insights, reducing administrative burden, and offering a standardized baseline for assessments. For instance, AI-powered platforms could assist examiners by generating tailored questions based on a student's written work, ensuring that the oral examination probes specific areas of doubt or interest (Eachempati et al., 2025).

The challenge for universities lies in striking the right balance between human expertise and AI assistance. This balance may vary depending on the specific context, subject matter, and learning objectives of each oral exam. Institutions must develop frameworks that leverage the strengths of both human examiners and AI technologies while mitigating their respective limitations (Nelson, 2024).

4. Innovative strategies

4.1 Designing AI-Resistant Tasks

Universities face the challenge of creating assessment tasks that are resistant to AI-generated responses while still effectively evaluating students' critical thinking skills. One approach is to design questions that require personal experiences, real-time analysis, or application of knowledge to novel situations (Cohen, 2025). These tasks should emphasize the integration of multiple perspectives and the ability to synthesize information from diverse sources, which are skills that current AI systems struggle to replicate convincingly.

Another strategy is to incorporate elements of unpredictability or contextual nuance into oral exams. For instance, examiners could present students with ambiguous scenarios or conflicting information, requiring them to navigate uncertainty and demonstrate adaptive reasoning (Aithal & Silver, 2023). This approach not only tests critical thinking but also assesses students' ability to articulate their thought processes clearly, a skill that remains distinctly human.

4.2 Promoting Critical Engagement with AI

Rather than viewing AI as a threat to academic integrity, universities can leverage it as a tool for enhancing critical thinking skills. By encouraging students to critically engage with AI-generated content, institutions can foster a deeper understanding of both the capabilities and limitations of AI systems (Agarwal et al., 2023). This approach involves teaching students to evaluate AI outputs, identify potential biases or errors, and use AI-generated information as a starting point for further inquiry and analysis.

Incorporating AI literacy into the curriculum can help students develop the skills necessary to navigate an AI-augmented world. This includes understanding how AI algorithms work, recognizing the ethical implications of AI use, and learning to ask probing questions that go beyond surface-level information

(Forbes Tech Council, 2024). By doing so, universities can prepare students to be discerning consumers and producers of knowledge in an increasingly AI-driven society.

4.3 Combining AI with Human Expertise

The most promising approach to assessing critical thinking skills during oral exams may lie in combining AI capabilities with human expertise. This hybrid intelligence system can leverage the strengths of both AI and human examiners to create more comprehensive and nuanced assessments (Agarwal et al., 2023). For example, AI could be used to analyze speech patterns, identify logical inconsistencies, or provide real-time data to support the examiner's questions, while human examiners focus on evaluating the depth of understanding, creativity, and ethical reasoning.

However, implementing such a system requires careful consideration of potential biases and the need for transparency in the assessment process. Universities must ensure that the use of AI in oral exams does not inadvertently disadvantage certain groups of students or reinforce existing biases (Agarwal et al., 2023). Additionally, clear guidelines must be established regarding the weight given to AI-generated insights versus human judgment in the final assessment.

By adopting these innovative strategies, universities can address the challenges posed by AI in assessing critical thinking skills during oral exams while also preparing students for a future where human-AI collaboration is increasingly common. The key lies in embracing AI as a tool for enhancing, rather than replacing, human critical thinking and expertise.

5. Future research directions

5.1 Longitudinal Studies on the Impact of AI on Critical Thinking

Long-term studies are crucial to understand how AI tools influence students' critical thinking abilities over time. These studies should examine whether AI-assisted learning enhances or hinders the development of critical thinking skills. For instance, a recent study found that increased use of AI tools is associated with lower critical thinking skills (Societies, 2025). However, more comprehensive research is needed to establish causal relationships and identify potential mediating factors.

5.2 Development of More Robust AI Detection Tools

As AI technology advances, universities face the challenge of distinguishing between genuine student responses and AI-generated content during oral exams. Future research should focus on developing sophisticated AI detection tools that can accurately identify AI-assisted responses in real-time. This is particularly important given the increasing sophistication of AI language models.

5.3 Exploration of AI in Adaptive Learning and Personalized Feedback

AI-powered adaptive learning systems have shown promise in personalizing educational outcomes (Gupta et al, 2024). Future research should investigate how these systems can be integrated into oral exams to provide tailored questions and real-time feedback. This could potentially enhance the assessment of critical thinking skills by adapting to individual student strengths and weaknesses.

5.4 Ethical Frameworks for AI in Education

The use of AI in educational assessment raises important ethical considerations. Research is needed to develop comprehensive ethical frameworks that address issues such as data privacy, algorithmic bias, and the potential for AI to exacerbate existing inequalities in education. These frameworks should guide universities in implementing AI-assisted oral exams responsibly and equitably (Ethical AI in Education, n.d.; OCED, n.d.).

5.5 Case Studies of Successful AI Integration in Oral Exams

Documenting and analysing successful implementations of AI in oral exams can provide valuable insights for universities. Case studies should examine how institutions have overcome challenges and leveraged AI to enhance the assessment of critical thinking skills. For example, the development of AI-powered oral assessment tools like "Socratic Mind" demonstrates the potential for AI to support Socratic questioning methods in exams (Georgia Institute of Technology, 2024).

In conclusion, while AI presents significant opportunities for enhancing oral exams and assessing critical thinking skills, it also poses challenges that require careful consideration and further research. By addressing these future research directions, universities can work towards harnessing the potential of AI while mitigating its risks in educational assessment.

6. Discussion

6.1 Synthesis of Findings

The integration of AI in assessing critical thinking skills during oral exams presents both opportunities and challenges for universities. Research indicates

that AI tools can enhance assessment efficiency and provide personalized feedback (Gerlich, 2025). However, there are concerns about the potential erosion of critical thinking skills due to increased reliance on AI (Gerlich, 2025). The study by Gerlich (2025) found a significant negative correlation between AI tool usage and critical thinking scores ($r = -0.68$, $p < 0.001$), suggesting that frequent AI users exhibited diminished ability to critically evaluate information and engage in reflective problem-solving.

6.2 Implications for Higher Education

1. **Transforming assessment practices.** Universities must rethink traditional assessment methods to mitigate the misuse of AI tools while leveraging their benefits (Mislevy et al., 2012; Swiecki et al., 2022). AI-powered assessment tools can automate grading, personalize tests, and offer real-time insights into student progress (Infosys BPM, 2020). However, institutions must balance these advantages with the need to maintain academic integrity and foster critical thinking skills.
2. **Changing roles of educators.** The role of educators is evolving with the integration of AI in assessment. While AI can support teachers in administrative tasks, allowing them to focus on student-centered aspects of their work (European Commission, 2023), it also requires educators to develop new competencies in AI literacy and ethical considerations. UNESCO recommends that educational stakeholders be aware of AI assessment tools and solutions, adjusting curricula to integrate AI where benefits clearly outweigh risks (European Commission, 2023)4.
3. **Preparing students for an AI-driven world.** Universities face the challenge of preparing students for a world where AI is increasingly prevalent. This involves not only teaching students how to use AI tools effectively but also developing their critical thinking skills to evaluate AI-generated information critically. The study by Gerlich (2025) suggests that education may mitigate some cognitive impacts of AI reliance, highlighting the importance of emphasizing critical thinking exercises and metacognitive skill development.

6.3 Ethical Considerations

The use of AI in assessing critical thinking skills during oral exams raises ethical concerns regarding privacy, fairness, and transparency. Universities must address issues such as algorithmic bias and lack of transparency in AI recommendations, which were frequently mentioned by participants in Gerlich's study (2025). Ensuring that AI-powered assessment tools are unbiased and respect student privacy is crucial for maintaining trust in the assessment process.

6.4 Balancing AI Integration and Human Judgment

While AI can provide valuable insights and efficiency in assessment, universities must strike a balance between AI integration and human judgment. The European Commission (2023) emphasizes that AI should support teachers rather than replace them. This balance is particularly important in assessing critical thinking skills during oral exams, where nuanced human interpretation of responses may be crucial.

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