

Using Generative Artificial Intelligence in the Education in Marketing (a didactic experiment)

Neviana KRASTEVA

*Sofia University "St. Kliment Ohridski", Bulgaria
nevianak@feb.uni-sofia.bg*

Tsvetan DAVIDKOV

*Sofia University "St. Kliment Ohridski", Bulgaria
tzvetandavidkov@feb.uni-sofia.bg*

Aleksey POTEBNYA

*Sofia University "St. Kliment Ohridski", Bulgaria
aleksey.potebnia@feb.uni-sofia.bg*

Ekaterina SOULEVA*

**Corresponding author, esouleva@sentierobg.eu*

Abstract. *Students increasingly rely on Generative Artificial Intelligence (Generative AI) tools when completing academic assignments, which fundamentally transforms learning dynamics in higher education. From a pedagogical perspective, this shift raises critical questions regarding students' attitudes toward Generative AI, their level of competence in using such tools, and the implications for teaching and learning in applied disciplines such as Marketing. Drawing on constructivist and self-regulated learning perspectives, the present study conceptualizes Generative AI as a cognitive and metacognitive support that mediates knowledge construction rather than replacing human learning processes. Based on a targeted didactic experiment conducted as a workshop within an undergraduate Marketing course, the study addresses three interrelated research questions: (1) how frequently students use Generative AI tools and how they assess their own level of preparedness; (2) how students evaluate the educational benefits of Generative AI usage; and (3) which factors they perceive as critical for the successful integration of Generative AI into academic work. Empirical data were collected through a twophase design combining artifact analysis, expert evaluation, and a structured questionnaire (n = 54). The results indicate a high frequency of Generative AI usage: 43% of students report using Generative AI tools often or continuously, while 44% use them occasionally. Most respondents assess their level of Generative AI competence as at least "decent," with ChatGPT being universally used. Students identify productivity gains, support in information synthesis, and assistance with preparatory tasks as key benefits, while emphasizing prompt formulation, prior knowledge, and output validation as essential success factors.*

Keywords: Generative AI; marketing education; higher education; didactic experiment; self-regulated learning.

Introduction

The rapid diffusion of Generative Artificial Intelligence (Generative AI) tools in higher education has profoundly altered the way students search for information, process knowledge, and complete academic assignments. In practice, Generative AI is no longer a marginal or experimental technology: for many students, it has become an integral element of everyday learning activities.

This development poses significant challenges and opportunities for university teachers, particularly in applied fields such as Marketing, where analytical reasoning, strategic thinking, and contextual understanding are central learning outcomes. Within the framework of the newly established (2024) Gamification Transformational Laboratory, a team of lecturers and researchers from the Faculty of Economics and Business Administration (FEBA) at Sofia University “St. Kliment Ohridski” conducted a didactic experiment focused on the use of Generative AI in marketing education. Rather than approaching Generative AI solely as a technological innovation, the present study adopts a pedagogical perspective, viewing Generative AI as a learning mediator that interacts with students’ prior knowledge, learning strategies, and self-regulatory capacities. From this standpoint, understanding how students actually use Generative AI, how they perceive its benefits, and which competencies they consider essential becomes a prerequisite for designing effective learning environments. The primary goal of the experiment was to gain a deeper understanding of students’ attitudes toward Generative AI and their level of knowledge and skills in using such tools. Based on these insights, the study seeks to inform the intentional design and management of learning dynamics so that the educational potential of Generative AI is fully and responsibly realized. The study contributes to the literature on Marketing education by providing empirically grounded insights into how Generative AI tools are embedded in students’ learning strategies and by outlining didactic implications for university teachers. The findings support the need for pedagogically guided integration of Generative AI that fosters critical thinking, self-regulation, and responsible use rather than purely instrumental adoption. By moving beyond a purely descriptive account of Generative AI usage, the paper positions itself within the broader academic discourse on constructivist learning, self-regulated learning, and technology-enhanced education. In doing so, it aims to contribute to the emerging body of research on the pedagogical integration of Generative AI in higher education and, more specifically, in Marketing education.

Literature review

Over the past decade, scholarly interest in the application of Artificial Intelligence in education has increased significantly, with a particularly sharp rise following the public diffusion of Generative AI tools. Bibliometric analyses confirm a rapid growth in publications addressing AI-supported teaching and learning across diverse educational contexts (Afzaal et al., 2024; Delen et al., 2024; López-Chila et al., 2024). Despite this expansion, the literature remains fragmented, and stable, theory-driven findings are still emerging due to the complexity of educational systems and the dynamic evolution of AI technologies.

Generative AI and Higher Education: Current Research Trends

Existing research identifies three major trends in the integration of AI in education. First, AI applications have expanded from highly specialized domains (e.g., medicine or computer science) to broader educational fields, including business and social sciences (Afzaal et al., 2024). Second, there is increasing emphasis on collaboration between educators, researchers, and developers in designing AI-supported learning environments (Delen et al., 2024). Third, AI is increasingly viewed as a driver of systemic transformation, influencing curriculum design, assessment practices, and educational management (Totseva & Mavrodieva, 2024).

In higher education, AI is associated with opportunities for personalization, efficiency, and adaptive learning (Kuleto et al., 2021; Beloev et al., 2024). Generative AI supports content generation, summarization, translation, data processing, and individualized feedback, which may reduce learning time and enhance productivity (Surugiu et al., 2024). At the same time, concerns

related to academic integrity, ethical use, and over-reliance on automated systems remain central to the debate (Sova et al., 2024; Tsankov & Damyanov, 2024).

Theoretical Perspectives: Constructivism, Self-Regulated Learning, and Generative AI

To move beyond a descriptive understanding of Generative AI usage, it is essential to situate empirical observations within established educational theories. Two particularly relevant theoretical perspectives are constructivism and self-regulated learning, both of which offer a robust framework for interpreting how students interact with Generative AI in academic contexts. From a constructivist standpoint, learning is understood as an active process in which learners construct knowledge through engagement with problems, information, and social interaction. In this sense, Generative AI can be conceptualized as a cognitive tool that supports knowledge construction by providing scaffolding, alternative representations, and rapid access to synthesized information. Rather than transmitting knowledge, Generative AI facilitates exploration, hypothesis generation, and iterative refinement of ideas, especially in complex, illstructured tasks typical of Marketing education. Self-regulated learning theory further enriches this perspective by emphasizing learners' capacity to plan, monitor, and evaluate their own learning processes. When students use Generative AI effectively, they engage in key self-regulatory activities such as goal setting (defining what to ask the system), strategic planning (selecting appropriate tools and prompts), monitoring (evaluating the relevance and quality of AI-generated outputs), and reflection (validating and integrating results into their own reasoning). Consequently, the educational value of Generative AI depends less on the technology itself and more on students' metacognitive skills and prior knowledge. These theoretical lenses imply that students' attitudes toward Generative AI, their perceived competence, and their actual usage patterns are interrelated components of a broader learning dynamic. Positive attitudes and frequent usage are likely to be associated with higher levels of selfregulation and domain knowledge, whereas uncritical or purely instrumental use may undermine deep learning. This theoretical linkage informs the conceptual logic of the present study and guides the interpretation of the empirical findings.

Generative AI in Business and Marketing Education

Within the fields of Economics, Management, and Marketing, empirical research on AI-supported learning remains comparatively limited. Thematic reviews indicate that only a small share of AIin-education publications explicitly address business-related disciplines (Kuleto et al., 2021). Existing studies primarily focus on lecturers' adoption of AI tools and their perceptions of pedagogical impact (Surugiu et al., 2024), as well as on factors influencing students' willingness to use AI technologies (Sova et al., 2024). Research in Marketing education suggests that Generative AI is increasingly used for content creation, market analysis, and strategic decision support. Ivanov (2023) demonstrates that, at present, students perceive only marginal differences between human- and AI-generated marketing content, highlighting the need for instructional designs that emphasize critical evaluation

rather than passive consumption. Mengov and Zinovieva (2024) further argue that future managers must develop "expert intuition" and judgment capabilities that cannot be outsourced to AI systems. From an educational perspective, marketing tasks such as market entry analysis, segmentation, and strategy formulation are particularly suitable for constructivist, problem-based learning supported by Generative AI. These tasks require the integration of diverse data sources, contextual reasoning, and iterative decision-making, all of which can be enhanced – but not replaced – by Generative AI tools.

Research Gap and Positioning of the Study

Despite the growing body of literature, several gaps remain. First, many studies focus on technological capabilities rather than on learning processes and student agency. Second, empirical evidence linking Generative AI usage to self-regulated learning and competence development is still scarce, particularly in the context of Marketing education. Third, there is a lack of didactically grounded experiments that combine authentic academic assignments with systematic reflection on students' experiences. The present study addresses these gaps by examining students' Generative AI usage within a structured didactic experiment embedded in a real Marketing course. By explicitly linking empirical indicators (frequency of use, perceived competence, benefits, and success factors) to constructivist and self-regulated learning perspectives, the study contributes to a more theoretically informed understanding of Generative AI in higher education.

Methodology

Overview of the Didactic Experiment

A didactic experiment was conducted for the purposes of the present study in order to explore how undergraduate students in Marketing use Generative AI tools in authentic academic settings. The experiment follows the understanding of didactic experimentation as a targeted pedagogical intervention in which specific conditions are intentionally designed, the resulting effects are systematically observed, and conclusions are drawn regarding teaching and learning processes (Bijkov & Kraevski, 2007). The methodological design is exploratory and mixed method in nature, combining qualitative and quantitative approaches. Given the innovative and rapidly evolving character of Generative AI in higher education, the study does not aim to establish causal relationships but rather to provide an empirically grounded, theoretically informed analysis of students' usage patterns, perceptions, and self-assessed competencies. The experiment seeks to answer the following research questions: – How frequently do students use Generative AI tools when completing academic assignments, and how do they assess their level of preparedness? – How do students evaluate the educational benefits of using Generative AI? – Which factors do students perceive as critical for the successful use of Generative AI in academic work?

Structure and Duration of the Experiment

The didactic experiment was embedded in a compulsory Marketing course for fourth-year undergraduate students enrolled in the bachelor's programs in Business Administration and Economics and Finance at the Faculty of Economics and Business Administration (FEBA), Sofia

University "St. Kliment Ohridski". The experiment was conducted over a five-week period, from 10 November to 18 December 2024, and was structured into two sequential phases.

Phase One: Generative AI Supported Academic Assignment and Workshop

As part of the Marketing course, students were assigned a complex, problem-based task simulating a real-world consulting scenario. A manufacturing company seeks to enter the European market and hires the students, acting as consultants, to conduct a marketing analysis and provide strategic recommendations. Students were required to address the following questions: – What environmental factors should be considered when developing a marketing plan for the European market? – How should the European market be segmented? – What is the potential and attractiveness of the identified segments, and which segment(s) should be targeted? – At what stage of the product life cycle is the European market for the product? – Which market entry strategy is most appropriate? – How should pricing, distribution, and communication policies be defined? The

task was explicitly designed in line with constructivist principles, requiring students to integrate prior knowledge, analyse unstructured information, and justify strategic decisions. The use of Generative AI tools was explicitly encouraged, but not prescribed in terms of specific platforms, allowing students to select tools according to their preferences and perceived usefulness. Students worked in 15 teams consisting of two to four members. They were informed in advance about the evaluation criteria and their respective weights, enabling strategic planning and self-regulation of learning activities. Each team was required to: – Prepare and submit a written report via the university's e-learning platform, including a concise (up to 1,000 characters) description of the Generative AI tools used, the sources consulted, and the way AI outputs were integrated. – Present their results during a face-to-face workshop session. Presentations were public and included a discussion component, allowing for questions, argumentation, and defence of positions. The workshop format served a dual didactic purpose: it functioned both as an assessment mechanism and as a reflective learning environment in which students articulated and critically discussed their use of Generative AI. Four lecturers acted as independent evaluators. Based on written reports, presentations, and participation in discussions, each evaluator completed an assessment form. The evaluation criteria included: – completeness and persuasiveness of responses; – quality of analysis and justification; – visualization and presentation quality; – reliability of data and correctness of citations; – clarity and precision of expression; – active participation in discussion. Each criterion carried a predefined weight, and the final team score was calculated as the sum of points awarded by the evaluators.

Phase One Data Sources and Analytical Logic

Data from Phase One were collected through document and artifact analysis (student reports and presentations), structured observation during the workshop, and expert evaluation by lecturers. A qualitative content analysis was conducted to identify recurring themes related to students' Generative AI usage, perceived benefits, and strategies. These themes informed the development of notional indicators used in Phase Two.

Phase Two: Questionnaire Survey

Based on the notional indicators identified during Phase One, a structured questionnaire was developed to collect individual-level data. The questionnaire was administered between 11 December and 18 December 2024 and completed by students on a voluntary basis. A total of 54 valid questionnaires were collected out of 59 participating students, resulting in a response rate of 92%.

Operationalization of Key Variables

The correspondence between notional (conceptual) indicators and empirical indicators measured through the questionnaire is presented in Table 1. The indicators capture multiple dimensions of students' interaction with Generative AI, including frequency of use, self-assessed competence, types of tools used, perceived benefits, and perceived success factors.

Table 1. Correspondence between notional and empirical indicators

Notional indicator	Empirical indicator
Frequency of Generative AI usage in completing academic assignments	How often do you use Generative AI when completing academic assignments? (1 - all the time; 2 - often; 3 - sometimes; 4 - rarely; 5 - never)
Level of Generative AI usage	To what extent do you manage to utilize the capabilities of Generative AI well? (1 - I am very skilled; there are no secrets in this area for me; 2 - I use Generative AI at a high level; 3 - I use Generative AI at a decent level; 4 - I face serious problems with using Generative AI; 5 - I practically do not use Generative AI)
Which Generative AI resources (tools) do students use?	Which of the following resources (tools) do you use? ChatGPT; Perplexity; Gemini; Copilot; LLaMA; AI image prompts to generate art using DALL-E; Scopus AI; medical imaging and computer vision; small language models; others – please specify.
How do students evaluate the benefits of Generative AI usage?	To what extent does the use of Generative AI provide: general orientation on the research topic; higher productivity; synthesis of data and information from diverse sources; a suitable set of useful texts (sources); specific information on the research topic; processing of large volumes of data and information; processing and analysis of structured data; analysis and summarization of unstructured data; models for interpreting data and information; necessary images; preparatory work allowing focus on analysis and interpretations; scenario simulation; quality translation; appropriate reformatting or editing. Scale: 1 – Yes, absolutely; 2 – Rather Yes; 3 – Rather No; 4 – Definitely No; 5 – Difficult to judge.
Strategies for successfully using Generative AI in education (key factors)	To what extent do you agree that successful use requires: familiarity with best practices for a specific tool and an appropriate algorithm; prior knowledge of the topic; ability to formulate questions correctly; experience with the tool capabilities; ability to verify data and interpretations; understanding the principles of Generative AI operation; knowing which tool is suitable for specific needs. Scale: 1 – Completely true; 2 – Mostly true; 3 – Equally true and false; 4 – Mostly false; 5 – Completely false; 6 – Difficult to judge.
Examples of successful Generative AI usage	Please briefly describe a case in which you successfully used Generative AI. If you wish, you can provide the questions asked and the answers received.

Source: Authors' own research results.

Data Analysis Approach

Quantitative data from the questionnaire were analysed using descriptive statistical methods (frequencies, percentages, and distribution patterns), which are appropriate given the exploratory nature of the study and the sample size. Qualitative responses to open-ended questions were analysed thematically to enrich and contextualize the quantitative findings. Inferential statistical techniques (e.g., regression analysis or ANOVA) were not applied, as the study does not aim to test causal hypotheses. Instead, the emphasis is placed on transparency, reproducibility, and analytical coherence between research questions, data collection methods, and analytical procedures.

Limitations of the Study

Several limitations must be acknowledged. First, the study is based on a relatively small and context-specific sample ($n = 54$) drawn from two bachelor's programs within a single faculty. Consequently, the findings should be interpreted as indicative rather than generalizable. Second, the results rely substantially on students' self-assessment and self-reported data, which may be influenced by social desirability or overconfidence. Opportunities for external validation are limited, despite the inclusion of expert evaluation during the workshop. Third, the dynamic nature of Generative AI technologies implies that students' skills, perceptions, and usage patterns may

evolve rapidly. Longitudinal research designs and broader comparative studies would be required to capture these dynamics more comprehensively.

Results and discussions

Frequency and Intensity of Generative AI Usage

The empirical findings reveal a high frequency of Generative AI usage among undergraduate students in Marketing-related programs. According to the survey data, 11% of respondents report using Generative AI tools continuously when completing academic assignments, 32% use them often, and 44% use them sometimes. Only 13% indicate rare or no usage. These results confirm that Generative AI has become an integral component of students' learning practices rather than an occasional or experimental resource. From a constructivist perspective, such frequent use suggests that students actively incorporate Generative AI into their problem-solving processes, particularly when dealing with complex, open-ended tasks such as market analysis and strategy formulation. Compared with earlier studies conducted shortly after the initial diffusion of Generative AI tools (e.g., Sova et al., 2024; Tsankov & Damyanov, 2024), the observed usage frequency is relatively high. This may reflect both the increasing maturity of Generative AI technologies and the specific academic context of Marketing education, where information synthesis and analytical reasoning are central learning activities.

Students' Self-Assessed Competence in Using Generative AI

Regarding self-assessed competence, 67% of students report using Generative AI at a "decent level," while 24% assess their competence as "high," and 5% claim very advanced skills. Only 4% indicate difficulties or non-use. These findings align with self-regulated learning theory, which emphasizes learners' perceived self-efficacy as a key determinant of strategic learning behaviour. Students who consider themselves competent are more likely to experiment with different prompts, critically evaluate outputs, and integrate AI-generated content into their own reasoning. Lecturers' observations during the workshop confirm that students' self-assessments are largely realistic. In comparison with findings reported by Surugiu et al. (2024) and Sova et al. (2024), the students in the present study appear better prepared to work with Generative AI tools. This higher level of perceived competence may be explained by the authentic, problem-based design of the assignment, which required students to move beyond superficial content generation and engage in iterative refinement, validation, and justification of AI-supported outputs.

Generative AI Tools Used by Students

All respondents report using ChatGPT, making it the dominant tool in the sample. Other tools are used less frequently: Gemini (48%), Copilot (35%), DALL-E (26%), Perplexity (24%), and small language models (13%). Tools such as Scopus AI, LLaMA, and domain-specific applications are rarely used (4%). This distribution reflects both accessibility and task relevance. Text-based large language models are particularly well suited to marketing assignments that involve analysis, synthesis, and strategic reasoning. The limited use of specialized or academic AI tools suggests that students prioritize convenience and versatility over disciplinary specificity. These findings are consistent with prior research indicating that students predominantly adopt Generative AI tools that offer immediate cognitive support and low entry barriers (Surugiu et al., 2024; Tsankov & Damyanov, 2024). From a didactic standpoint, this underscores the need for instructors to explicitly introduce and scaffold the use of more specialized AI resources where appropriate.

Perceived Benefits of Generative AI Usage

Students' evaluations of the benefits of Generative AI reveal a clear hierarchy. Thus, the evaluated benefits can be grouped into five well-defined categories - see Table 2.

Table 2. Benefits of Generative AI resources

Group	Benefits of Generative AI resources
Group 1 - Positive assessment in the range [96–93%]	Generative AI can handle preparatory and routine tasks, thereby enabling users to concentrate on analysis and interpretation (96%); synthesis of data and information from diverse sources (93%).
Group 2 - Positive assessment in the range [87–83%]	General orientation on the research topic (87%); higher productivity (87%); processing large volumes of data and information (83%).
Group 3 - Positive assessment in the range [79–78%]	Specific information on the research topic (79%); appropriate text formatting/editing in accordance with specified parameters (78%); processing and analysis of structured data (78%); analysis and summarization of unstructured data (78%); models for interpreting data and information (78%).
Group 4 - Positive assessment [72%]	Quality text translation (72%); suitable set of useful texts or sources (72%); simulation of scenarios for future developments (72%).
Group 5 - Positive assessment [50%]	Images needed for visualization (50%).

Source: Authors' own research results.

The highest-rated benefits relate to handling preparatory and routine tasks, synthesizing information from diverse sources, providing general orientation on the research topic, and increasing productivity. These results support the interpretation of Generative AI as a cognitive offloading mechanism that allows students to allocate more cognitive resources to higher-order learning activities such as analysis, interpretation, and decision-making. This aligns with constructivist assumptions that tools should reduce extraneous cognitive load while supporting meaningful knowledge construction. Lower – but still substantial – levels of positive assessment are reported for data processing, scenario simulation, and visualization, indicating that students recognize the broader analytical potential of Generative AI tools beyond text generation. The pattern of perceived benefits closely mirrors findings reported in business education research (Surugiu et al., 2024) and suggests that Generative AI is primarily valued for its role in enhancing efficiency and sense-making rather than for replacing analytical judgment.

Factors for Successful Use of Generative AI

Students identify several factors as critical for successful Generative AI usage. Based on the combined criterion (completely true + mostly true) from the scale ranking, the evaluated factors can be grouped into three well-defined categories - see Table 3.

Table 3. Factors for successful Generative AI usage

Group	Factors for successful Generative AI usage
Group 1 - Positive assessment in the range [100–96%]	The ability to formulate well your questions to Generative AI (100%); the ability to verify or validate the provided data and interpretations (96%).
Group 2 - Positive assessment in the range [92–91%]	Familiarity with best practices for working with a specific tool and using an appropriate algorithm (92%); having prior knowledge of the topic, enabling more effective communication with Generative AI (92%); understanding the principles of Generative AI mode of operation in order to adapt accordingly (91%).
Group 3 - Positive assessment [89%]	Knowing which Generative AI is suitable for your needs (89%); having experience and understanding in general the capabilities of the utilized Generative AI tool (89%).

Source: Authors' own research results.

The most strongly endorsed factors include the ability to formulate effective prompts and to verify and validate AI-generated outputs. Familiarity with best practices, prior domain knowledge, and understanding how Generative AI functions are also rated highly. These findings directly reflect core components of self-regulated learning, particularly monitoring and evaluation. The emphasis on validation indicates that students are aware of the limitations and potential inaccuracies of AI-generated content and recognize their own responsibility in the learning process.

Importantly, the prominence of prior knowledge as a success factor supports the argument that Generative AI amplifies, rather than substitutes for, students' existing competencies. Without sufficient domain knowledge, the educational value of Generative AI remains limited.

Didactic Implications and Theoretical Integration

Taken together, the results illustrate a dynamic interaction between students' attitudes toward Generative AI, their self-assessed skills, and their learning strategies. Frequent usage, positive evaluations, and emphasis on critical success factors suggest that Generative AI is embedded within students' self-regulated learning processes rather than used as a passive shortcut. From a theoretical perspective, the findings provide empirical support for conceptualizing Generative AI as a mediating artifact in constructivist learning environments. Its pedagogical value emerges when it is integrated into assignments that require analysis, reflection, and justification – conditions that were intentionally designed in the present didactic experiment. At the same time, the results highlight the necessity of pedagogical guidance. Without explicit instructional framing, there is a risk that students may over-rely on Generative AI or use it instrumentally, thereby limiting deep learning. This reinforces the role of university teachers as designers of learning environments that foster critical, responsible, and reflective use of AI technologies.

Conclusion

Based on a two-phase didactic experiment conducted within undergraduate programs in Business Administration and Economics and Finance, the present study examined how students use Generative Artificial Intelligence tools when completing academic assignments in Marketing. The findings indicate a high frequency of Generative AI usage: 43% of participants report using such tools often or continuously, while 44% use them occasionally. Students also report relatively high levels of competence, with the majority assessing their skills as at least “decent.” ChatGPT emerges as the dominant tool, while other Generative AI resources remain less widely known and used. From a pedagogical perspective, the results demonstrate that Generative AI is primarily used to support preparatory activities, information synthesis, and initial orientation on complex assignments. At the same time, students clearly recognize that successful Generative AI usage depends on human competencies such as effective prompt formulation, critical validation of outputs, prior domain knowledge, and an understanding of how AI systems function. These findings reinforce the view that Generative AI does not replace learning but reshapes the conditions under which learning occurs.

Academic and Didactic Contribution

The main contribution of the study lies in its theoretically informed, empirically grounded analysis of Generative AI usage in Marketing education. By integrating constructivist and self-regulated learning perspectives with data from a real-world didactic experiment, the study moves beyond descriptive accounts and offers insights into the learning dynamics associated with Generative AI-supported tasks. Specifically, it demonstrates how students embed Generative AI into their

selfregulatory strategies and how pedagogical design can channel AI usage toward deeper learning outcomes. For Marketing education, the study provides evidence that complex, problem-based assignments – such as market entry analysis – are particularly well suited for the responsible integration of Generative AI. When properly framed, such tasks encourage students to use AI as an analytical partner rather than as a shortcut, thereby fostering critical thinking and strategic reasoning.

Implications for University Teachers and Institutions

The findings have several practical implications for university teachers. First, instructors should explicitly address Generative AI usage within course design by clarifying expectations, ethical standards, and evaluation criteria. Second, learning activities should be structured to require justification, reflection, and validation of AI-generated outputs, thereby supporting self-regulated learning. Third, educators themselves require ongoing professional development to remain informed about the capabilities and limitations of evolving Generative AI tools. At the institutional level, universities should move beyond restrictive or purely regulatory approaches and instead develop pedagogically informed frameworks for Generative AI integration. This includes providing access to appropriate tools, supporting interdisciplinary collaboration, and embedding AI literacy within curricula.

Limitations and Directions for Future Research

Several limitations of the study must be acknowledged. The sample size is relatively small and context-specific, which limits the generalizability of the findings. In addition, the reliance on selfreported data introduces potential biases related to self-perception and social desirability. Future research should address these limitations through longitudinal designs that track changes in students' Generative AI usage, competencies, and learning outcomes over time. Comparative studies across disciplines, institutions, and demographic groups would further enhance understanding of contextual differences. In addition, future work could employ experimental or quasi-experimental designs to examine the causal effects of specific pedagogical interventions involving Generative AI. As Generative AI continues to evolve, ongoing empirical and theoretical research will be essential to ensure that its integration into higher education supports meaningful learning, equity, and academic integrity rather than undermining them.

Acknowledgments

The authors wish to thank their colleagues, Assoc. Prof. Nikolay Netov, Ph.D., and Prof. D.Sc. Georgi Mengov, from FEBA at Sofia University "St. Kliment Ohridski," for their consultations and assistance in conducting the experiment, and the fourth-year students from the Business Administration and Economics and Finance programs at FEBA who participated in the didactic experiment.

During the preparation of this manuscript, the authors used ChatGPT by OpenAI exclusively for language editing, readability improvement, and correction of English phrasing. The conceptual framework, methodology, analysis, interpretations, experimental design, and conclusions presented in the paper were developed entirely by the authors. Following the use of this tool, the authors carefully reviewed and revised the manuscript and assume full responsibility for the final content of the publication.

Funding

This study was partially funded by the Bulgarian Ministry of Education and Science under the National Science Fund, Competition for Fundamental Scientific Research 2024, Contract No. KII-06-H85/3 dated December 5, 2024.

This study was also partially funded by the European Union - NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, Project SUMMIT BG-RRP-2.004-0008-C01.

References

- Afzaal, M., Shanshan, X., Yan, D., and Younas, M. (2024). Mapping artificial intelligence integration in education: A decade of innovation and impact (2013–2023). A bibliometric analysis. IEEE Education Society Section. <https://doi.org/10.1109/ACCESS.2024.3443313>
- Beloev, H., Voynokhovska, V., and Smrikarov, A. (2024). Conceptual framework for the use of artificial intelligence in higher education. *Strategies for Policy in Science and Education*, 32(5s), 11–22.
- Bijkov, G., and Kraevski, V. (2007). *Methodology and Methods of Pedagogical Research*. Sofia: University Publishing House "St. Kliment Ohridski".
- Delen, I., Sen, N., Ozudogru, F., and Biasutti, M. (2024). Understanding the growth of artificial intelligence in educational research through bibliometric analysis. *Sustainability*, 16, 6724. <https://doi.org/10.3390/su16166724>
- Ivanov, S. (2023). Using artificial intelligence to create marketing content – opportunities and limitations. *Newmedia21*. <https://newmedia21.eu/using-artificial-intelligence-to-create-marketing-content-opportunities-and-limitations/>
- Kuleto, V., Ilić, M., Dumangiu, M., Ranković, M., Martins, O. M. D., Păun, D., and Mihoreanu, L. (2021). Exploring opportunities and challenges of artificial intelligence and machine learning in higher education institutions. *Sustainability*, 13(18), 10424. <https://doi.org/10.3390/su131810424>
- López-Chila, R., Llerena-Izquierdo, J., Sumba-Nacipucha, N., and Cueva-Estrada, J. (2024). Artificial intelligence in higher education: An analysis of existing bibliometrics. *Education Sciences*, 14(1), 47. <https://doi.org/10.3390/educsci14010047>
- Mengov, G., and Zinovieva, I. (2024). Games, competitions, and artificial intelligence in university education in business administration. *Pedagogika – Pedagogy*, 96(9s), 21–34.
- Sova, R., Tudor, C., Tartavulea, C. V., and Dieaconescu, R. I. (2024). Artificial Intelligence Tool Adoption in Higher Education: A Structural Equation Modeling Approach to Understanding Impact Factors among Economics Students. *Electronics*, 13(18), 3632. <https://doi.org/10.3390/electronics13183632>
- Surugiu, C., Grădinaru, C., and Surugiu, M.-R. (2024). Artificial Intelligence in Business Education: Benefits and Tools. *Amfiteatru Economic*, 26(65), 241–258. <https://doi.org/10.24818/EA/2024/65/241>
- Totseva, Y., and Mavrodieva, I. (2024). Strategic and communication aspects of artificial intelligence usage in education. *Pedagogika – Pedagogy*, 96(8), 1056–1073.
- Tsankov, N., and Damyanov, I. (2024). Attitudes of Students – Future Teachers, for the Application of Generative Artificial Intelligence. *Strategies for Policy in Science and Education*, 32(4), 383–394.