TE_Reg WP2b Marburg/Germany

Integrated report on “Integration of GenAI in Teacher Education”

1 Introduction

This report provides a comprehensive insight into the role of artificial intelligence (AI) in teacher education, drawing from a series of surveys and discussions conducted with experts from various sectors of the educational landscape.

The first round of inquiry involved a written survey and subsequent discussion with 19 colleagues active in teacher education, focusing on their perspectives on the role of AI in their profession.

The second part of the inquiry involved a focus group discussion, which took place after an AI training session. The discussion centred on potential applications of AI in teacher education, with participants sharing their experiences and insights after the training.

Finally, a third inquiry involved written feedback and a discussion with experts from different sectors of the educational landscape, including representatives from educational administration, school directors, and experts in teacher education.

The report illuminates the diverse perspectives and experiences of the participants regarding the opportunities and challenges of integrating AI into teacher education. Both the positive potentials as well as the concerns and challenges arising from the use of AI are detailed.

2 Focus group “Teacher Educators”, part 1

As a focus group in the context of the TE_REG project at the Studienseminar Marburg, 19 colleagues who are active in teacher education were asked to share their perspectives on the role of Artificial Intelligence (AI) in teacher education. They were asked to answer two questions in writing:

1. What opportunities and challenges do you see for teacher education through AI?
2. Have you already gained experience with AI applications in educational work?

Following the written responses to these questions, a group discussion was held where participants further elaborated on their views and experiences.

The following presents a summary of the written responses and the results of the group discussion. This summary provides insight into the diverse perspectives and experiences of the participants regarding the opportunities and challenges of integrating AI into teacher education.

Opportunities of AI in Schools and Teacher Education

According to the educators, AI provides a myriad of opportunities for revolutionizing teaching and learning processes. They highlight the potential of AI to serve as a cognitive sparring partner in education. This feature allows it to aid in lesson planning by providing suggestions based

on data-driven insights. The educators also note that AI can facilitate the recording and clustering of lesson transcripts, providing teachers with a comprehensive overview of classroom interactions.

The educators see the potential of AI in creating differentiated texts and assignments. It can help explain concepts at various language levels, thereby catering to the diverse learning needs of students. They believe this can be particularly beneficial in reducing factual errors, especially among novice teachers who are still familiarizing themselves with the subject matter and teaching methodologies.

In the context of teacher education, the educators see AI as a valuable planning assistant. It can provide suggestions and support during the planning process, helping to streamline tasks and improve efficiency. They also see potential in AI's ability to foster evaluation skills in training sessions and in teaching. For instance, in exams where AI can be used, it can provide insights into student performance and identify areas that need improvement.

The educators also note the role of AI in generating ideas for module sessions and providing support in giving feedback on lesson plans and classroom visits. They see AI as a source of inspiration, providing a safe space for student teachers to seek feedback. They also mention the potential of AI in the quick creation of exercises or practice texts, allowing teachers to focus more on teaching and less on administrative tasks.

Challenges of AI in Schools and Teacher Education

Despite the numerous opportunities AI presents, its integration into schools and teacher education is not without challenges, as the educators point out. They express concern about the quality of AI contributions, particularly for secondary education. They argue that the quality of AI's output can only be assessed with a sound understanding of the subject matter. This necessitates a strong knowledge base among teachers to effectively utilize AI tools and interpret their outputs.

The educators also express concern about an over-reliance on AI, which could potentially lead to a decline in teachers' self-efficacy and autonomy. They worry that teachers might become overly dependent on AI for lesson planning and decision-making, which could undermine their professional judgement and skills.

The educators raise the issue of uncritical and unreflective text production using AI. Without proper guidance and critical thinking, teachers and students might accept AI-generated content without questioning its accuracy or appropriateness. They also express concern about the potential for misuse or plagiarism with AI-generated content, which could undermine academic integrity.

Distinguishing between the independent work of student teachers and the contributions of AI can be a complex task, as the educators note. They worry that student teachers may become overly reliant on AI tools, pushing the act of teaching into the background. This could impact the development of essential teaching skills and reduce the quality of education.

Moreover, the educators point out that many AI-created materials are not checked for factual accuracy. This could lead to the dissemination of incorrect information, impacting student learning and understanding. They stress the importance of teachers critically evaluating AI-generated materials to ensure their accuracy.

The educators also highlight the challenges posed by the rapid development of AI. Teacher educators need to keep pace with the evolving technology, necessitating regular professional development and updating of course content. This can be a demanding task, given the fast pace of AI advancements.

Experiences with AI in Teacher Education

Several of the educators have had experiences with using AI applications in their educational work. These experiences range from using AI tools in modules, comparing their own planning with AI's, using AI for creating subject analysis and teaching materials, to using AI as an idea generator.

The experiences with AI have been both positive and critical. Some educators reported relief in planning and preparing lessons, while others pointed out the challenges arising from using AI. These challenges include the need to critically reflect on the results and provide guidance on using AI. Some educators also expressed concerns about the quality and accuracy of AI-generated materials and the need to check these materials for factual correctness.

In conclusion, while AI offers significant opportunities for enhancing teaching and learning, it also presents considerable challenges. The educators stress the need to approach the integration of AI in schools and teacher education with a critical and reflective mindset. The goal should be to harness the potential of AI while also promoting the development of independent and critical thinking skills among teachers. The experiences of these educators provide valuable insights into how AI can be effectively integrated into education, highlighting the need for continuous learning and adaptation in the face of rapidly evolving technology.

3 Focus group “Teacher Educators”, part 2

In the following chapter, a discussion is summarized that was conducted with colleagues from teacher education. This discussion took place subsequent to an initial survey and discussion, which we summarized in the previous chapter. The discussion followed a two-part training on AI with a focus on "Creating your own AI bots for the support of teacher education". During the training, colleagues engaged with the concept of "megaprompts". The question posed for the discussion was: What possible applications do you see for the use of AI in teacher education?

Summarized responses included:

1. AI can be used as a planning aid for seminar design.
2. AI can provide assistance with feedback on lesson plans.
3. AI can aid in the design of reflection discussions.

4. AI can act as a "megaprompt" or sparring partner for trainee teachers to prepare lessons.
5. AI can serve as a research tool to prepare for non-subject classroom visits.

Reflecting on AI in the seminar sessions could include:

1. Critically evaluating lesson plans created by an AI.
2. Critically evaluating teaching materials generated by AI.
3. Understanding AI and learning how to use it (e.g., learning how to prompt, etc.).
4. Observing data protection and copyright when using AI.

4 "Understanding AI in Teacher Education: A Before and After Comparison"

The document provides insights from two rounds of discussions and surveys conducted among teacher educators about the role of artificial intelligence (AI) in teacher education. The process involved an initial discussion, followed by an AI training session, and then a subsequent discussion.

Across both discussions, there were several recurring themes. Participants consistently identified AI as a beneficial tool in lesson planning and creating differentiated instruction. They saw AI as a potential aid for reducing administrative tasks, thus allowing teachers to focus more on teaching. Concerns about the quality of AI's contributions, the risk of over-reliance on AI, and the need for a critical and reflective approach towards AI were also consistently brought up. The participants emphasized the importance of maintaining teacher autonomy and professional judgement, and ensuring the accuracy and appropriateness of AI-generated content.

The differences between the two discussions largely revolved around the specificity of the participants' understanding and proposed applications of AI. In the initial discussion, the views on AI's role were more general. However, after the AI training session, the participants' suggestions became more specific. They proposed concrete uses of AI such as using AI as a planning aid for seminar design, providing assistance with feedback on lesson plans, and acting as a "mega prompt" or sparring partner for trainee teachers to prepare lessons.

In conclusion, the process involving two discussions and an AI training session revealed an evolution in the participants' understanding of AI's role in teacher education. While there were common themes across both discussions, the specificity of the proposed applications of AI and the level of critical reflection required increased after the AI training. This suggests a growing awareness of the need for a critical and reflective approach to integrating AI into teacher education.

5 Focus group “Expert Perspectives on AI in Teacher Education”

In another round of inquiry, experts from various sectors of the educational landscape, including representatives from the educational administration (University of Marburg, the Hessian Ministry

of Education, Studienseminar Marburg) school directors, and experts in teacher education from the first (university) and second (Studienseminar) phases of teacher education, were asked for their views on the opportunities and challenges of AI in teacher education. The inquiry was conducted in writing, followed by a discussion on the given responses.

The responses from the experts showed a wide spectrum of perspectives on the role of AI in teacher education. A recurring theme was the potential for workload reduction through AI. Experts saw the potential of AI to take over certain tasks, thereby increasing efficiency. Furthermore, AI was seen as a source of new ideas and approaches to teacher education.

Another positive aspect highlighted was the role of AI as a reflection partner. Experts saw the potential of AI to facilitate reflective thinking in a "dialogue" format. They envisioned AI as a tool that could stimulate critical thinking and help teachers and students to reflect on their practices, ideas, and assumptions. This would not only enhance the learning process but also contribute to personal and professional growth.

Despite these positive aspects, experts also expressed concerns and challenges. Some were skeptical about the integration of AI in teacher education. The challenge of facing the development of AI and teaching students responsible handling of AI was emphasized.

In addition, the danger was raised that the use of AI could lead to a delegation of competence and creativity. There was concern that the use of AI could replace "real" reflection and scientific work and cause a lack of "human interaction".

Experts also posed the question of how to deal with AI-generated performances. They pointed out the need to change examination formats, not only to accommodate the potential of AI-generated content but also to ensure that the examination process remains relevant and effective in the context of AI integration. This new examination culture arises from the issue that students can generate texts with AI, rendering many traditional examination formats, such as essays, ineffective. On the other hand, experts emphasized the need to establish new examination formats that include the handling and use of AI for task processing.

The discussion revealed that the consideration of AI in teacher education is still in its early stages across all involved institutions. So far, the focus has been particularly on the issue of cheating in exams and the problem of an uncritical approach to AI, especially in text generation and research. However, the ideas about the positive potentials of AI are still quite vague. This particularly concerns aspects such as the potential of AI for workload reduction, as a source of new ideas and approaches, and as a reflection partner for teachers and students.

6 Conclusions

This report provides a comprehensive analysis of the role of artificial intelligence (AI) in teacher education, based on a series of surveys and discussions with experts across various sectors of the educational landscape.

The potential of AI to facilitate the creation of teaching materials and the planning of lessons was highlighted as a key benefit. This implies a need for teacher education to equip teachers with the skills to critically analyse, revise, and enhance AI-generated materials.

However, the integration of AI also necessitates changes to certain aspects of teaching. This includes the need to revise examination practices and homework assignments, and to prepare and support students in working with AI. The lack of developed concepts for these areas presents a particular challenge for teachers and teacher education.

Feedback and reflection are crucial elements of teaching and teacher education that enable sustainable and independent learning. There is hope that AI can support these areas, although this aspect of AI development is still in its early stages.

There are concerns, however, about the potential decrease in human interaction in education as AI systems take on more roles in guiding the learning process. This raises the need for a careful pedagogical discussion about the relationship between human teachers and AI systems.

Interestingly, key aspects often associated with the integration of AI in education did not resonate significantly in the discussions and surveys conducted for this report. Specifically, ethical discussions surrounding AI, the fundamental transformation of learning and working in general due to AI, and data protection issues, which are often highlighted in the literature (see the exploratory report), did not emerge as prominent concerns among the participants in this study. This could suggest a need for further awareness and understanding of these issues among educators and those involved in teacher education. As AI continues to evolve and become more integrated into educational settings, these issues will likely become increasingly relevant and important to address.