AI-HED
Artificial Intelligence in Higher Education Teaching and Learning

Starter Kit

University of Zagreb Faculty of Organization and Informatics

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Language models and other AI-based tools were used in the process of creating this document.

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Contents

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Select Case Studies

This chapter explains how we selected and analysed the fifteen case studies presented here, offers an overview of their collective findings, and provides a detailed account of each case study based on the collected data. The methodology involves identifying publications that apply AI in higher education contexts, focusing on specific or diverse student populations, with disciplines ranging from computer science to communication and management. We reviewed these studies from both qualitative and quantitative perspectives, observing how they integrate AI-based tools and measure teaching and learning outcomes.

Our brief overview highlights key themes and insights, including ethical considerations, the benefits and limitations of AI-based solutions, and how these tools shape student engagement. The subsequent in-depth look at the fifteen case studies draws from the collected data, aiming to give readers a solid grasp of the practical approaches and outcomes observed, while emphasizing the importance of thoughtful and responsible AI adoption in higher education.

Methodology of Selecting the Case Studies

To identify case studies that highlight the use of AI tools, potential sources for case studies were first identified. These included academic journals and databases such as Scopus, Web of Science (WoS), SAGE, SpringerLink, and Elsevier's ScienceDirect (including journals like Computers & Education and the Journal of Educational Technology & Society), as well as Taylor & Francis Online (featuring Interactive Learning Environments and Educational Technology Research and Development). Open-access publications were accessed via online repositories such as ERIC (Education Resources Information Center) and arXiv.org. Additionally, relevant literature was found in books

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and Google Scholar, which were searched using the identified keywords.

In the first phase, scientific databases were searched using the below queries with keywords. It is important to emphasise that the search was limited to scientific papers published from October 2022 to the end of 2024, focusing on the application of artificial intelligence in teaching. The search for relevant case studies on AI in teaching involved several academic sources described in continuance of this section:

SAGE The search query yielded 25 initial papers, of which nine were selected for further consideration.

Web of Science Core Collection (WoS CC) The following query resulted in 579 papers, with 50 selected based on citation criteria:

```
TI=("artificial intelligence" OR "AI") AND TI=(teach)*
```

Scopus The search query below initially retrieved 1,402 papers, which increased to 1,952 after including the keyword "Teaching". From this, 50 papers were selected based on citation criteria.

```
TITLE ("artificial intelligence" OR "AI") AND TITLE ("teach")*
```

SpringerLink Search using the query provided below produced 1,018 results. After refining the search by applying filters for Research Articles, Last 24 Months, English language, and subdisciplines, including Educational Technology and Computers & Education, the number of relevant papers was reduced to 74.

```
title:(("artificial intelligence" OR "AI") AND ("teach"))*
```

ScienceDirect The following query yielded 3,410 papers.

```
TITLE(("artificial intelligence" OR "AI") AND ("teach"))
```

After applying selection criteria, 58 papers were chosen, filtered by:

- Publication years: 2024 (28 papers), 2023 (16 papers), 2022 (14 papers).
- Article type: "Research articles" (42 papers).
- Journal titles: Computers and Education: Artificial Intelligence (30 papers), Procedia Computer Science (21 papers), Educational Research Review (4 papers), Computers & Education (3 papers).
- Research fields: Social sciences (37 papers), Computer science (21 papers), Psychology (4 papers).
- Access type: Open Access & Open Archive (58 papers).

Google Scholar The first search query, provided below first returned 14 results, while the second query, following second below, yielded 93 results.

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```
(allintitle: "artificial intelligence" "teaching" "case study")

(allintitle: "artificial intelligence" ("education" OR "learning") "case study"
-teaching)
```

Google Books No relevant results were found in the past two years using the following query.

```
intitle: "artificial intelligence" ("teaching" OR "learning" OR "education") "case study"
```

This systematic approach ensured that only the most relevant and high-impact studies were considered for further analysis. It is important to emphasise that only papers available for download were considered. In cases where many papers were retrieved, such as in Scopus, only the 50 most significant papers were selected to ensure a feasible literature review within the researchers' realistic capacity.

Papers were initially screened based on their titles and abstracts. Those that did not focus on higher education were excluded from further consideration. Although the search yielded many papers, only a smaller portion was suitable for analysis. The primary focus was on identifying studies that described real cases of AI tool implementation, where results were presented based on interviews, experimental outcomes, or survey data. Some literature review papers were also included, as they provided valuable insights for this project phase.

Ultimately, **15 key papers** were identified and categorised as described below. The analysed papers were categorised based on key features, including the case study name, reference, year, short description, educational level and participants, education field, approach/methods, research goal, AI tool used, challenges, ethical considerations, outcomes/effects, pedagogical design/teaching methods, and additional comments. It is important to note that the categories and subcategories within each category were also defined based on recent and relevant literature related to applying AI tools in higher education. In this way, the presented results can be interpreted and positioned in alignment with the current state of the art and existing classifications from scientific literature.

For example, the category goal of the study is linked to key areas of AI tool application (role), including assessment, learning, teaching, and administration, as a means of supporting these processes. This categorisation aligns with findings by Chiu, Xia, Zhou, Chai, and Cheng (2023), who conducted a systematic literature review on AI's opportunities, challenges, and future research directions in education. According to the authors, for learning, AI is applied to facilitate personalised and adaptive learning experiences, including task assignment based on competence, human-machine interaction, student work analysis for feedback, and adaptability in digital environments. AI enhances teaching by offering adaptive strategies, improving teaching capabilities, and supporting professional development through intelligent systems. AI automates grad-

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ing and marking in assessment and predicts student performance using learning data and activity patterns. The last subcategory is administration – AI tools support libraries, career centres and outer university services.

Furthermore, the research approach and methodology were categorised based on qualitative and quantitative methods commonly used in social sciences and IT research, including:

- Experimental (EXP): Controlled experiments examining AI interventions.
- Quasi-Experimental (QE): Studies comparing pre-existing groups where random assignment is not feasible.
- Survey (SUR): Using questionnaires and opinion polls to gather data.
- Discourse Analysis (DA): Analysis of communication, discussions, and textual data.
- Interview (INT): Collection of qualitative data through participant discussions.
- Systematic Literature Review (SLR): Comprehensive analysis of existing research on AI in education.

The selected subcategories align with the most commonly used research methods in AI education studies, as Zhai et al. (2021) identified in their review of AI in education from 2010 to 2020. However, we also introduced additional categories better to capture the methodological approaches of the analysed studies.

Since challenges in AI tool use are widely recognised in the literature, they were included in the template for literature analysis, covering three key areas identified by Memarian and Doleck (2024): technological challenges (such as accuracy issues in AI models and system constraints), design and methodological challenges (including difficulties in developing AI-based teaching methods, data collection issues, and bias in evaluation), and teacher and student concerns(such as digital literacy gaps, cognitive load, ethical considerations, and the adaptability of AI tools in education).

Additionally, challenges related to limitations in empathy and human interaction – acknowledging AI's inability to provide emotionally intelligent and empathetic responses compared to human instructors – were included to address human-computer interaction (HCI) issues in people – AI communication, as identified by Grassini (2023).

Even though many perceive them as a broader challenge, ethical considerations were highlighted as a separate category. However, according to existing literature, ethical concerns can be divided into specific subcategories directly related to the practical use of AI tools in educational activities, as identified by İpek, Gözüm, Papadakis, and Kallogiannakis (2023). These include cheating (students using AI to generate answers

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dishonestly), creating bias (AI-generated content reflecting underlying biases that impact fairness and inclusivity), ethical issues (broader concerns regarding AI's role in education), and legal issues (such as copyright and data privacy challenges).

The outcomes and effects of AI tools were described from either a student or teacher perspective, in line with the approach taken by Chiu, Xia, Zhou, Chai, and Cheng (2023). The outcomes of AI in education can be categorised into academic performance, perceptions, and broader impacts. Academic outcomes include student scores, achievements, and completion rates, while perception-based outcomes focus on students' and teachers' satisfaction, motivation, and acceptance of AI tools. Other impacts extend to creativity, critical thinking, collaboration, and personal development, with digital citizenship skills being a key outcome of the project.

For teachers, AI improves work efficiency by automating routine tasks, enhances teaching competence by supporting instructional strategies, and influences attitudes toward AI in education. **For students**, AI fosters motivation and engagement, contributes to academic success, and helps develop 21st-century skills such as collaboration, creativity, and problem-solving. Additionally, AI impacts non-cognitive aspects by supporting emotional and social development, including confidence building and stress management. However, due to the specific nature of the studies, a free-text description was generally used to provide a more detailed explanation of the effects or outcomes of AI tools in each case.

Finally, for the included studies, it was essential to categorise pedagogical approaches and teaching methods. The following subcategories were used, covering various teaching models that incorporate technology in education, specifically applicable to AI-enhanced learning: Active and Experiential Learning, Adaptive Learning, Adaptive Teaching, Blended Learning, Collaborative Learning, Distance Learning, Flipped Classroom, Gamification and Game-Based Learning, Inquiry-Based Learning, Learner-Centered Learning, Online Learning, Personalized Learning, Problem-Based Learning, Technology-Enhanced Learning, and Thinking-Based Learning.

Overview of the Selected Case Studies

The following papers containing descriptions of case studies on using AI-based tools or platforms in higher education have been selected, listed here in no particular order:

- 'Early Perceptions of Teaching and Learning Using Generative AI in Higher Edu-

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cation'
by Damiano, Lauría, Sarmiento *et al.* [1]

- 'Microsoft Copilot and Anthropic Claude AI in Education and Library Service'
  by Adetayo, Aborisade and Sanni [2]
- 'Leveraging Google Gemini as a Research Writing Tool in Higher Education'
  by Barrot [3]
- 'The Effect of Generative Artificial Intelligence (AI)-Based Tool Use on Students' Computational Thinking Skills, Programming Self-Efficacy and Motivation'
  by Yilmaz and Karaoglan Yilmaz [4]
- 'Chat GPT for Professional English Course Development'
  by Kostikova, Holubnycha, Besarab *et al.* [5]
- 'Students' Adoption of AI-Based Teacher-Bots (T-Bots) for Learning in Higher Education'
  by Pillai, Sivathanu, Metri *et al.* [6]
- 'Not Quite Eye to A.i.'
  by Barrett and Pack [7]
- 'Is the Education System Prepared for the Irruption of Artificial Intelligence?'
  by Lozano and Blanco Fontao [8]
- 'Fostering Social-Emotional Learning Through Human-Centered Use of Generative Ai in Business Research Education'
  by Aure and Cuenca [9]
- 'Extending Design Thinking, Content Strategy, and Artificial Intelligence into Technical Communication and User Experience Design Programs'
  by Tham, Howard and Verhulsdonck [10]
- 'Preparing Public Relations' Practitioners for the AI Era: Advancing Pedagogical Principles in Public Relations' Artificial Intelligence Education'
  by Yang [11]
- 'Exploring the Integration and Utilisation of Generative Ai in Formative E-Assessments'
  by Huang, Huang and Cummings [12]
- 'Integration of Artificial Intelligence in Academia'
  by Irfan, Murray and Ali [13]
- 'Paraphrasing Strategies and Levels of Proficiency of an AI-generated QuillBot and Paraphrasing Tool'
  by Chanpradit, Samran, Saengpinit *et al.* [14]

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- ‘Cultivating Writing Skills’
  by Punar Özçelik and Yangın Ekşi [15]

All the selected case studies discuss how AI shapes higher education, in the context of undergraduate or graduate programs. Some concentrate on specific groups, like undergraduates or master’s students, while others take a broader look at AI’s role across higher education. The selected case studies explore multiple fields, including but not limited to information and communication sciences, computer science, social sciences (especially pedagogy), management, and communication. In most cases, AI-based tools are introduced in a flexible way that can be applied to different disciplines.

Research designs that can be found in the papers presenting the case studies found in this chapter combine quantitative and qualitative methods, such as experimental setups, surveys, literature reviews, and close-up case studies. The goals of these research approaches focus on improving teaching and learning through the use of AI, examining AI’s potential as an academic support tool, and finding strategies for adaptive learning that boost student engagement and personalisation. Many of those studies also look at the role of AI in academic research, whether for literature reviews, content creation, or quality checks.

Common tools mentioned over all the analysed case studies include ChatGPT (specifically models GPT-3.5 and GPT-4), Microsoft Copilot, Claude, Google Gemini (formerly Bard), and AI-driven teacher bots that act as virtual teaching assistants. When educators incorporate these tools into their classrooms, these AI-based tools and models often help with research, writing, and administrative work, providing easier access to information and speeding up tedious daily tasks.

Although these studies showcase the clear advantages of AI, they also pinpoint difficulties. On the technical side, AI remains imperfect at solving certain academic challenges. Ethical questions remain one of the major issues, from academic dishonesty and over-automation to potential drops in critical thinking. Researchers face further problems with ensuring that AI-based lessons would stimulate real participation rather than just automating or mechanizing tasks. Lacking in emotional intelligence, any AI struggles with the more human sides of teaching, such as empathy and personal guidance. Therefore, learners struggle when coping with the constraints imposed on the learning process by the inhuman AI models, however human-like they pose to be.

Concerns about ethics are rooted in academic integrity, since AI can enable and ease plagiarism and foster over-reliance on generated text. Bias in AI-based tools and systems, which can replicate harmful stereotypes, raises serious issues as well. Privacy and data safety must be observed and taken into account as well, ensuring careful handling of delicate data when interacting with AI-based tools. Furthermore, it is crucial for teachers and students to consider AI as a useful aid rather than a stand-in

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for real social interaction.

When it comes to results, AI frequently speeds up learning, helps in adapting lessons to different needs, and keeps students more active. Still, not all students can tell good AI-based or AI-generated responses from poor ones, and reliance on AI technology greatly influences student motivation in various ways – some students thrive with the extra push, while others lean too heavily on it. On the teaching side, most studies follow the logic of technology-enhanced learning, using adaptive methods and the power of AI-based tools, models, and systems to shape lessons to individual learners. Many selected case studies encourage group work and peer review of AI outputs, thus prompting students to think critically. The flipped classroom model shows up often as well, as one of the preferred pedagogical design approaches, with AI helping students prepare before they meet face-to-face. In many cases, researchers embed AI in a structured setup so they can test the impact of including AI-based tools on students' performance.

Overall, these studies give a clear sense of AI's strengths and drawbacks in higher education. They confirm that AI can broaden learning opportunities, customize how students gain knowledge, and support research work, but only when used properly. Teachers must be aware and steer clear of shortcuts that undermine integrity, avoid unethical uses of AI-based tools, and preserve academic quality. Through careful planning and awareness, AI-based tools, models, and systems can fit into the educational landscape as powerful companions without undermining the core values of academic integrity.

Details of the Selected Case Studies

This section presents each of the fifteen collected case studies in detail, giving readers a clear sense of how AI is being integrated into higher education. Every case is described using several features. At the beginning, the title of the paper presenting the case study is given, followed by the year of publication and a reference to the bibliography item. Following is the summary description of the chosen case study and the related observed outcomes including a summary of the main results and the conclusions drawn. Additional details include: a) the educational setting, discipline, and the utilised pedagogical design or teaching method, illustrating the study's context; b) the specific chosen tools, employed research methods, and set goals; c) a note on any key challenges or ethical considerations mentioned in the referenced paper.

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Early Perceptions of Teching and Learning Using Generative AI in Higher Education

Y. 2024 [1]

Description. This paper investigated perceptions of ChatGPT in higher education among students and faculty, examining its implications for teaching and learning. Guided by Diffusion of Innovation theory and the Technology Acceptance Model, the study surveyed 380 participants. Findings revealed that while participants did not intend to use ChatGPT for plagiarism, they suspected others might. Many struggled to accurately assess ChatGPT's outputs, with over half misjudging incorrect responses or being unsure of their accuracy. Results varied by demographics, highlighting the importance of teaching data literacy and critical thinking for effective integration of Generative AI in education.

Outcomes. The study found that older participants had higher awareness and trust in ChatGPT, while younger participants saw more educational benefits but struggled to discern the accuracy of its output

Education level	**Education field**	**Pedagogical design**
Tertiary education in general	Computer Science and Mathematics, Communication and the Arts, Social and Behavioral Sciences, School of Management, Science, Liberal Arts	Technology-Enhanced Learning

Methods	**Goal**	**Tool**
Survey (SUR)	Assessment	Chat GPT

Challenges	**Ethical considerations**
N/A	Cheating

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MICROSOFT COPILOT AND ANTHROPIC CLAUDE AI IN EDUCATION AND LIBRARY SERVICE **Y.** 2024 [2]

Description. This article explores the integration of Microsoft Copilot and Anthropic Claude AI in educational and library contexts. It discusses the tools' unique capabilities, including Microsoft Copilot's productivity features, real-time internet access, and image generation, alongside Claude AI's advanced contextual comprehension, file ingestion, and metadata generation. The study highlights their potential to revolutionize information management, research assistance, and educational content creation. By integrating these tools, users can leverage Copilot's broad information access and Claude's deep analytical capabilities for enhanced learning and research workflows.The paper also addresses challenges like algorithmic biases, data security, and AI governance, emphasizing the need for ethical and transparent implementation to maximize their impact responsibly.

Outcomes. The partnership between Copilot and Claude AI provides an integrated approach to revolutionizing education and library services. The study highlights the effective synergy of real-time internet connectivity, advanced information retrieval, and sophisticated comprehension capabilities as its core strengths.

Education level	**Education field**	**Pedagogical design**
Tertiary education in general	Library services on university	Technology-Enhanced Learning and Adaptive Learning,

Methods	**Goal**	**Tool**
Literature review	Administration	Copilot and Claude AI

Challenges	**Ethical considerations**
Technological Challenges, Limitations in Empathy and Human Interaction, Teacher and Student Concerns	Ethical Issues, Legal Issues, Creating Bias

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Leveraging Google Gemini as a Research Writing Tool in Higher Education

Y. 2024 [3]

Description. The article explores the application of Google Gemini, an artificial intelligence tool powered by advanced large language models (LLMs), in research writing within higher education. Gemini offers functionalities such as idea generation, content organization, paraphrasing, summarizing, and automated feedback. Its capabilities include generating research questions, creating outlines, and providing concise summaries, significantly streamlining the writing process. The article explores the potential of Google Gemini, an AI-powered chatbot, as a tool to enhance research writing processes in higher education. The study highlights Gemini's capabilities, including idea generation, outlining, paraphrasing, summarizing, and providing automated feedback, which support students and researchers in addressing common challenges like writer's block, organizing ideas, and language clarity. However, the article also discusses limitations such as occasional inaccuracies, potential for plagiarism, lack of critical thinking engagement, and its inability to handle advanced data analysis or primary data collection. The paper emphasizes the need for ethical guidelines, critical evaluation of outputs, and institutional policies to effectively and responsibly integrate AI tools like Gemini into academic practices.

Outcomes. The article highlights the potential outcomes of using Google Gemini for students and teachers. For students, positive effects include improved writing support, productivity, and engagement, with timely AI feedback enhancing grammar and structure. However, risks include overreliance on AI, plagiarism, limited skill development, and misleading content. For teachers, Gemini can streamline support, enhance collaboration, and provide insights into student challenges, but it also raises concerns about assessing genuine student work, ethical use, and the need for adapting teaching methods to incorporate AI effectively. Balancing benefits and challenges is essential for its responsible use in education.

Education level	**Education field**	**Pedagogical design**
Tertiary education in general	All education fields applicable	Collaborative learning, P2P learning
Methods	**Goal**	**Tool**
Literature review	Learning, Teaching, Assessment, Administration	Google Gemini/ Google Bard
Challenges		**Ethical considerations**
Technological Challenges, Design and Methodological Challenges, Teacher and Student Concerns		Ethical Issues, Legal Issues

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THE EFFECT OF GENERATIVE ARTIFICIAL INTELLIGENCE (AI)-BASED TOOL USE ON STUDENTS' COMPUTATIONAL THINKING SKILLS, PROGRAMMING SELF-EFFICACY AND MOTIVATION **Y.** 2023 [4]

Description. The article examines ChatGPT's impact on programming education, focusing on computational thinking, programming self-efficacy, and motivation. An experimental study with undergraduates compared a ChatGPT-supported group to traditional learning, controlling for pretest scores. Results highlight benefits but also concerns about AI reliance in complex problem-solving, emphasizing the need for guided integration aligned with pedagogical goals.

Outcomes. This study examined the impact of ChatGPT-supported programming education on university students' computational thinking, programming self-efficacy, and motivation in a pretest-posttest experimental design. The experimental group used ChatGPT in the learning process, while the control group did not. Results showed that ChatGPT significantly improved students' computational thinking skills, programming self-efficacy, and motivation, with notable differences in creativity, algorithmic thinking, cooperativity, critical thinking, problem-solving, programming tasks (simple and complex), and motivation-related factors (attitude, direction, reward, social pressure, and competition). However, no significant difference was observed in the "challenging goals" dimension, indicating that AI tools like ChatGPT do not inherently enhance motivation when students face complex programming challenges. Teachers are advised to adopt diverse motivational strategies for such tasks. For optimal student outcomes, providing training in prompt writing is crucial, as effective prompts enhance the use of AI tools like ChatGPT. Teachers should also develop AI literacy skills to integrate such tools effectively into lessons. Additionally, incorporating metacognitive strategies, including prompts that encourage self-reflection, can support students in understanding and regulating their learning processes. These approaches can maximize the benefits of AI tools in programming education for both students and teachers.

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Computer programming	Flipped classroom
Methods	**Goal**	**Tool**
Experimental (EXP)	Learning, Teaching	ChatGPT
Challenges		**Ethical considerations**
Design and Methodological Challenges		N/A

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CHATGPT FOR PROFESSIONAL ENGLISH COURSE DEVELOPMENT **Y.** 2024 [5]

Description. The article showcases the use of ChatGPT to create a specialized English course for law students. ChatGPT was employed to generate a curriculum, syllabus, textbook content, and learning materials aligned with specific objectives, such as international law topics. Authors are demonstrating how ChatGPT can aid in designing professional English courses by generating content, tasks, and testsIt provided lesson structures, reading texts, discussion prompts, and vocabulary lists while also assisting in crafting assignments and testing materials. The tool streamlined the course creation process by offering quick, coherent outputs, although educators refined and adapted the AI-generated content to meet educational standards and ensure relevance. This highlights ChatGPT's role as a valuable support tool in enhancing language education (language teaching and learning in general).

Outcomes. The article highlights both positive and negative outcomes of using ChatGPT for professional English course development. For students, positive effects include access to diverse and engaging learning materials, such as tailored reading texts, assignments, and activities that enhance skills in speaking, writing, reading, and listening. However, negatives include the risk of overreliance on AI, which may hinder critical thinking and problem-solving skills, and the potential misuse of AI for academic dishonesty, such as submitting unedited AI-generated assignments. For teachers, ChatGPT provides significant advantages by giving flexibilty of ourse creation, saving time, and offering a foundation of materials to adapt and refine, thereby fostering innovation in teaching methods. Conversely, challenges for educators include the need to thoroughly review and adjust AI-generated content to ensure accuracy and cultural relevance and to address ethical concerns around AI use in education. Creating a balance between AI-generated content and human-guided instruction is critical to ensure the effective and complete development of any course in education

Education level	**Education field**	**Pedagogical design**
Master level	Law course	Technology Enhanced Learning
Methods	**Goal**	**Tool**
Case study, Quasi-Experimental (QE)	Learning, Teaching	ChatGPT 3.5
Challenges	**Ethical considerations**	
Technological Challenges, Limitations in Empathy and Human Interaction	Cheating, Creating Bias, Ethical Issues, Legal Issues	

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STUDENTS' ADOPTION OF AI-BASED TEACHER-BOTS (T-BOTS) FOR LEARNING IN HIGHER EDUCATION

Y. 2023 [6]

Description. The purpose of the paper was to investigate the use of Teaching-bots (T-bots) supported by artificial intelligence by students for learning. Variables such as perceived ease of use, perceived usefulness, personalization, interactivity, perceived trust, anthropomorphic and perceived intelligence were investigated and their influence on the intention to adopt T-bots in education and the use of T-bots. The results showed that developers and designers of T-bots should ensure greater interactivity of T-bots, provide personalized information to students and provide anthropomorphic characteristics of T-bots.

Outcomes. Motivation and engagement

Education level	**Education field**	**Pedagogical design**
Postgraduate level	Courses on private and government colleges	Personalized Learning

Methods	**Goal**	**Tool**
Survey (SUR), Other	Learning	AI-based teacher-bots

Challenges	**Ethical considerations**
Design and Methodological Challenges, Technological Challenges	N/A

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NOT QUITE EYE TO AI: STUDENT AND TEACHER PERSPECTIVES ON THE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN THE WRITING PROCESS **Y.** 2023 [7]

Description. The survey in paper included displays of user prompts and output from ChatGPT, a GenAI chatbot, for each of the six tasks of the writing process (brainstorming, outlining, writing, revising, feedback, and evaluation). Students and teachers were asked via a survey to share their experience of using ChatGPT for the specified writing process tasks.

Outcomes. AI helps students in creativity and innovation in creating new ideas

Education level	**Education field**	**Pedagogical design**
Undergraduate level	N/A	Personalized Learning
Methods	**Goal**	**Tool**
Survey (SUR)	Learning	ChatGPT
Challenges		**Ethical considerations**
Design and Methodological Challenges		Ethical Issues

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IS THE EDUCATION SYSTEM PREPARED FOR THE IRRUPTION OF ARTIFICIAL INTELLIGENCE? A STUDY ON THE PERCEPTIONS OF STUDENTS OF PRIMARY EDUCATION DEGREE FROM A DUAL PERSPECTIVE: CURRENT PUPILS AND FUTURE TEACHERS **Y.** 2023 [8]

Description. The paper includes the following three objectives: (O1)To study the level of prior knowledge and use of ChatGPT by students.; (O2) To assess the perception of the application by students. (O3) To assess the perception of the application by prospective teachers. A survey was conducted in research.

Outcomes. Students outcomes: personalized learning tool, ChatGPT saves much more time on doing tasks than with other online resources or textbooks, easy to access and use; Teacher outcomes: to generate high-quality content, know-how artificial intelligence works to understand how the students can use it in their tasks, to be able to evaluate it in a way that prevents/detects plagiarism

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Teaching and Learning of Experimental Sciences	Personalized Learning

Methods	**Goal**	**Tool**
Survey (SUR)	Learning, Teaching	ChatGPT

Challenges	**Ethical considerations**
Design and Methodological Challenges, Teacher and Student Concerns	Cheating

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FOSTERING SOCIAL-EMOTIONAL LEARNING THROUGH HUMAN-CENTERED USE OF GENERATIVE AI IN BUSINESS RESEARCH EDUCATION: AN INSIDER CASE STUDY **Y.** 2024 [9]

Description. This paper examines a 14-week undergraduate business research course integrating AI tools for literature gathering, summarization, drafting, and editing. The pedagogy emphasizes foundational research skills, APA-style writing, and a human-centered approach incorporating Social-Emotional Learning (SEL) and Human-Centered AI (HCAI) principles. Students maintained meta-reflective journals to track AI engagement, while the instructor provided feedback through online and in-person sessions. Findings highlight AI's role in enhancing research efficiency, critical thinking, and self-awareness while addressing ethical concerns and dependency risks. Data from 72 student journals and instructor reflections offer insights for fostering responsible AI use in education.

Outcomes. Students improved their research skills by effectively using AI tools for tasks like brainstorming, summarization, and drafting, enhancing efficiency and comprehension. Through reflective practices, they developed critical thinking, ethical awareness, and practical AI competencies, including prompt engineering and fact-checking. Social-emotional learning (SEL) principles fostered self-regulation and responsible decision-making, while students also gained awareness of AI's limitations, such as producing generic outputs or potential dependency. Teachers adopted a facilitator role, guiding ethical and practical AI use while encouraging independent and collaborative learning. Meta-reflective journals provided valuable insights for assessing student progress and refining pedagogy. By balancing technical skill-building with SEL principles, educators promoted holistic student development and explored innovative teaching strategies, leveraging AI to enhance both learning outcomes and instructional practices.

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Business Research Methods	Student centered/ collaborative learning
Methods	**Goal**	**Tool**
Thematic Analysis, Case study	Learning, Teaching	ChatGPT,Perplexity, Claude,AIElicit, BuzzCaptions

Challenges	**Ethical considerations**
Technological Challenges, Teacher and Student Concerns	Cheating, Ethical Issues, Creating Bias

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EXTENDING DESIGN THINKING, CONTENT STRATEGY, AND ARTIFICIAL INTELLIGENCE INTO TECHNICAL COMMUNICATION AND USER EXPERIENCE DESIGN PROGRAMS: FURTHER PEDAGOGICAL IMPLICATIONS **Y.** 2022 [10]

Description. This article builds on the discussion of emerging approaches in technical communication and user experience (UX) design—specifically, design thinking, content strategy, and artificial intelligence (AI)—and their implications for professional practice. By extending these insights to technical communication pedagogy, the authors highlight the importance of integrating these trends into program development and offer strategies for effective implementation.

Outcomes. The article highlights that design thinking enhances the team experience because it provides a mechanism for productive collaboration while empowering collaborators to contribute to their projects.

Education level	**Education field**	**Pedagogical design**
Tertiary education in general	TPC and UX practices	N/A
Methods	**Goal**	**Tool**
Sistematic Literature Review (SLR)	Learning, Assessment	N/A
Challenges		**Ethical considerations**
Design and Methodological Challenges		N/A

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PREPARING PUBLIC RELATIONS' PRACTITIONERS FOR THE AI ERA: ADVANCING PEDAGOGICAL PRINCIPLES IN PUBLIC RELATIONS' ARTIFICIAL INTELLIGENCE EDUCATION **Y.** 2024 [11]

Description. This essay draws insights from recent research on AI value alignment, dialogic communication, and PR ethics, articulating three foundational principles for AI education in PR: authentic dialogue, client value centricity, and legal and ethical considerations. Aligned with these principles, the essay outlines four essential knowledge areas for PR AI education: programming and coding proficiency, AI fundamentals, the retrieval-augmented generation (RAG) system, and the LangChain framework for information security, as well as AI deployment and model optimization. An illustrative syllabus is presented to solidify these concepts. The essay further explores potential future directions and implications of integrating AI into PR education.

Outcomes. Advancements in AI suggest opportunities for higher productivity and more influential roles for strategic communicators, AI tools can significaly enhance the efficiency of tasks such as monitoring, sentiment analysis and data-driven insights

Education level	**Education field**	**Pedagogical design**
Master level	Programming	N/A
Methods	**Goal**	**Tool**
Other	Learning, Assessment, Teaching	N/A
Challenges		**Ethical considerations**
Limitations in Empathy and Human Interaction		Ethical Issues

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EXPLORING THE INTEGRATION AND UTILISATION OF GENERATIVE AI IN FORMATIVE E-ASSESSMENTS: A CASE STUDY IN HIGHER EDUCATION

Y. 2024 [12]

Description. This study investigated the use of GenAI within an 8-week undergraduate-level research methods courseat a university in the United States of America, aiming to understand how students leverage GenAI tools during individual formative e-assessments questions.

Outcomes. Firstly, the varied success and challenges students face when interacting with ChatGPT underscore the need for AI literacy programmes. These programmes would aim to equip students with the skills necessary to effectively use AI tools, including understanding their capabilities and limitations, how to interpret AI-generated responses, assess their reliability and how to formulate queries to obtain useful responses.Secondly, the strategic use of ChatGPT for assistance with formative e-assessments, including direct copying of questions into the tool, highlights the need for clear guidelines on the ethical use of AI in academic settings. Educational policies should clearly define what constitutes ethical AI use in coursework and formative e-assessments, providing examples of acceptable and unacceptable practices. This would help maintain academic integrity while allowing students to benefit from AI technologies.Thirdly, the effectiveness of ChatGPT in providing explanations and verifying students' thought processes suggests that GenAI tools can play a complementary role in learning and assessment. However, the findings also suggest that traditional study methods and resources (e.g., textbooks, class notes) still remain crucial in supporting students' learning. Educators should consider how GenAI tools can be integrated with traditional teaching methods to enhance learning outcomes. This could involve using AI to support flipped classroom models, personalised learning, and as a supplementary resource for explaining complex concepts.

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Social Sciences Research Methods	Technology Enhanced Learning

Methods	**Goal**	**Tool**
Survey (SUR)	Assessment, Learning	ChatGPT

Challenges	**Ethical considerations**
Design and Methodological Challenges, Teacher and Student Concerns	Ethical Issues, Other

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INTEGRATION OF ARTIFICIAL INTELLIGENCE IN ACADEMIA: A CASE STUDY OF CRITICAL TEACHING AND LEARNING IN HIGHER EDUCATION

Y. 2023 [13]

Description. This study scrutinizes the role of AI literacy and ChatGPT-3 in enhancing critical reasoning and journalistic writing competencies among 50 third-term journalism students at Tajik National University.

Outcomes. Research findings suggest a significant improvement in students' critical thinking and journalistic writing skills with ChatGPT-3 usage. The integration of AI tools in the classroom encourages in-depth analysis and collaboration, thereby enhancing students' writing skills. The results underline the importance of AI literacy in journalism education, preparing students for the rapidly transforming, AI-centric journalism industry.

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Journalism	Thinking-Based Learning
Methods	**Goal**	**Tool**
Interview (INT), Survey (SUR)	Learning	ChatGPT3
Challenges	**Ethical considerations**	
Technological Challenges, Teacher and Student Concerns	Ethical Issues, Legal Issues	

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Paraphrasing Strategies and Levels of Proficiency of an AI-generated QuillBot and Paraphrasing Tool: Case Study of Scientific Research Abstracts

Y. 2024 [14]

Description. The study by explores the effectiveness of AI-based paraphrasing tools, specifically QuillBot and Paraphrasing Tool, in rewording scientific research abstracts. Core focus is on the assessment of paraphrasing quality and strategies in AI-generated academic writing.The research focuses on identifying the paraphrasing strategies used by these tools and assessing their proficiency levels based on established frameworks Using 30 research abstracts from the Journal of Second Language Writing, the study evaluates the tools' paraphrased outputs according to the Keck (2014) taxonomy and Nabhan et al. (2021) strategies. The analysis examines various techniques, including synonym substitution, sentence restructuring, word-order changes, and condensation. Both tools were tested in their standard modes, and their outputs were categorized based on the extent of textual modification..

Outcomes. The study found that while AI paraphrasing tools (QuillBot and Paraphrase Tool) assist in avoiding direct plagiarism, they primarily rely on synonym substitution and minor structural changes, often requiring human post-editing to ensure accuracy, coherence, and academic integrity in research writing.

Education level	Education field	Pedagogical design
N/A	Applied Linguistics and English Language Education	N/A

Methods	Goal	Tool
Qualitative descriptive analysis	Assessment	AI-based paraphrasing tools (QuillBot and Paraphrasing Tool)

Challenges	Ethical considerations
Technological Challenges	Creating Bias, Ethical Issues

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CULTIVATING WRITING SKILLS: THE ROLE OF CHATGPT AS A LEARNING ASSISTANT—A CASE STUDY

Y. 2024 [15]

Description. The study by Punar explores the role of ChatGPT as a learning assistant in cultivating writing skills, with a specific focus on register knowledge in English language writing. The study aims to examine the impact of ChatGPT on the acquisition of register knowledge (formal, informal, and neutral) during different writing tasks. It explores whether students can improve self-editing skills through AI-assisted feedback and how they perceive ChatGPT's effectiveness in academic writing.

Outcomes. The study involved 11 university students from different faculties (Engineering, Economics and Administrative Sciences, and Education) at a state university in Türkiye, aged 19–21, with an English proficiency level above B1.

Education level	**Education field**	**Pedagogical design**
Undergraduate level	Language Education	Experiential Learning
Methods	**Goal**	**Tool**
Quasi-Experimental (QE)	Learning	ChatGPT-3.5
Challenges	**Ethical considerations**	
Technological Challenges, Limitations in Empathy and Human Interaction	Ethical Issues, Creating Bias, Other	

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