LEARNING GAINS AND STUDENT RESERVATIONS: EVALUATING A GPT-BASED AI ASSISTANT IN GEOGRAPHY TEACHING

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Abstract
This study examines the educational potential of a GPT-based AI assistant designed to support university geography students in practising geographical relationships, developing geographical thinking, and improving their ability to explain geographical topics clearly and accurately. The assistant was implemented in an experimental teaching setting involving four seminar groups: two received access to the AI tool, while the remaining two followed standard instruction without it. Student performance was evaluated through a pre-test/post-test design. The results indicate that students who used the AI assistant achieved significantly better learning outcomes than those in the control group. At the same time, the findings reveal an important tension between effectiveness and acceptance: despite improved performance, 54% of students using the AI assistant reported a preference for conventional teaching. This apparent paradox suggests that measurable learning gains do not automatically translate into positive student attitudes toward AI-supported learning. The study discusses two possible explanations for this result: first, the relational and affective dimensions of teaching, including teacher friendliness, empathy, and interpersonal support; and second, the AI assistant's strictness, particularly its tendency to reject imprecise or insufficiently accurate answers.

Key words: geography education, GPT-based AI assistant, geographical thinking, learning outcomes, student perceptions

Introduction

Artificial intelligence (AI), particularly generative AI based on large language models, has become a prominent topic in higher education due to its capacity to generate explanations, respond interactively, and provide scalable academic support across diverse learning tasks. At the same time, its expansion has raised concerns regarding reliability, academic integrity, student dependency, and the changing role of teachers (Milano, McGrane & Leonelli, 2023; Lee et al., 2024). A key advantage of AI-supported learning lies in its ability to offer immediate, flexible, and partly personalised assistance, including repeated practice, adaptive explanation, and formative feedback, which makes it relevant not only as an information source but also as a tutoring tool (Chan & Hu, 2023). Students often value generative AI for brainstorming, writing support, idea clarification, and personalised feedback, while recent reviews highlight its growing role in personalised learning pathways in tertiary education (Fortuna et al., 2025).

However, the educational significance of generative AI cannot be understood solely in terms of efficiency. Student perceptions remain ambivalent, combining appreciation for speed and convenience with concerns about accuracy, bias, privacy, ethics, and over-reliance on machine-generated responses (Chan & Hu, 2023). This tension is particularly relevant in geography education, where learning depends not only on factual recall but also on understanding relationships between phenomena, interpreting spatial complexity, and explaining causal links in a clear and structured manner (Drápela, 2023). Although AI tools may therefore support the development of geographical reasoning, geography teaching also relies on guidance, dialogue, and the gradual formation of disciplinary thinking in a social learning environment (Lee et al., 2024; Chan & Tsi, 2024). Current debates likewise stress that, despite their interactive capacities, generative AI tools cannot replace the relational and affective dimensions of teaching that shape engagement and trust (Kim et al., 2025). Student–teacher rapport, empathy, and interpersonal support remain central to meaningful learning, which is why teachers are unlikely to become obsolete even in AI-supported education (Sybing, 2019; Zhou, 2022). Against this background, the present paper examines a GPT-based AI assistant developed for university geography students to support the practice of geographical relationships, the development of geographical thinking, and the formulation of clear and accurate explanations. Using an experimental design with four seminar groups, two with access to the assistant and two following standard instruction, the study evaluates both its effect on learning outcomes and the extent to which positive student acceptance accompanies improved performance.

Material and methods

The experiment was conducted in the course Economic Geography, in which 160 students were originally enrolled. Of these, 138 students completed the course and were included in the final evaluation. The experimental group consisted of two seminar groups totalling 78 students. These students were instructed to use the GPT-based assistant during the semester, and their use of the tool was encouraged and monitored. The control group consisted of 60 students from seminar groups that did not have access to the assistant.

At the beginning of the semester, a pre-test was administered to determine students' initial knowledge level. The results showed no statistically significant differences between the experimental and control groups, indicating a comparable starting level.

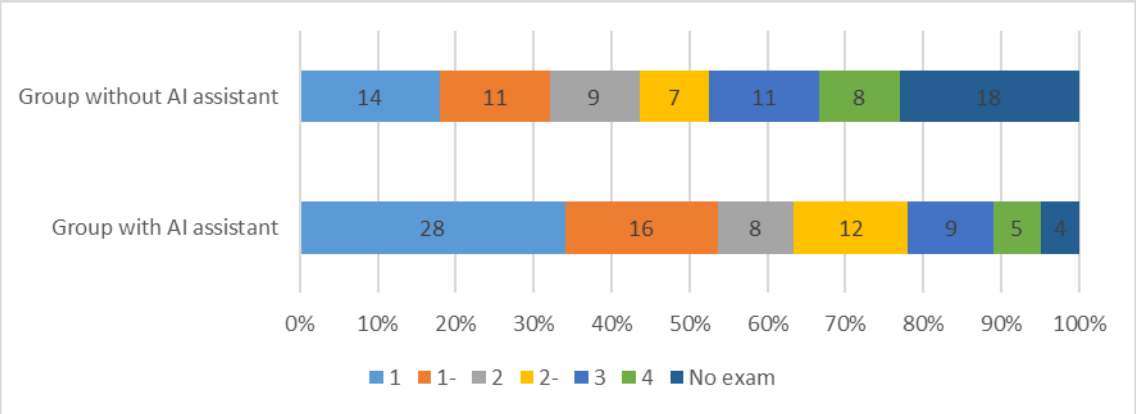
The intervention was based on a custom GPT model created by the course instructor under the title "Tutor of Economic Geography." The model was developed on the ChatGPT platform and built on course materials, including the course textbook, lecture presentations, and additional supporting materials. The assistant was designed to examine students on the subject matter covered in the course. In cases of incorrect or incomplete answers, it provided hints leading students toward a correct response. At the same time, it was able to generate questions of varying difficulty and to focus selectively on particular parts of the curriculum.

At the end of the semester, student performance on the final test was evaluated to assess whether access to the assistant affected learning outcomes. In addition, students in the experimental group completed a short questionnaire reflecting on their experience with using the AI assistant.

Results

Table 1 presents a comparison of the final test results between the group required to use the AI assistant and the group without access to it. The difference is immediately apparent: students in the experimental group achieved markedly better outcomes. More than half of the students in the experimental group received grades of 1 or 1−, whereas fewer than one-third of the students in the control group did. The results also indicate a substantial reduction in the semester failure rate, defined here as a student not taking the final examination.

Tab. 1: Final exam results for the experimental and control groups



At the same time, the results reveal a striking paradox. Although the AI assistant appears to have contributed to significantly better learning outcomes, student attitudes towards it remained rather reserved. In the final questionnaire, 54% of students (42) who used the assistant stated they still preferred conventional teaching, while only 29% (23) evaluated the assistant positively. Interestingly, the analysis of responses to the open-ended question, in which students were invited to describe their experience with the AI assistant in their own words, showed that only a very small number explicitly mentioned factual or technical errors, even though such limitations were in fact present, for example, in tasks involving numerical calculation or ordering. Instead, the dominant criticism concerned the assistant's interaction style. Students frequently described it as overly strict in its evaluation of answers, insufficiently empathetic, and lacking the human element they associate with effective learning. Some responses also suggested that repeated failure to provide a fully correct answer led to frustration and even feelings of inadequacy. On the other hand, students also identified several clear advantages of the tool, particularly the possibility of using it anytime and anywhere via their own mobile phone, the conversational format of interaction, the ability to turn repetitive revision into a relatively engaging activity, and an overall appreciation of having such a support tool available.

Discussion and Conclusion

The findings point to an apparent paradox: measurable learning gains do not automatically translate into positive student attitudes towards AI-supported learning. Although students who used the GPT-based assistant achieved significantly better academic results, a majority still preferred conventional teaching. This suggests that the effectiveness of an educational tool cannot be evaluated solely through performance outcomes. Students may benefit cognitively from a particular form of learning support while simultaneously perceiving it as less attractive, less comfortable, or less motivating than traditional teacher-led instruction.

One possible explanation lies in the relational and affective dimension of teaching. Learning is not only a cognitive process, but also a social and emotional one. In conventional classroom settings, students are accustomed to forms of support that include teacher friendliness, empathy, encouragement, and interpersonal understanding. These qualities help create a sense of safety and trust that can be highly important for motivation and willingness to engage with challenging content. Even if an AI assistant improves performance, it cannot fully replicate the human dimension of interaction that many students continue to value as an essential part of the educational experience.

A second explanation may be found in the assistant's strictness, especially in its tendency to reject imprecise or insufficiently accurate answers. From a pedagogical point of view, this strictness may have contributed to better learning outcomes by forcing students to formulate their responses more precisely and to engage more carefully with the subject matter. At the same time, however, such an approach may have been experienced as frustrating. In the Czech educational context, many students have become accustomed to a system in which demands are often softened, grading is moderated, and insufficiently precise answers are frequently tolerated to some extent. The AI assistant did not operate in this way. Instead, it consistently insisted on correctness and precision, which may have left students feeling academic strictness they found uncomfortable or discouraging. In this sense, the negative reactions to the assistant may reflect not only its technological nature, but also a broader tension between rigorous feedback and student expectations shaped by prior educational experience.

In conclusion, these findings suggest that the future educational use of AI should not be understood simply in terms of whether it improves results, but also in terms of how students experience its mode of interaction. If AI tools are to be more widely accepted, their design may need to combine cognitive rigour with a more supportive and emotionally sensitive style of communication.

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Souhrn
Tento článek analyzuje vzdělávací potenciál asistenta s umělou inteligencí založeného na modelu GPT, který je navržen tak, aby podporoval vysokoškolské studenty geografie v procvičování geografických souvislostí, rozvíjení geografického myšlení a zlepšování jejich schopnosti jasně a přesně vysvětlovat geografická témata. Asistent byl implementován v experimentálním výukovém prostředí zahrnujícím čtyři seminární skupiny, z nichž dvě měly přístup k nástroji s umělou inteligencí, zatímco zbývající dvě skupiny absolvovaly standardní výuku bez něj. Výkon studentů byl hodnocen pomocí pretestu a posttestu. Výsledky naznačují, že studenti, kteří používali asistenta s umělou inteligencí, dosáhli výrazně lepších studijních výsledků než studenti v kontrolních skupinách. Zároveň zjištění odhalují důležité napětí mezi efektivitou a akceptací: navzdory zlepšenému výkonu 54 % studentů používajících asistenta s umělou inteligencí uvedlo, že dává přednost konvenční výuce. Tento zdánlivý paradox naznačuje, že měřitelné studijní zisky se automaticky nepromítají do pozitivního postoje studentů k učení podporovanému umělou inteligencí. Studie diskutuje dvě možná vysvětlení tohoto výsledku: zaprvé, relační a afektivní dimenze výuky, včetně vstřícnosti učitele, empatie a interpersonální podpory; a zadruhé, přísnost asistenta s umělou inteligencí, zejména jeho tendence odmítat nepřesné nebo nedostatečně přesné odpovědi.

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