



Using GenAI Tools to Enhance Teaching and Learning in Science

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Outline

- ▶ Introduction
- ▶ Literature Review
- ▶ Methodology
- ▶ Results (Questionnaire, Open-Ended Responses, Interviews)
- ▶ Discussion
- ▶ Conclusion and Recommendations -Perspectives
- ▶ Possible Questions

Introduction

- ▶ **Transformative potential of AI** (Abualrob, 2025)
- ▶ **Challenges**
- ▶ **Ethical Concerns:** Potential biases in AI-generated content, data privacy issues, and academic integrity (Van Den Berg & Du Plessis, 2023)
- ▶ **Teacher Roles:** Educators need to reinvent how they structure lessons and evaluate student work.
- ▶ **Curriculum Redesign:** Universities are exploring how AI fits into existing modules and whether we need to revise entire programs.

Why GenAI in Teacher Training?

- ▶ **Pedagogical Support for Complex Concepts** (Ramnarain et al., 2024)
- ▶ **Prompt Engineering as a Core Digital Skill**
- ▶ **Inclusivity: Special Educational Needs (SEN)** (Akanzire et al., 2025)
- ▶ **Ethical and Practical Concerns**

Literature Review - Key Points

Benefits of GenAI

- ▶ Faster, more creative lesson planning (Wen & Wen, 2024)
- ▶ Improved accessibility for SEN (Abualrob, 2025)

Challenges

- ▶ Risk of “hallucinations” / inaccurate AI outputs (Goodale, 2024)
- ▶ Ethical issues: data privacy, academic dishonesty (Petousi & Sifaki, 2020)

Gap in Teacher Training

- ▶ Need for AI literacy, especially prompt engineering skills (Lee & Zhai, 2024)

Methodology

Pilot study, SEN, Department University of Thessaly, Greece

Questionnaire (60 students),

Focus: Attitudes, AI awareness, perceived usefulness in science

Open-Ended Question (88 students)

- ▶ Used in “E-learning in Education” course (17 out of 88)
- ▶ Students described which AI tools they used for creating digital courses

Semi-Structured Interviews (5 students),

Explored deeper views on SEN adaptations, ethical concerns, institutional support

Results - Questionnaire Highlights

- ▶ Positive Perception of GenAI
- ▶ Emphasis on SEN Integration
- ▶ Variation in Ethical Concerns

Results - 1/4

| 0 | 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 |

Results - 2/4

| Q | Questions | Mean | Median | Std. deviation |
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Results - Open-Ended Question

- ▶ 59% explicitly used GenAI
- ▶ All comment: Time-saving, simplified explanations
- ▶ 17 (/88) students create Science Lessons (Physics, Biology, Astronomy) in LMS and all used GenAI tools

Results - Interviews

- ▶ Overall Impression: “Promising,” “Time-Saving”, “Creativity Booster”
- ▶ Potential Uses: Lesson plans, prompts, SEN adaptations
- ▶ Demand for Guidance: Ethical rules, prompt engineering, verification

Discussion

- ▶ **Broad Acceptance:** Aligned with previous research (Bae et al., 2024)
- ▶ **Practical Gains:** Significant time savings, less on customization
- ▶ **Ethical & Reliability Issues:** Misinformation, data privacy, bias (Baidoo-Anu & Ansah, 2023)
- ▶ **Institutional Role:** Provide guidelines, training, and ethical standards

Conclusion & Recommendations

- ▶ Curriculum Integration (GenAI & Prompt Engineering)
- ▶ Hands-On Workshops (Practical AI Use)
- ▶ Ethical & Data Privacy Frameworks
- ▶ Further Research (Larger Samples, Classroom Observation)

Overall Conclusion-Perspectives

- ▶ Positive Reception of GenAI: Pre-service teachers see AI as a time-saving tool for lesson creation, including science and SEN contexts
- ▶ Inclusive Potential: Participants highlight GenAI's capacity to adapt content for diverse learning needs, promoting better accessibility
- ▶ Ethical and Practical Concerns: Data privacy and reliability of AI-generated content remain key worries. Participants request structured training and clear guidelines on responsible use
- ▶ Future Directions: Institutional support (ethical frameworks, prompt engineering training). Extended research to validate and refine strategies for AI integration in education

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Thank you!

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