



## EXPLORING THE ROLE OF AI IN HIGHER EDUCATION: A STUDY OF USAGE BY STUDENTS AND TEACHERS IN THE NETHERLANDS

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### ABSTRACT

**Purpose:** This study explores the integration of artificial intelligence (AI) tools in Dutch higher education, examining how students and teachers use these technologies in practice. It aims to assess the extent to which AI enhances educational efficiency and raises critical ethical considerations.

**Design/Methodology/Approach:** A quantitative research design was employed using digital questionnaires distributed among students and teachers in Dutch universities. The study analyzed usage frequency, application purposes, perceived benefits, and concerns related to AI tools in educational settings.

**Findings:** Results show that AI is primarily used for practical support such as text generation, editing, and lesson preparation rather than for fundamentally transforming learning or teaching methodologies. Both groups report improved efficiency and work quality but also express concerns about the reliability and ethical implications of AI-generated content.

**Practical Implications:** The findings highlight the urgent need for AI literacy initiatives that balance technical skills with ethical awareness. Institutions should develop targeted training programs and policies to foster responsible AI use and support its integration in both teaching and learning.

**Originality/Value:** By providing empirical insights into real-world AI use in higher education, this study contributes to the ongoing discourse on responsible AI integration. It underscores the importance of aligning AI adoption with pedagogical goals and ethical standards to ensure meaningful educational innovation.

**Keywords:** Artificial intelligence in education, Higher education, Educational technology, AI literacy, Pedagogical integration, Ethics in AI

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## EXPLORAR O PAPEL DA IA NO ENSINO SUPERIOR: UM ESTUDO SOBRE A UTILIZAÇÃO POR ESTUDANTES E PROFESSORES NOS PAÍSES BAIXOS

### RESUMO

**Objetivo:** Este estudo investiga a integração de ferramentas de inteligência artificial (IA) no ensino superior dos Países Baixos, analisando como estudantes e docentes utilizam essas tecnologias na prática. Busca-se avaliar em que medida a IA contribui para a eficiência educacional e suscita considerações éticas relevantes.

**Desenho/Metodologia/Abordagem:** Adotou-se um delineamento de pesquisa quantitativa, com aplicação de questionários digitais a estudantes e docentes de universidades holandesas. Foram analisadas a frequência de uso, os propósitos das aplicações, os benefícios percebidos e as preocupações associadas às ferramentas de IA no contexto educacional.

**Resultados:** Os dados revelam que a IA é utilizada predominantemente como suporte prático — para geração e edição de textos e preparação de aulas — em vez de promover transformações profundas nas metodologias de ensino e aprendizagem. Ambos os grupos relatam ganhos em eficiência e qualidade do trabalho, mas também manifestam preocupações quanto à confiabilidade e às implicações éticas dos conteúdos gerados por IA.

**Implicações Práticas:** Os achados evidenciam a necessidade urgente de iniciativas de letramento em IA que combinem competências técnicas com consciência ética. As instituições devem desenvolver programas de formação e políticas específicas para fomentar o uso responsável da IA e apoiar sua integração no ensino e na aprendizagem.

**Originalidade/Valor:** Ao oferecer evidências empíricas sobre o uso real da IA no ensino superior, este estudo contribui para o debate em curso sobre a integração responsável dessas tecnologias. Reforça a importância de alinhar a adoção da IA com objetivos pedagógicos e padrões éticos, a fim de garantir inovações educacionais significativas.

**Palavras-chave:** Inteligência artificial na educação; Ensino superior; Tecnologia educacional; Letramento em IA; Integração pedagógica; Ética na inteligência artificial.

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## 1. Introduction

In recent years, the emergence of artificial intelligence (AI) in higher education has generated a spectrum of expectations. These expectations range from enthusiasm regarding its transformative potential to apprehension about its broader implications for the education sector (Batista et al., 2024). Both academic literature and media frequently portray AI as a technology with the capacity to fundamentally alter the landscape of education (Kurban & Şahin, 2024). Personalized learning, adaptive systems, and new forms of knowledge construction are cited as innovations that could eventually surpass traditional educational



practices (Li et al., 2021), exemplifying this transformative power. Simultaneously, AI is also positioned as a practical tool that can streamline existing processes, such as generating teaching materials or automating test questions (Batista et al., 2024). In light of these varied expectations, it is essential to examine how AI is being integrated into educational settings by both students and teachers.

Despite the prominence of AI in public and academic discourse, there remains a gap between the transformative potential ascribed to technology and its actual implementation in educational practice. This study addresses that gap by investigating how AI tools are currently used in higher education, focusing on everyday practices, motivations, and challenges as experienced by students and teachers in the Netherlands.

The remainder of this paper is structured as follows. The next section reviews recent literature on the perceived and actual use of AI in education, followed by a detailed explanation of the methodology used in this study. The findings are then presented and discussed in light of current theoretical frameworks. The paper concludes with a reflection on limitations, directions for future research, and implications for educational practice.

## 1.1 Literature Review

While the optimistic vision surrounding AI in education is widely shared, empirical studies suggest that its current application tends to focus on enhancing efficiency rather than transforming pedagogy. Research indicates that both teachers and students primarily use AI tools in their daily educational contexts to perform existing tasks more efficiently, such as structuring texts, preparing lessons, or quickly gathering information (Mah & Groß, 2024; Stan, Dumitru, & Bucuroiu, 2025). This pattern aligns with what Bauer et al. (2025) describe as substitution and augmentation effects, where AI either replicates existing instructional practices or slightly enhances them through added support, without fundamentally altering the underlying learning processes.

The assumption that AI would bring about deep educational change finds little confirmation in these studies. In fact, recent work cautions against potential *inversion effects*, in which generative AI may lead to decreased cognitive effort and more superficial processing of information, thereby undermining the very learning gains it is expected to promote (Bauer et al., 2025). This tension between promise and practice underscores the need for closer examination of how AI is actually embedded in educational routines.



Moreover, several obstacles hinder the integration of AI into teaching and learning. Users frequently report barriers such as a lack of knowledge and training, as well as concerns about the reliability, ethical implications, and privacy risks of AI tools (Santos & Radanliev, 2024). These issues suggest that adoption is not merely a technical or personal matter but also tied to broader institutional and societal constraints.

At the same time, there is an increasing societal drive to incorporate AI into education. Employers are increasingly expecting graduates to effectively and critically utilize AI to enhance their professional performance (Nartey, 2024). As a result, educational institutions face the challenge of preparing students for a labor market in which AI literacy is becoming essential (Gillani et al., 2023; Boussouf et al., 2024).

Contrasting with these integration efforts is the widespread perception that students are extensively and sometimes unethically using AI tools such as ChatGPT. This perception has, in some cases, led to institutional responses that echo earlier reactions to technological change—such as the initial bans on calculators or internet use (Rowell, 2024; Shah, 2023). These responses are often shaped by what Corbin, Dawson, and Liu (2025) term *discursive policies*: symbolic regulations that attempt to communicate boundaries for AI use but remain difficult to enforce in practice. This results in what the authors describe as an *enforcement illusion*, where institutions may believe they are effectively governing AI use in assessment while, in reality, leaving underlying structures unchanged.

Currently, empirical evidence on the actual use and experiences of students and teachers—especially within the Netherlands—is limited. Although concerns about misuse are common (Zhu et al., 2025; Ajevski et al., 2023), few studies offer detailed insights into users' practices, motivations, or reflections. A recent study among U.S. college students similarly found that much AI usage remains informal, with frequent users generally more confident and optimistic about AI's potential, despite limited institutional guidance (Basch et al., 2025). Additionally, there is ongoing debate about the desirability and feasibility of restrictions on AI use, with questions about what should be prohibited and who holds the authority to decide (de Fine Licht, 2024).

Taken together, the literature reveals a fragmented and often contradictory picture. AI in education is surrounded by high expectations, yet its adoption remains cautious and pragmatic. At the same time, anxieties about misuse persist despite limited empirical



grounding. These tensions highlight the need for further investigation into how AI is actually being used in everyday educational practice.

### ***1.2 Perceptions and Realities of AI Usage in Education***

Conversely, there is a prevalent perception that students are extensively and unethically using AI tools such as ChatGPT. This perception has sometimes led to panic reactions within educational institutions, reminiscent of the initial responses to the introduction of calculators or the internet, where the immediate reaction was often to ban their use (Rowell, 2024; Shah, 2023). This recurring pattern of suspicion towards new technology is well-documented, yet it remains to be seen whether it is justified in the context of AI. Currently, empirical evidence on the actual use and experiences of students and teachers in the Netherlands is largely lacking. Although there is a perception that students are using AI on a large scale and potentially unlawfully (Zhu et al., 2025; Ajevski et al., 2023), the specifics remain unclear. Additionally, there is ongoing debate regarding the desirability of imposing restrictions, with uncertainty about what exactly should be prohibited and who holds the responsibility for establishing such boundaries (de Fine Licht, 2024).

### ***1.3 Objectives and Aims: Investigating AI Utilization and Impact in Dutch Higher Education***

The objective of this research is to acquire preliminary empirical insights into the actual utilization of AI by students and teachers within Dutch higher education. The study explores the perceived benefits and drawbacks of AI tools, as well as users' self-assessed competence in employing these technologies. This research aims to discern whether AI is currently functioning as a transformative technology or if its application primarily serves to enhance the efficiency of existing educational practices.

To achieve this aim, the present study investigates the integration of AI tools within the daily educational activities of students and teachers in Dutch higher education. The research aims to ascertain the extent to which AI usage facilitates educational transformation, beyond merely enhancing the efficiency of existing practices. Thus, the study endeavors not only to gain insights into the current utilization of AI but also to elucidate the broader impact of AI on educational practice.



To address the gap between the perceived transformative potential of AI and its actual implementation in educational practice, this study investigates how AI tools are being used by students and teachers in Dutch higher education. The aim is to gain empirical insight into the everyday applications, motivations, and challenges surrounding AI usage in teaching and learning contexts. Specifically, the following research question guides this study:

**1.3.1. *How are students and teachers in Dutch higher education using AI tools in their daily academic practices, and what shapes their choices and experiences?***

To explore this overarching question, the study examines the following four sub-questions:

***Sub-question 1:*** *What types of AI tools are being used by students and teachers, and for specific educational purposes?*

***Sub-question 2:*** *What motivates students and teachers to adopt specific AI tools, and how do they choose among available options?*

***Sub-question 3:*** *What are the perceived benefits and challenges of AI usage from the perspective of students and teachers?*

***Sub-question 4:*** *What are the main reasons some students and teachers choose not to use AI in their educational practices?*

## 2 Methods

This study employs an exploratory research design to investigate the use of artificial intelligence (AI) tools by students and teachers in higher education. The primary aim is to gather preliminary insights into the frequency, purposes, and perceived benefits and drawbacks of AI usage within this context.



## 2.1 Participants and Sampling

The final sample consisted of 96 students and 71 teachers from a Dutch university of applied sciences. A convenience sampling strategy was employed: questionnaires were distributed in educational settings where the research team had direct access. Efforts were made to ensure a broad representation across different academic domains, and to reach a sufficiently large and diverse group of respondents. Participation was voluntary and anonymous, and explicit informed consent was obtained at the start of the questionnaire. Anonymity was emphasized to reduce socially desirable answering and to foster a sense of safety among participants.

## 2.2 Instrument Development and Data Collection

Data were collected in the spring of 2025 using digital questionnaires. The instrument was developed by three researchers based on a systematic review of the literature on AI adoption in education (Brignardello et al., 2025), and was refined through multiple rounds of peer feedback with members of the research group (n=5), all of whom have professional backgrounds in higher education practice. This iterative development process helped ensure both content validity and contextual relevance.

The questionnaire incorporated a variety of question types. Closed-ended questions using a 5-point Likert scale assessed usage frequency, attitudes, and perceived impact (Boone, 2012). Open-ended questions invited respondents to elaborate on their experiences, motivations, and challenges. For those reporting infrequent or no AI use, targeted follow-up questions probed the reasons for non-adoption. Particular care was taken to phrase sensitive items, such as those concerning the concealment of AI use, in ways that minimized social desirability bias (Creswell, 2018).

## 2.3 Data Analysis

Quantitative data were analyzed using JASP software, which enabled descriptive analysis of usage patterns and perceived effects. Qualitative data from open-ended responses were analyzed using thematic analysis. An inductive approach was adopted to identify





recurring themes and patterns without relying on a predefined coding scheme. Coding was conducted manually by one researcher, and emerging themes were iteratively discussed within the research team to enhance interpretive validity and reduce bias.

## 3 Results

### 3.1 Key Findings Among Students

The responses from students indicate that AI tools, predominantly ChatGPT, have increasingly become integral to their study practices, though there is considerable variation in usage frequency and purpose. Approximately half of the students use AI regularly, while the other half use it sporadically or not at all. Key determinants include familiarity with AI tools, perceived usefulness, and ease of use. Students who do not use AI often cite unfamiliarity with the technology, lack of knowledge on where to find AI, or a lack of immediate need. Ethical objections or feelings of shame are mentioned only in exceptional cases. More than half of the students report that AI technology has enhanced the quality of their work.

#### *3.1.1 Students who utilize AI primarily do so to support five core activities:*

1. **Language Processing:** This includes checking spelling, improving sentence structure, refining formulations, and clarifying meaning. Students with language difficulties, such as dyslexia, particularly value AI as a helpful tool.
2. **Summarizing and Structuring Long or Complex Texts:** This helps students gain an overview and maintain control over the study material.
3. **Inspiration and Idea Generation for Reports, Lesson Plans, and Assignments:** AI acts as a thinking partner, helping students overcome writer's block or generate creative angles.
4. **Content Explanation and Clarification of Complex Topics:** This includes explaining formulas or theoretical concepts, with AI being seen as an accessible digital tutor.
5. **Information Search on Specific Topics:** Students quickly access factual data or background information.

The *perceived benefits* are primarily time savings, improved quality of texts, and support in starting assignments, which helps students avoid getting stuck. AI lowers barriers, promotes progress, and gives students a sense of control over their work process.





Students also identify *significant limitations and risks*. The reliability of generated information is often questioned, with students pointing out factual inaccuracies and 'hallucinations' from the tool. This necessitates additional verification, which can partially negate the initial time advantage. Additionally, there is a danger of complacency and superficial knowledge acquisition: AI can tempt students to blindly copy information, jeopardizing deep learning and critical thinking. Furthermore, formulating effective prompts is seen as a skill that is not self-evident. An unclear or too general question leads to generic or irrelevant output.

Notably, most students develop AI skills largely on their *own initiative*. Self-study and tips from fellow students are the main learning sources. There is little systematic guidance or training within education, leading students to find their way through trial and error.

### 3.2 Key Findings Among Teachers

The utilization of AI tools among teachers presents a varied landscape (see Figure 1.). While some teachers regularly incorporate AI into their practices, a significant portion use it sporadically or not at all. Factors such as unfamiliarity with the technology, doubts about its added value, and practical barriers, including limited access to advanced versions, contribute to this variation (see Figure 2). Ethical objections are minimal among teachers, and there is no associated stigma with AI use.

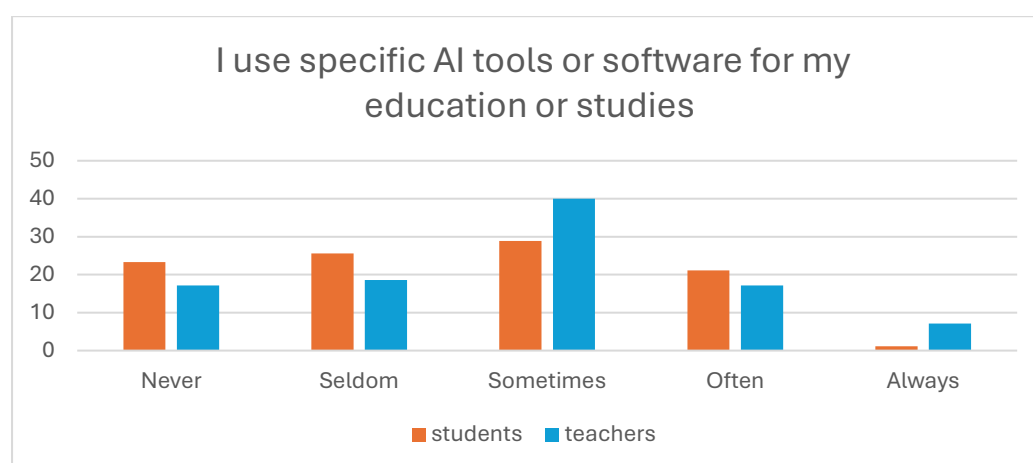


Figure 1

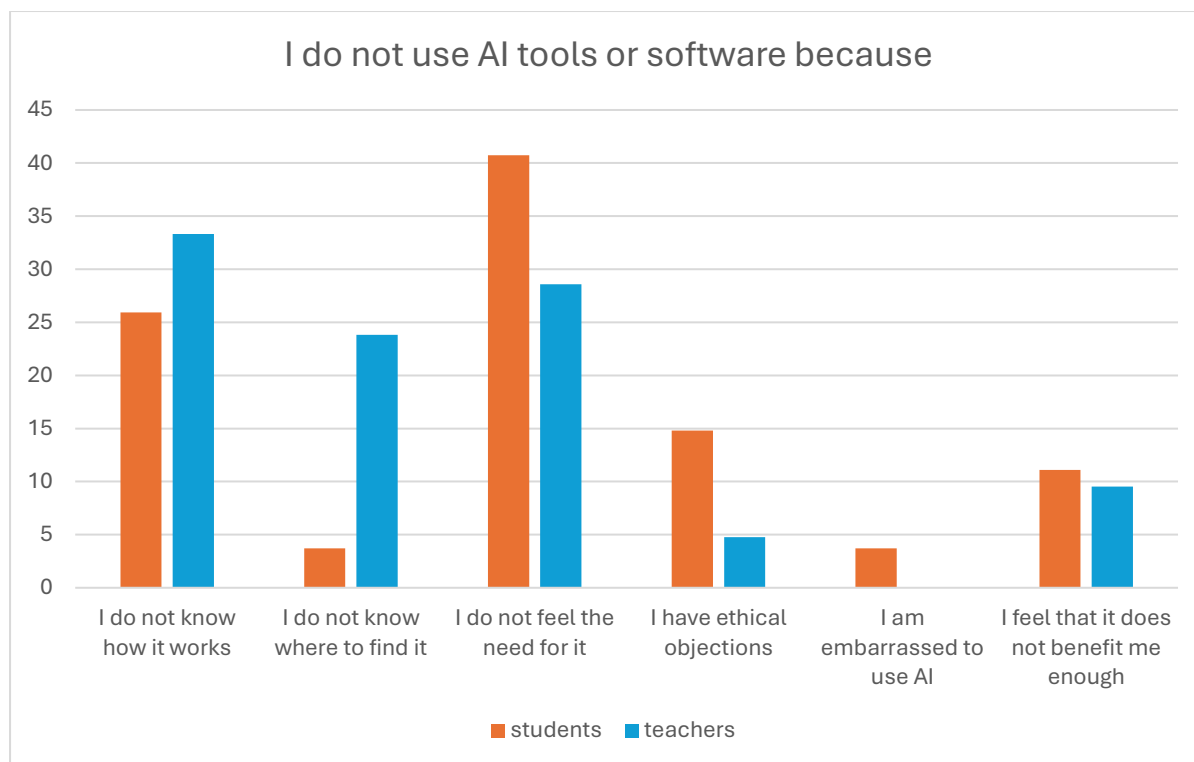
*Frequency of AI Tool Use in Study and Work by Students and Teachers*

#### Caption

Figure 1 supports SQ1 by showing how often students and teachers report using AI tools in their academic and professional routines. The distribution highlights key differences in adoption levels between the two groups,



providing a foundational comparison for examining usage types and purposes. The majority of students use AI occasionally or regularly, while a sizable portion of teachers report rare or no usage. These findings support further inquiry into adoption patterns across roles.



**Figure 2**

*Reasons for Not Using AI Tools and Software in Education.*

**Caption**

Figure 2 is aligned with SQ4, which explores why some students and teachers choose not to use AI in their educational practices. The figure presents self-reported justifications for non-use, including unfamiliarity with AI tools, perceived lack of necessity, ethical concerns, and uncertainty about effectiveness. These findings highlight barriers to adoption and underscore the importance of supporting informed and responsible integration of AI in higher education.





Similar to students, ChatGPT is the most frequently used application among teachers. Other tools mentioned include Copilot, Perplexity, Consensus, and Claude, as well as image generation tools such as MidJourney and Canva.

### 3.2.1 Teachers reported that they primarily employ AI for four types of educational tasks:

1. ***Lesson Preparation and Generating Lesson Ideas and Activities:*** AI provides inspiration for creative educational activities and supports the development of differentiated materials.
2. ***Creating and Reviewing Exam Questions, Assignments, and Assessment Criteria:*** AI is used to quickly generate concept questions or refine existing test items.
3. ***Text Production and Editing:*** This includes drafting emails, lesson plans, handouts, and summaries. AI lowers the barrier to starting writing tasks and provides a foundation that teachers can further refine.
4. ***Information Search and Summarizing Sources:*** AI assists in literature exploration and making complex information more accessible.

Based upon our findings, there is no clear consensus on whether AI tools have improved the quality of work among teachers. The perceived benefits are primarily efficiency and time savings. AI accelerates routine tasks and frees up time for other activities, such as providing more personal attention to students. Additionally, AI is valued as a source of inspiration, serving as a 'sparring partner' that helps teachers break patterns and generate new ideas.

However, there is also a *degree of caution*. The reliability of generated information is often seen as problematic, with teachers reporting fictitious sources and factual inaccuracies, necessitating critical verification. AI is frequently viewed merely as a starting point, with the ultimate responsibility for the quality of the material remaining with the teacher. Concerns also exist regarding the superficiality of AI output, the risk of plagiarism among students, and the potential erosion of personal creativity. Many teachers find formulating effective prompts to be complex and time-consuming.

### 3.3 Key Differences Between Students and Teachers

**Caption**

Figure 3 supports SQ2 and SQ3 by illustrating students' primary motivations for using AI tools and the benefits they perceive. Frequently mentioned terms such as assignment, example, summary, and understand reflect a strong reliance on AI for initiating academic tasks, clarifying content, and completing coursework. These patterns suggest that students use AI primarily as a cognitive aid to support learning, writing, and exam preparation.



Word Cloud of Teacher Responses on AI Use in Educational Practices.

**Caption**

Figure 4 is linked to SQ2 and SQ3, visualizing how teachers benefit from AI in lesson planning, assessment, and content creation. Frequently mentioned terms such as lesson, content, questions, grading, and slides emphasize AI's role in instructional design and efficiency. Teachers primarily use AI for planning, developing educational materials, and streamlining communication, reflecting a more strategic and professionally oriented approach compared to students.

Moreover, teachers exhibit a stronger inclination to critically evaluate the generated output and integrate it into broader educational objectives, whereas students often perceive AI as a directly usable production tool. Teachers express greater concerns regarding plagiarism and the potential impact of AI on students' learning processes. Ethical considerations, such as privacy and data security, also appear to be more prominent among teachers than students. Additionally, teachers report higher levels of frustration due to the lack of structural provisions, such as paid licenses and policy frameworks for AI use in education.



## 4 Discussion

This study investigated the utilization of AI technology in the daily educational practices of students and teachers in higher education in the Netherlands. The central question addressed the extent to which AI technology contributes to the transformation of education versus enhancing the efficiency of existing practices. The distinction between AI as an assistive tool and as a transformative force is central to current theoretical models, such as the ISAR framework (Bauer et al., 2025), which differentiates between substitution, augmentation, and redefinition of learning processes through AI.

The findings indicate that AI technology primarily serves as a digital tool for practical support, focusing mostly on efficiency and text processing. This observation aligns with previous studies (Mah & Groß, 2024; Jahić et al., 2024), which concluded that AI tools are predominantly used to perform existing tasks more efficiently. In terms of the ISAR model, most use falls under the categories of substitution or augmentation, with limited evidence of redefinition or transformative impact. The potential of AI for personalized learning or adaptive feedback remains largely untapped in daily practice.

This discrepancy between expectations and current use raises the question of whether there is underutilization, or whether AI usage currently aligns with the actual needs and capabilities of students and teachers. Findings from Treve (2024) suggest that AI as a practical tool often marks a necessary initial phase in the adoption process, in which users first gain familiarity before engaging with more transformative applications. Educational institutions could therefore invest in AI education that not only facilitates basic use, but also encourages exploration of pedagogical innovation.

However, the current emphasis on efficiency is not without risks. Students in this study expressed concerns about superficial learning, mirroring earlier work by Slimi (2023), who noted the tension between technological efficiency and educational depth. Bauer et al. (2025) similarly warn of possible “inversion effects,” where automation can reduce learner engagement. At the same time, other studies show that AI can support deeper learning, provided users engage critically with generated content (Lawasi et al., 2024). The challenge for higher education is to find a balance in which AI enhances workflow while also contributing meaningfully to students’ understanding.



Both students and teachers reported that they primarily acquire AI-related competencies through self-directed learning and informal networks. This bottom-up learning culture reflects adaptability and initiative (Boussof et al., 2024), yet it also contributes to disparities in AI proficiency and confidence. Similar patterns have been observed elsewhere: Basch et al. (2025) found that students with more frequent AI use report higher confidence and more positive attitudes, despite the lack of structured institutional support.

AI literacy goes beyond technical skill acquisition (Gillani et al., 2023); it includes ethical reasoning, critical evaluation, and the ability to understand the broader implications of AI use. While informal learning promotes experimentation (Long et al., 2022), it is unlikely to fully address these wider dimensions. Formal education therefore plays a key role in structuring AI literacy development, especially in relation to critical and ethical use (Walter, 2024).

The societal impetus to enhance AI literacy is also growing. Narthey (2024) emphasizes that employers increasingly expect graduates to apply AI critically and effectively in professional contexts. Yet both students and teachers in this study expressed reservations about the reliability of AI-generated output. Concerns about hallucinations, factual errors, and unpredictability are consistent with findings by Santos and Radanliev (2024), who identify reliability as a key barrier to integration.

In addition, ethical concerns diverge by role: teachers are more attuned to privacy and data protection, while students more frequently raise issues such as plagiarism. These distinctions likely reflect differing responsibilities, but also indicate a need for more structured guidance on ethical dimensions of AI use (Boussof et al., 2024). This need is echoed in student perceptions elsewhere; Basch et al. (2025) note that concerns about academic integrity are common among users, but rarely addressed through formal instruction.

Reactions to technological innovation in education have often been characterized by suspicion and restriction (de Fine Licht, 2024). While caution is warranted, an overly risk-averse stance may hinder experimentation and innovation. As Rowell (2024) and Shah (2023) argue, institutions should instead equip students and teachers with the tools to critically evaluate and work with AI. Establishing clear ethical guidelines (Balalle & Pannilage, 2025; Szczyrek et al., 2024) can help mitigate risks while still supporting informed, responsible use.

Students in this study primarily use AI to support their academic work, while teachers use it for instructional preparation and test development. Yet it remains unclear whether current educational practices prepare students to meet future professional demands.





Strengthening the connection between higher education and domain-specific AI competencies may help better align learning outcomes with evolving labor market expectations.

In professional settings, collaboration is essential. However, this research reveals that AI is predominantly used as an individual tool. Despite AI's potential for fostering collective knowledge development, this opportunity remains largely untapped—particularly when it comes to collaborative use between teachers and students. As Bearman and Ajjawi (2023) argue, institutions should begin to view AI not just as a personal assistant, but as a process-oriented technology that can enable co-creation and shared inquiry

## 5 Limitations

First, the study employed a convenience sampling strategy within a single institution, which limits the generalizability of the results. Although efforts were made to ensure disciplinary diversity, the sample may not reflect broader national or international patterns in AI adoption.

Second, the reliance on self-reported data introduces potential biases. As Imas and Ling (2025) demonstrate, students in particular may underreport their AI usage due to concerns about academic or social judgment. This form of social desirability bias may have contributed to conservative estimates of actual AI engagement.

Third, the qualitative data were analyzed inductively by a single researcher. Although themes were iteratively discussed within the research team to enhance validity, the absence of interrater coding procedures limits the reliability of interpretation. Future studies could benefit from more formal triangulation or coder agreement strategies.

Finally, this study presents a snapshot of AI use during a period of rapid technological development. As tools and institutional policies evolve, so too may attitudes, competencies, and practices. Longitudinal research is therefore necessary to track these dynamics over time and to assess how early patterns of use might shift toward more transformative engagement.

### 5.1 Future research agenda

The integration of AI in higher education prompts two interrelated but distinct research trajectories: learning and teaching with AI, and learning about AI in relation to future professional practice. Both lines of inquiry are critical to adequately preparing students and educators for a rapidly evolving technological landscape.



First, research is needed into how AI can effectively support student learning and teaching practices within higher education. While recent systematic reviews (e.g., Labadze et al., 2023) highlight the growing use of AI-powered chatbots such as ChatGPT as learning companions, writing coaches, and virtual assistants, questions remain about the long-term effects of such tools on students' critical thinking, motivation, and self-regulation. Further investigation should address the pedagogical design of AI-enhanced learning environments, the differential impact on diverse learner populations, and the affordances and limitations of specific tools across disciplines. Likewise, future studies should explore how educators can meaningfully integrate generative AI into their instruction without compromising educational integrity, as well as the kinds of support, training, and institutional conditions that are required to do so sustainably.

Second, beyond using AI as a tool, students must also learn about AI and its implications for their future professional roles. As Kong et al. (2024) have shown, awareness of AI technologies can affect career-related outcomes such as burnout and perceived competency, underscoring the importance of integrating AI literacy into curricula across domains. Future research should examine how different disciplinary programs can help students understand, critique, and ethically engage with AI in ways that are relevant to their field. This includes questions of professional identity, responsibility, and the transformation of work processes due to automation and algorithmic decision-making.

In conclusion, future research should take into account both sides of the coin: AI as a teaching tool that reshapes how education is delivered, and AI as a socio-technical force that transforms the knowledge and skills students need for their future careers. Understanding how these two dimensions interact didactically, institutionally, and ethically is crucial for developing robust educational responses to the challenges and opportunities posed by generative AI.

## 6 Conclusion

This study shows that within Dutch higher education, AI technology is currently used predominantly as a practical instrument to increase efficiency in existing educational processes. Although students and teachers report clear benefits such as time savings, textual support, and convenience, the broader transformative potential of AI discussed in academic and public discourse remains largely unfulfilled. Most observed use aligns with substitution and



augmentation levels within the ISAR framework (Bauer et al., 2025), with little evidence of redefinition in terms of pedagogy, assessment, or collaboration.

The findings reveal that students and teachers often navigate AI individually and informally, without consistent institutional support. While this fosters autonomy and exploration, it also risks deepening disparities in AI proficiency and critical awareness. Moreover, both groups express significant reservations about the reliability and ethical risks of AI tools, including concerns about hallucinated content, data privacy, and academic integrity. These concerns underscore the need for structured, inclusive, and ethically grounded AI education.

To fully realize AI's potential in education, institutions must engage with both dimensions of AI integration: supporting learning and teaching with AI, and preparing students to understand and critically engage with AI as part of their future professional landscape. This requires more than just technical upskilling; it calls for thoughtful curriculum design, open dialogue on risks and opportunities, and a cultural shift that views AI not merely as a tool for productivity but as a catalyst for deeper learning, shared inquiry, and societal readiness.

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