



Using GenAI Tools to Enhance Teaching and Learning in Science

Dimitrios Sotiropoulos¹, Michail Kalogiannakis²

University of Thessaly, Department of Special Education, Volos, Greece^{1,2}

Abstract

The integration of generative artificial intelligence (GenAI) tools in the teacher's training curriculum offers a golden chance to build on the pedagogical competencies of pre-service primary teachers, especially in science teaching. The utilisation of GenAI Chatbot tools, grounded in natural (and native) language, has been demonstrated to be efficient and effective, i.e. it generates valid and reliable responses when the questions (prompts) directed to it are formulated correctly. The formulation of effective prompts by users is contingent on their awareness of prompt engineering principles and the formulation of questions based on this knowledge, particularly in educational settings. Recent research has underscored the efficacy of familiarizing educators with the fundamentals of prompt engineering as a pivotal component for effectively integrating GenAI tools in enhancing learning experiences. GenAI tools can greatly assist science teachers in this area. For example, they help explain experiments, create graphical representations, and clarify concepts across different subjects. The effective (relevant and accurate) response of these tools when designing educational activities can significantly assist teachers in preparing their learning materials that include more specific and accurate questions and answers for students, always adapted to their needs and in cultivating their skills. Also, GenAI tools are useful in enhancing the integration of special needs education (SEN) methods in science teaching and learning, and thus enhance inclusivity and effectiveness. The responses of our students at the University of Thessaly, collected via three different tools, indicate a favourable attitude towards the utilisation of GenAI tools for the creation of learning materials for science lessons and the support of SEN issues in primary school. However, as is the case with numerous other surveys, concerns regarding the ethical implications of such tools and a desire for enhanced support for learning within their studies have also been expressed.

Keywords: Chatbots, Generative AI, Pre-service teachers training, Science Education, Special Education Needs

1. Introduction

In the last three years, educational organisations at every level have experienced a significant impact due to the emergence of numerous generative AI tools capable of responding to simple and complex inquiries from pupils, students and teachers within seconds, and of creating materials tailored to their specific needs. This impact is primarily attributable to the radical transformation that AI is effecting in conventional teaching methods, assessment practices and learning models. This transformation has given rise to several challenges, including the interrogation of conventional assessment methodologies, concerns regarding academic integrity and the authenticity of learning, the role of educators in the emerging technological landscape, the necessity to reconceptualise curricula, and the emergence of a digital divide. These challenges are prompting educational institutions to re-evaluate the fundamental principles of learning and pedagogy in the era of AI, and to reconfigure their courses through the proactive integration of the field of artificial intelligence (AI), with a particular focus on the domain of generative artificial intelligence (GenAI).

In the context of these changes in the Department of Special Education at the University of Thessaly, we are exploring possible changes and additions within the context of the subject of science in the teacher's training curriculum. In teaching science, GenAI has been especially beneficial. GenAI can deconstruct complex scientific concepts and construct different representations of phenomena, thus providing teachers with several avenues through which they can effectively teach challenging concepts [1]. GenAI is also beneficial in inclusive education since it modifies learning content for students with special educational needs (SEN). By offering differentiated content - in the guise of simplified descriptions or alternative examples - GenAI enables a more inclusive learning environment and accommodates the different learning profiles present in today's classrooms [2]. However, while the benefits of GenAI are profound, its application has challenges, including ethical considerations and data privacy, as well as the need for robust AI literacy for educators [3]. Addressing these challenges is important so that the potential of GenAI is realized equitably and sustainably.



2. Literature Review

2.1. *Benefits and Challenges in GenAI Adoption in Teacher Training*

The integration of Generative Artificial intelligence (GenAI) into teacher training is rapidly transforming teacher training practices with novel instruments to improve pre-service teachers' pedagogical competencies [4]. In this existent age where educators and students are heavily dependent on AI applications, they have a lot of benefits to expect in relation to science education, since complicated concepts require dynamic, adaptive teaching strategies that GenAI could deliver, such as the use of context-specific lessons plans and explanations through chatbots [5]. Additionally, their usage helps the pre-service teachers to develop critical skills in prompt engineering, a new kind of digital literacy competency that enables the user to converse with an AI system [2], [6].

A recent study has shown that GenAI can be beneficial for teacher training because it would enable the preparation of pedagogical competencies in less time. For example, these studies showed that pre-service teachers could use GenAI to plan lessons, create content, and generate formative assessments, sharpening their instructional skills [7]. GenAI has much promise for deep teacher training, yet it is not without its own set of serious challenges.

Ethical issues in the use of AI for education have been raised as among the vital issues of concern. Various forms of inherent bias in AI-generated content, risks to data privacy, and over-reliance on AI-generated outputs causing academic dishonesty have been widely covered in the literature [3]. Moreover, effectiveness depends largely on user inputs since prompt engineering has to be developed by pre-service teachers [8] to have pertinent, accurate, and pedagogically sound responses from the AI [5], [9]. The steep learning curve attached to acquiring proficiency in these competencies results into initial frustration and resistance on the part of the educators. The infrastructure limit and lack of administrative support also defeat the chance to widespread use of these technologies leading to underutilization of what GenAI has to offer compared to its potential in educational practice [7]. But all these have to be strategically addressed in order to ensure effective and ethical integration of GenAI into transforming teacher training.

2.2. **GenAI and Special Education**

Generative AI has begun to investigate the potential of its tool to encourage the practice of inclusive teaching. This is caused by GenAI's ability to tailor its outputs based on different input types, thereby allowing teachers to create different learning experiences for students with varying needs from this multifunctional technology. Research into the AI lesson assistants indicated that they could produce various versions of educational materials on the same topic. For instance, according to Abualrob [1], alternative methods or resources for learner ability levels could be recommended. In the same study [1] teachers remarked that the AI assistant had facilitated modifying lessons to adapt to the students' needs and offered recommendations on modifying the lesson for high-achieving and low-achieving students in the same class. Such flexibility serves an even greater purpose of supporting SENs or special needs students by enabling GenAI tools to simplify, extend, or sensory-friendly section materials like teachers will find it relatively easy to create equal opportunities for disabled or learners having learning difficulties. Additionally, the AI may provide a very extensive version of a lesson, with a visual aid for a student with a vision impairment, or it could suggest ways an autistic student might participate in a group activity.

Beyond academic-length materials, AI technologies are added from time to time, such as auto-captioning audio materials and text-to-speech and voice-interface chatbots, again making education accessible to students with hearing or reading impairments [10]. Such items combined will allow teachers to develop more inclusive classrooms. In sum, while human judgment is always important in realizing any AI output, GenAI can serve as posterity's best friend for generating differentiated instructional materials and thus support increased inclusiveness in education

2.3. **GenAI and Science Education**

Particularly in the area of science education, GenAI helps render difficult scientific concepts into easier ones and attracts student interest, specifically in subject-specific pedagogy. Making abstract or advanced topics relevant for young learners is often a struggle for science pre-service teachers. Generative AI can contribute in offering analogies, visual descriptions, or step-by-step explanations for science topics [3] like kinematics [11].

For instance, a GenAI system might create a simple analogy for a teacher explaining gene editing or generate a detailed verbal description of a physics phenomenon that the teacher might adopt or



modify for a lesson. It could also suggest exciting experiments or hands-on activities. One study indicated that by suggesting games to teach ecosystems, the AI would give teachers fresh ideas to expand their science lessons, ideas they never would have considered on their own [1].

When these AI-suggested ideas were implemented, students became more engaged, as the novel activities captured their interest in enjoyable ways [1-]. Moreover, generative AI may be applied in simulated lab environments or problem-based scenarios for science inquiry. But also some inherent limitations in the ChatGPT (and other chatbots) must be highlighted such as generating wrong or fake information and that way misleading users [12].

3. Methodology

The present study constitutes a pilot investigation, the findings of which will facilitate the formulation of preliminary hypotheses concerning the utilisation of GenAI tools in the context of science education. The research was carried out with students of the Special Education Department (SED) during the winter semester of 2024-25 studying various years from the 2nd to the 4th year. The objective of this phase of the research is to collect data from diverse sources to obtain a multifaceted perspective on the perceptions of special education students regarding the utilisation of generative AI tools in the creation of educational materials, with a particular focus on science instruction.

The participating students are drawn from three diverse elective courses within the special education department's curriculum, representing different years of study. The courses chosen were: "E-learning in Education", "Educational Software and Applications" and "Science Education". The characteristics of the courses were significant for the study. The first two are elective courses that students choose to learn to use digital tools in their future teaching. Especially at "E-learning in Education" students have an obligatory assessment of creating an e-learning course in the Learning Management System (LMS). The third course is also an elective course with science education as a main topic and students are working in the creation of educational scenarios with the use of digital technology.

The objective at this stage of our research is not to draw safe conclusions that can be extended, but rather to establish some preliminary conclusions about the opinions and attitudes of the students of our department towards the use of GenAI tools in creating educational material for science education. We intend to build on these initial conclusions and complement (and/or modify them accordingly) with additional and broader research in the coming period.

The tools employed in this qualitative pilot research study comprised the following:

- (a) questionnaire,
- (b) an open-ended question and
- (c) short interviews with students.

3.1. Questionnaire

The questionnaire was completed by students enrolled in the elective courses "E-learning in Education" and "Educational Software and Applications". Participants were studying at different levels, from second to fourth year. The questionnaire was administered in the first lesson of each course, prior to the commencement of the first lecture. The completion of the questionnaires was not compulsory and freedom tends to attract a more diverse group, thereby increasing the randomness of participant characteristics, a factor that strengthens the validity and reliability of the collected data [13]. The questionnaire posed questions regarding respondents' perspectives, perceptions and attitudes concerning the overarching concept of AI, the utilisation of AI mobile applications, and the employment of online GenAI tools for education in general. While not all the questions in the questionnaire pertained to science, they did pertain to the other disciplines (language, mathematics, etc.) of future special education teachers. The present study concentrated on the eight questions related to the primary subjects of our research, namely the use of GenAI tools in science teaching for both general and special education.

3.2. Open-ended question

The open question posed to the students attending "E-learning in Education" was part of the accompanying documentation file of the course's main assessment. The main assessment of the course was to create a complete digital e-learning course (learning scenario, activities, teaching materials, etc.) in the LMS (open e-class) platform of our university. To develop this course, students were permitted to utilise any AI tool they deemed beneficial. Before that in two lectures of the "e-learning in education" course, students were introduced to various AI tools that they will either use in the classroom or help them create educational material.



Among these tools, they were introduced to mobile AI applications and especially to GenAI tools, for which students were trained on the basic principles of prompting engineering. The open question asked students to state which tools and how they were used by them during implementing a digital course on the LMS. In total, 88 students in the context of the “e-learning in education” course, submitted the accompanying documentation answering the specific open-ended question.

3.3. Semi-structured Interviews

In the context of the "Science" course, students were presented with a series of GenAI tools designed specifically for the course's benefit: science teaching and learning. The tools were demonstrated through illustrative examples, accompanied by specific prompts that highlighted their applications in Science. The presentation encompassed various GenAI tools, including ChatGPT, Magic School, Perplexity, Claude and Napkin. These tools can assist in the evaluation of both general and special education science lessons.

The presentation was followed by semi-structured interviews with five students. The interviews were designed to gather from five randomly selected students their views and attitudes about possible educational uses of the GenAI tools. Educational use means the creation of lesson plans, exercises, quizzes and rubrics in science education and on topics related to students with learning difficulties and/or disabilities and how to approach specific cases of students in their classrooms in the future.

The semi-structured interviews had the following four main parts of discussion with particular questions and probe questions:

- (A) Overall impression about the applications of genAI tools presented in the session
- (B) Potential uses of genAI tools in educational settings
- (C) Benefits of incorporating GenAI tools into science or SEN education
- (D) Reflections and Future Directions

Great importance was given to the issues of exploring issues concerning students with learning difficulties and/or disabilities, with particular reference to the help that students could receive on how to approach specific cases of students in their classrooms in the future. A significant discussion ensued regarding the practical application of these tools and the potential support available from the university in learning and using them according to academic integrity and established ethical rules [14].

4. Results

4.1 Questionnaire Results

A total of 14 male and 46 female participants took part in the study. The questionnaire comprised eight questions. At Table 1 the eight selected questions of the questionnaire are included along with the statistical data about mean, median and standard deviation. The statistical analysis was made using application software SPSS v27.

Table 1. The eight selected questions of the questionnaire

Q	Questions	Mean	Median	Std. deviation
1	I find it interesting and useful to use Generative Artificial Intelligence tools to facilitate my daily life as a classroom teacher.	3,83	4	0,642
2	There is enough room to create many more applications that will help to increase the use of AI in the educational process.	3,75	4	0,628
3	The use of AI in the educational process will change education itself for the better.	3,47	3	0,769
4	Based on what I already know, I believe that AI will give significant help, bring change and provide support especially in the field of the science course.	3,75	4	0,704
5	Based on what I already know, I estimate that GenAI will provide significant help in preparing my teaching in terms of material (presentations).	4,03	4	0,637
6	Based on what I already know, I estimate that the GenAI will provide considerable help in preparing my teaching in terms of lesson plans.	3,85	4	0,709
7	The GenAI tools will significantly help me with accessibility and inclusion topics in education.	4,10	4	0,752
8	When using AI applications and technologies in the classroom, human values and rights may be violated.	3,32	4	1,033



The questionnaire posed a series of inquiries designed to ascertain respondents' perspectives, cognisances and dispositions concerning the overarching notion of artificial intelligence (AI), the utilisation of mobile AI applications, and the employment of online generative AI (GenAI) tools within the context of education. It is noteworthy that not all of the questionnaire's inquiries pertained to scientific disciplines. The present study concentrated on 8 (out of 30) inquiries pertinent to the primary subjects of our research, namely the implementation of GenAI tools in science instruction for both general and special education.

4.2 Open-ended Question Results

Approximately sixty per cent (59.01%) of the 88 students that attended the course (e-learning) reported using generative AI tools, with 52 students stating that they used GenAI tools and 28 students leaving this open-ended question blank. A subsequent review of the generated content of their answers indicated that other students may have utilised such tools, though they did not explicitly mention it. Eight students stated that they did not employ a generative AI tool.

Of the 52 students who indicated that they used AI tools, 17 created digital courses on science subjects such as environmental studies, geography, biology, chemistry, physics, and astronomy. All individuals who developed a digital course in the LMS on the subject of sciences utilised GenAI tools. Seventeen (17) participants were implementing a science lesson, and in Table 2 below the GenAI tools and a qualitative approach to the frequency and type of use are listed for these participants. The GenAI tools that were most frequently used by the students included ChatGPT, Canva, and Gamma, among others.

Table 2. Usage and Tools

Online GenAI Tool	Category
ChatGPT	General purpose AI
Canva	Design with AI functions
Gamma	Creating presentations
DALL-E	Creating images
Magic School AI	Educational tool
Quizizz AI	Evaluation
AutoCap	Creating subtitles
Napkin AI	Diagrams
FREEPIK	Creating images
Pixlr	Editing images
Veed	Video Editing
Flixier	Creating subtitles
Genially	Interactive exercises

The ensuing table 3 provides a synopsis of the GenAI tools that students disclosed their utilisation of, along with how they employed said tools, in the conception of their digital course at the Department of Special Education at the University of Thessaly in Greece.

Table 3. Ways of using tools with AI components

Use Category	Applications	Tools Used
Create Educational Content	Organisation of learning scenarios	ChatGPT, Gamma
	Improvement and simplification of textbook texts	ChatGPT
	Creation of activities	ChatGPT, Magic School AI
	Creation of the ADDIE method	ChatGPT
Visual Material	Creation of images for e-class	Canva, DALL-E, FREEPIK, Pixlr
	Design of presentations	Gamma, Canva
	Create layouts	Napkin AI
Assessment & Interactivity	Create quizzes and tests	Quizizz AI
	Design of interactive exercises	Genially
	Creation of crosswords	Canva
Accessibility	Creating subtitles for videos	AutoCap, Veed, Flixier
Support & Explanations	Explanation of unknown concepts	ChatGPT
	Search for information	ChatGPT
	Improving structure and organisation	ChatGPT



Table 4 below lists the topics of the courses created at the LMS. The topics are from almost all grades of primary education and cover various topics of Natural Sciences.

Table 4. Course topics in LMS

Geography 5 th grade	Geography The earth as a celestial body 6 th grade	Geography solar system 6 th grade	Biology reproductive System. 6 th grade
Environmental study 3 rd grade	Geography 6 th grade	Physics mechanics 6 th grade	Biology 6 th grade
Environmental study 2 nd grade	Geography Continents 6 th grade	Environmental Studies 1 st grade	Physics Static Electricity and Electrical Circuits 5 th grade
Geography 5 th grade	Biology Digestive system 5 th grade	Astronomy Earth as a celestial body 6 th grade	Astronomy Solar System 6 th grade

The students attributed a beneficial and supportive role to GenAI. *"I provided ideas and ChatGPT refined them"* or *"help me to facilitate the explanation of complex scientific concepts"*. This fully aligns with the study [15] that explains that AI-powered tools like ChatGPT can provide personalized learning experiences, adapt to individual student needs, and offer instant feedback, making lessons more interactive and effective. Several students reported utilising GenAI contributing to the general improvement of their material. They mention that: *"ChatGPT help me to put in other words, sections of the textbook and to enhance existing texts"*, thereby. It was reported by many students that: *"GenAI functioned as an effective tool"* that *"save me time"*.

The extent of utilisation exhibited heterogeneity, ranging from rudimentary applications in image creation to sophisticated ones in the realm of scientific teaching methodology. The integration of GenAI into the educational process is evident, with students employing it across the entire spectrum of instructional preparation, including planning, organisation, content creation, and assessment.

4.3 Interviews' Results

By analyzing the students' responses, we derive the main general perception of each part of the discussion, as presented in the following Table 5.

Table 5. Interviews Results

Part	Part of the discussion	General perception	Indicative students' answers
A	Overall impression about the applications of genAI tools presented in the session	Positive and promising technology with useful tools	<i>I could save time and make my material more interesting</i>
B	Potential uses of genAI tools in educational settings	Good overview of how they can be used in education	<i>I realized that with these tools I can create material for my future course</i>
C	Benefits in incorporating GenAI tools into science or SEN education	Important assistance	<i>It could help me understand in special cases what to do, e.g. for a student on the autism spectrum</i>
D	Reflections and Future Directions	I expect to benefit from using GenAI tools but I also need help on how to use them	<i>I think I will use them but I need more help from the University on how to use them</i>

5. Discussion

The students in the first question (q1), expressed very positive attitudes about the support they would be able to have in preparing teaching materials through GenAI. Very high mean and median indicated a positive approach to supporting course planning through GenAI and low standard deviation indicated strong unanimity in responses. In question 2 (q2) participants show a positive attitude towards the development of new AI applications, believing that there is room for innovation in the field of education.

The homogeneity of responses suggests that students have concentrated perceptions on the topic. In the next question (q3) the relatively low mean and median indicate a moderate or even ambivalent



perception of the degree of change that AI will bring about in education. The larger standard deviation suggests that there are significant differences in participants' views, possibly due to differences in experience or expectations. Responses to the fourth question (q4) reveal that students have a positive perception of the support that AI can provide in science lessons. The median at 4 suggests that at least 50% of responses are at higher levels of agreement, although there is some variation.

At the next question (q5) participants express very positive attitudes towards support in preparing teaching materials through GenAI, with a very high mean and low standard deviation indicating a strong consensus in responses. Responses at the sixth question (q6) indicate a positive approach to supporting course design through AI, with responses clustered around high values (median 4). However, there is little variation indicating some variation in views. This particular question (q7) demonstrates the most positive perception, exhibiting a high mean, suggesting that participants believe in the significant potential of GenAI to enhance accessibility and inclusivity.

In the last question (q8) the lower mean combined with the higher standard deviation indicate a wide variation in the participants' opinions. This suggests the presence of significant concerns regarding potential violations of human values, with some expressing considerable scepticism and others holding more moderate views. The creation of lessons from the beginning, with the subsequent enrichment of these lessons using material created with the assistance of generative artificial intelligence (GenAI) tools, serves as a prime illustration of the effective utilisation of GenAI tools in the context of teaching science lessons.

The findings of the interviews indicate that teachers generally hold a favourable attitude towards the utilisation of AI, with a particular emphasis on its potential to facilitate the creation of teaching materials and to provide support for specific SEN cases. However, the study also underscores the necessity for further assistance and guidance to ensure optimal utilisation of these tools, particularly in the context of their application in the holistic integration of AI within the educational process.

6. Conclusion

The results of the study, as indicated by the completion of the questionnaire, the open-ended questions and the semi-structured interviews, suggest several noteworthy conclusions. The data in total demonstrate, as recent research has also revealed [16], that future teachers generally hold positive attitudes towards the integration of AI in education, particularly concerning enhancing accessibility, the creation of teaching materials, and its implementation in science lessons. However, there is a moderate degree of ambivalence regarding the extent to which AI will disrupt the educational process as a whole and opinions on the potential implications for human values vary significantly as also relative research mention too [16].

These findings underscore the necessity for further exploration and discourse concerning the integration of AI in education, to ensure that the advantages offered by technology are realised in a manner that respects human values, personal data and rights. In addition, through the successful practical use of GenAI tools to implement digital online courses in their assessments, we can assert that they not only wish or want but manage in practice to use such tools for educational and learning purposes.

Pre-service teachers wish to utilise GenAI tools to facilitate their professional development. They are convinced that these tools will assist them significantly in addressing both scientific issues and cases of special education. Nevertheless, they request additional assistance in two areas: firstly, they require guidance on the most effective utilisation of these tools, and secondly, they seek to acquire the knowledge necessary to manage any erroneous responses satisfactorily, whilst being protected from the potential ethical concerns associated with their use [14]. As it is mentioned [17] the integration of ChatGPT into educational settings also raises concerns about its potential negative impacts on educational processes and its adoption fosters a new paradigm in education that balances innovation with ethical considerations [14].

7. Limitations and Recommendations

The heterogeneity of the sample, both in terms of the year of study and the courses attended, precludes the possibility of generalisation of the conclusions. However, this heterogeneity can add important information to the overall data grid on the use of GenAI tools in the learning process. Indeed, using such tools by students (after only two lectures) when creating digital learning scenarios and related materials is encouraging and remarkable. A notable finding is the positive perception of these tools among a substantial proportion of students, who view them as valuable support for issues and topics related to special education. However, this assertion requires further validation through additional research.



All three pilot surveys even if they are limited in sample size each one demonstrate a favourable response from students towards GenAI tools, both in terms of their potential to facilitate the creation of learning materials in the domain of science and their anticipated role in providing support for special education issues. These studies, which collect a range of data that merits further investigation, serve as a preliminary foundation for effectively utilising these tools in science education and learning especially in SEN.

REFERENCES

- [1] Abualrob, M. M. (2025). Innovative teaching: How pre-service teachers use artificial intelligence to teach science to fourth graders. *Contemporary Educational Technology*, 17(1), ep547, <http://doi.org/10.30935/cedtech/15686>
- [2] Ramnarain, U., Ogegbo, A., Penn, M., & Ojetunde, S. M. (2024). Pre-service science teachers' intention to use generative artificial intelligence in inquiry-based teaching. *Journal of Science Education and Technology*, 33(5), 667-681, <http://doi.org/10.1007/s10956-024-10159-z>
- [3] Akanzire, B. N., Nyaaba, M., & Nabang, M. (2025). Generative AI in teacher education: Teacher educators' perception and preparedness. *Journal of Digital Educational Technology*, 5(1), ep2508, <https://doi.org/10.30935/jdet/15887>
- [4] Van Den Berg, G., & Du Plessis, E. (2023). ChatGPT and Generative AI: Possibilities for Its Contribution to Lesson Planning, Critical Thinking and Openness in Teacher Education. *Education Sciences*, 13(10), 998, <https://doi.org/10.3390/educsci13100998>
- [5] Wen, W., & Wen, H. (2024). Bridging Generative AI Technology and Teacher Education: Understanding Preservice Teachers' Processes of Unit Design with ChatGPT. *Contemporary Issues in Technology and Teacher Education (CITE)*, 2(4), <https://citejournal.org/volume-24/issue-4-24/general/bridging-generative-ai-technology-and-teacher-education-understanding-preservice-teachers-processes-of-unit-design-with-chatgpt>
- [6] Lee, G., & Zhai, X. (2024). Using ChatGPT for Science Learning: A Study on Pre-service Teachers' Lesson Planning. *IEEE Transactions on Learning Technologies*, 17, 1683-1700, <https://doi.org/10.1109/TLT.2024.3401457>
- [7] Bae, H., Hur, J., Park, J., Choi, G. W., & Moon, J. (2024). Pre-service teachers' dual perspectives on generative AI: Benefits, challenges, and integration into their teaching and learning. *Online Learning*, 28(3), 131–156. <http://doi.org/10.24059/olj.v28i3.4543>
- [8] Sun, G. H. (2024). Prompt Engineering for Nurse Educators. *Nurse Educator*, 49(6), 293-299, <https://doi.org/10.1097/NNE.0000000000001705>
- [9] Goodale, T. (2024). Using Generative AI to help with statistical test selection and analysis. *MSOR Connections*, 22(3), 10-16, <https://doi.org/10.21100/msor.v22i3.1485>
- [10] Stefaniak, J.E., & Moore, S.L. (2024) The use of generative AI to support inclusivity and design deliberation for online instruction. *Online Learning*, 28(3), 181-205, <https://doi.org/10.24059/olj.v28i3.4458>
- [11] Polverini, G., & Gregorcic, B. (2024). Performance of freely available vision-capable chatbots on the test for understanding graphs in kinematics. *2024 Physics Education Research Conference Proceedings*, <https://doi.org/10.1119/perc.2024.pr.polverini>
- [12] Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.4337484>
- [13] Kılınc, H., & Fırat, M. (2017). Opinions of expert academicians on online data collection and voluntary participation in social sciences research. *Kuram ve Uygulamada Eğitim Bilimleri/Educational Sciences: Theory & Practice*, 17(5), 1461–1486. <https://doi.org/10.12738/estp.2017.5.0261>
- [14] Petousi, V., & Sifaki, E. (2020). Contextualizing harm in the framework of research misconduct. Findings from discourse analysis of scientific publications, *International Journal of Sustainable Development*, 23(3/4), 149-174, <https://dx.doi.org/10.1504/IJSD.2020.10037655>
- [15] Uğraş, H., Uğraş, M., Papadakis, St., & Kalogiannakis, M. (2024). Innovative Early Childhood STEM Education with ChatGPT: Teacher Perspectives, *Technology, Knowledge and Learning*, Forthcoming article, <https://doi.org/10.1007/s10758-024-09804-8>
- [16] Alwaqdani, M. Investigating teachers' perceptions of artificial intelligence tools in education: potential and difficulties. *Educ Inf Technol* 30, 2737–2755, <https://doi.org/10.1007/s10639-024-12903-9>



- [17] Ipek Z.-H., Gözüm, A.-C.-I., Papadakis, St., & Kalogiannakis, M. (2023). Educational applications of ChatGPT, an AI system: A systematic review research, *Educational Process*, 12(3), 26-55, <https://dx.doi.org/10.22521/edupij.2023.123.2>