

Understanding AI Literacy for Higher Education Students: Implications for Assessment

Symposium Theme: Theory

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Abstract

The level of AI literacy among New Zealand's learners varies significantly. The use of AI tools in assessments also shows a lack of consistency in ethical and responsible usage. This paper aims to lay the groundwork for understanding AI literacy and the ethical use of AI tools in assessments. The research has practical implications for educators, policymakers, and students. Currently, existing AI literacy frameworks have not been empirically tested, so the true nature of AI literacy in New Zealand is largely unknown. The authors propose a comprehensive study to evaluate and enhance AI literacy among higher education learners using a mixed-methods approach. This includes conducting a survey to assess students' familiarity with AI concepts, practical application skills, and understanding of ethical considerations within assessments. The survey findings are expected to illustrate the impacts of AI technologies on assessment equity, access, and quality. This will contribute to the development of a theory on the effective and ethical use of AI tools in academic assessments.

Focus areas: AI Literacy, Equity in Education, Innovative Educational Practices, Assessment Policy

Introduction

As artificial intelligence (AI) technologies become increasingly integrated into educational settings, understanding AI literacy—the cognitive and technical knowledge and skills necessary to interact with AI—is a crucial yet under-explored area for students and educators (Kong et al., 2023). In higher education, assessments certify a student's competency in their chosen discipline and guide employers in their ability to perform to a certain level.

A growing body of research highlights the cognitive, affective, and behavioural benefits of AI-powered learning tools (Kong et al., 2021; Yim & Su, 2024). These tools can provide autonomous support to students in various aspects of their learning while assisting educators in management and supervisory tasks (Cassidy et al., 2023) and delivering engaging classes (Chen et al., 2024). However, adopting AI in education raises critical ethical questions, such as data privacy, algorithmic bias, academic misconduct and the impact on learning, for example, offloading cognitive tasks to generative AI (Cassidy et al., 2023). International experts have underscored the need to develop robust research that can inform the design and implementation of AI literacy curricula for students who will be entering a profoundly changed labour market driven by AI (Steinbauer et al., 2021; Wang & Lester, 2023). Kong emphasises the importance of “fostering artificial intelligence (AI) literacy for all citizens” (2023, p. 16), given that AI is relevant to all our lives and work.

Against this backdrop, in this paper, the authors provide the rationale for and initial design of a study to examine the current state of AI literacy among higher education students, which will investigate their understanding and use of AI technologies in assessments, as well as the ethical considerations they grapple with. The focus on assessment is fundamental in this study to support an understanding of how learners can apply AI skills and competencies to learn and demonstrate their learning in a transparent and authentic way.

Student Utilisation of AI Tools in Assessment

Globally reported use of generative AI in student assessment submissions ranges from low to moderate. The University of Melbourne reports that 10% of students they surveyed admitted to

using AI tools to produce content submitted for assessment (Byrnes, 2024). A study of 400 higher education students reveals moderate usage of generative AI in assessments (Smolensky et al., 2023). In the UK, the Higher Education Policy Institute reports that 53% of undergraduates use AI to generate material for work they would be marked on (Adams, 2024). Students use AI tools in various ways in their assessments, such as enhancing language proficiency, writing assistance, data analysis, and personalised learning support (Smolensky et al., 2023; Sullivan et al., 2023). Gamage et al. (2023) claim that AI-powered tools can enhance student productivity by providing easy access to valuable information and resources, offering tailored content, giving feedback on drafts of work, and suggesting improvements without interacting with a lecturer. AI tools can also promote more inclusive educational practices (Sappaile et al., 2024), catering for diverse learning needs and allowing, for instance, students who are overwhelmed to complete assignments and essays within a very short timeframe (Gamage et al., 2023). A Studiosity report reveals that while 'speed' is the main reason students use AI tools in many countries, New Zealand students cite 'confidence' above speed (YouGov, 2024). Other reasons students use AI in assessments include avoiding burdening others, pressure to perform to the same level as peers, assessments deemed too complicated, and studying in a competitive academic environment (Byrnes, 2024; Gamage et al., 2023). However, research highlights that while students often find AI tools beneficial, there are mixed feelings about the impact of AI tools on assessments (Perkins et al., 2024) and a need for a greater understanding of how to use them effectively and ethically within the context of assessments (Mohamed, 2024). Smith highlights that students are confused about what AI is and how it can be used in their context and goes on to claim that 57% of students want their university to innovate and provide AI support (YouGov, 2024). Without sufficient levels of AI literacy, students may rely too heavily on these tools, thus undermining the learning process, hindering the development of key academic and professional skills and raising concerns about the validity of assessments (Gamage et al., 2023). Additionally, students may use tools that are not fit for purpose, contain inaccuracies or factual errors (Gamage et al., 2023), or are based on outdated information, leading to suboptimal outcomes that do not accurately reflect their true understanding and capabilities. Developing AI literacy is, therefore, crucial to ensure students can leverage these technologies responsibly and transparently within their assessments.

Many institutions are focusing efforts at the 'bottom of the cliff' by using punitive detection tools, as opposed to raising the AI literacy of learners. However, detection tools are being increasingly scrutinised for their inaccuracies in detecting AI-generated content. Chaka (2023) tested the accuracy of five AI content tools, revealing that they are not at a level that can accurately differentiate and are not yet fully ready to accurately and convincingly detect AI-generated content. Perkins et al. (2024) employed various adversarial techniques to circumvent detection tools and discovered that the tool's accuracy decreased to 22.4% over 797 valid tests. In addition to the challenges posed by AI detection tools, Perkins et al. (2024) suggest that using these tools has implications for inclusivity, equality, and integrity. They state that students without AI literacy and access to these tools will be penalised for incorporating AI tools into their work. In contrast, students with knowledge of adversarial techniques and access to higher-quality AI tools that bypass detection will not be caught. Furthermore, Dalalah and Dalalah (2023) highlight the challenges of false positives and negative detection of AI-generated content, calling for detection tools to be enhanced. Similarly, AI-generated content detectors have been known to misclassify work by non-native English students (Liang et al., 2023). The University of Reading conducted the first-of-its-kind real-world study where 100% AI-generated assessments were submitted to undergraduate courses (Scarfe et al., 2023). 94% of the studies were undetected, and the grades awarded to the AI submissions were,

on average, half a grade boundary higher than human-generated content. Thus, they pose questions for educators to discern the integrity of submitted work.

The literature demonstrates that we cannot reliably detect AI-generated content. At the same time, students are graduating into a world where employers expect them to use AI tools in their work. According to Perkins et al. (2024), the way forward is for educators to enable students to be ethical and transparent in their use of AI tools for assessment. However, a challenge is that students do not understand the intricacies of using AI tools and, therefore, require AI literacy.

Importance of AI Literacy in Education

AI literacy is increasingly recognised as essential in modern education. Hwang et al. (2020) argue that AI literacy equips students with the skills to understand and leverage AI technologies, fostering critical thinking and problem-solving abilities. Furthermore, AI literacy helps students navigate AI's ethical and societal implications, preparing them for future challenges.

AI Literacy Frameworks

AI literacy encompasses a range of competencies, from basic awareness to advanced application and creation of AI technologies. A wide range of frameworks throughout various educational domains are being developed to identify AI literacy levels and support learners. Su (2024) created an AI literacy framework and assessment for kindergarten children (AI4KGA), arguing that early identification of literacy levels can bridge the digital divide and create opportunities for diverse learners. The framework comprises five elements approved by a range of AI experts: perceptions, representation and reasoning, learning, natural interaction, and societal impact. Another framework proposed by Long and Magerko (2020) also identifies five themes of AI literacy, expressed in a series of questions: What is AI? What can AI do? How does AI work? What should AI do? And how do we perceive AI? In line with the elements proposed by Su (2024), these competencies reflect the need for students to understand AI fundamentals and critically evaluate AI technologies, communicate effectively with AI systems, and consider the ethical implications of AI use. In higher education Allen and Kendeou (2024) have included six components in their AI literacy framework: knowledge, evaluation, collaboration, contextualisation, autonomy, and ethics. The increase in components claims a more holistic approach to understanding how AI literacy is reflected in students' learning and understanding of concepts (Gustus, 2017).

In a New Zealand context, MacCallum et al. (2023) outline four levels of AI literacy: Awareness, Use and Apply, Analyse and Evaluate, and Create. This framework has been built on a Delphi study, a robust method for gathering diverse expert perspectives. By working with 17 AI experts, this study drew upon a wealth of experience and diverse viewpoints to develop a comprehensive framework for AI literacy. The Delphi approach is particularly valuable in emerging fields like AI, where there may be a lack of established models or standards. Through this iterative process, the researchers were able to distil the key components of AI literacy, providing a valuable foundation for assessing students' competencies in this area.

Ethical requirements for AI literacy

The ethical use of AI in education is a significant concern. Issues such as data privacy, algorithmic bias, and the potential for AI to exacerbate inequalities are critical areas of focus. As Liang et al. (2023) note, fostering AI literacy includes teaching students to recognise and mitigate these ethical challenges. Integrating AI literacy into educational assessments is essential for building students' confidence and competency with AI technologies, thereby bridging gaps in access and usage (Chaudhari, 2021; Kalyani, 2023).

While several frameworks have been proposed for AI literacy, they have not been empirically validated within New Zealand's higher education system (Allen & Kendeou, 2024; MacCallum et al., 2023). Additionally, there is a lack of research specifically focusing on how AI literacy impacts the ethical use of AI tools in assessments and the resulting implications for assessment equity and quality (Faruque et al., 2022). This gap underscores the need for a comprehensive study to empirically test AI literacy frameworks and investigate AI use's practical and ethical implications in academic assessments. Understanding these dynamics can inform the development of targeted interventions to enhance AI literacy, ensuring that students are equipped to use AI tools responsibly and transparently in their educational pursuits.

Research Questions

The proposed study aims to address four important research questions.

1. How do learners in higher education institutions currently utilise AI in their assessments?
2. Why are students using AI tools in their assessments?
3. Based on the framework by MacCallum et al., what are the current levels of AI literacy among higher education students?
4. How effective is the AI literacy framework in identifying gaps in students' understanding and use of AI in assessments?

Research Design

Several studies have conducted surveys with participants to evaluate AI literacy (Long & Magerko, 2020; Ng et al., 2021). In the proposed study, a survey will be distributed to New Zealand higher education students, encompassing questions aligned with the AI literacy framework to discover self-reported evaluation of AI literacy. Respondents to the survey will share how they use generative AI in their assessments and why they are using the tools. To understand AI literacy levels, the questions will be guided by the AI literacy framework proposed by MacCallum et al. (2023). The survey will cover three categories: AI Concepts, Application of AI and Technical Skills, and Issues, Challenges, and Opportunities. It will use both quantitative (Likert scales, multiple-choice) and qualitative (open-ended) questions.

Data Gathering and Analysis

The proposed study uses mixed methods to comprehensively assess AI literacy among higher education students. Quantitative data from Likert scale and multiple-choice questions will be statistically analysed to identify patterns and correlations in AI usage and literacy levels. Qualitative data from open-ended questions will be analysed using thematic analysis to uncover underlying reasons for AI tool usage and to identify specific challenges and opportunities related to AI literacy. The integration of these methods will offer valuable insights into the current state of AI literacy and the effectiveness of the proposed framework in identifying gaps in students' understanding and use of AI in assessments.

Significance and Expected Outcomes

This study has significant implications for higher education, especially in improving AI literacy among students as AI technologies become more prevalent in educational practices. It aims to understand and enhance students' skills in using AI tools effectively, ethically, and transparently. The study will provide insights into how and why students use AI tools in their assessments, helping educators tailor support and resources to meet students' needs effectively.

One of the primary expected outcomes of this research is to establish a baseline understanding of AI literacy among higher education students in New Zealand. This will encompass their knowledge of fundamental AI concepts, their technical skills in applying AI, and their comprehension of ethical considerations associated with using AI in assessments. Establishing this baseline will provide valuable insights into the current state of AI literacy and identify areas that require further development.

The findings from this study will inform the development of targeted strategies to enhance AI literacy among students, particularly regarding AI literacy in assessment. Research has shown that educators prefer assessments that have been adapted to encourage critical thinking, problem solving and creativity, assuming that students will use AI (Liu & Bridgeman, 2023; Smolansky et al., 2023). Given that trajectory, it becomes even more important that students are equipped with the cognitive, technological and behavioural competencies to effectively and ethically use AI tools to support their learning and to perform in assessments. These strategies could involve curriculum adjustments, introducing specialised AI literacy modules, or integrating AI elements topics into existing assessments. By implementing these strategies, educators can better prepare students for the ethical and practical use of AI in their academic work. The study will propose recommendations for the equitable integration of AI in education. This includes ensuring that all students have access to AI tools and resources, promoting ethical use, and addressing any potential biases or inequalities that might arise from using AI in assessments. These recommendations will be crucial for fostering an inclusive educational environment where all students can benefit from AI technologies.

The outcomes of this study will significantly contribute to the global body of research on AI literacy. By providing a unique New Zealand perspective, this study's findings can be compared with international research, helping to understand both universal and context-specific aspects of AI literacy. The expected outcomes will not only enhance AI literacy among students but also provide valuable guidelines and strategies for educators and policymakers to integrate AI into education equitably and ethically.

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Author Bio's

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