



PRESERVICE TEACHERS' PERCEPTIONS OF AI IN EDUCATION



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Arxiv Section: Instruction

Context

In Fall 2023 and Spring 2024, generative AI tools were integrated into the curriculum of my multiple-subject (elementary) and single-subject (secondary and K-12) teaching credential courses, EDMS 330A, EDMS 330B, EDSS 373A & EDSS 373B. Each course, conducted fully online and asynchronously over 8 weeks, enrolled 210 teacher candidates per semester, most with no prior experience using generative AI in education. The Fall course, Educational Technology Lab I, was followed by the Spring course, Educational Technology Lab II.

Learning Objectives

The AI-related assignments aimed to achieve the following key learning objectives:

In Fall 2023, the Educational Technology Lab I course included three AI-focused assignments:

- Week 3+4 Task 1. AI in Education (I) Introduction and Discussion: This assignment aims to introduce student teachers to AI tools, particularly generative AI tools. Additionally, student teachers will analyze practical ideas for utilizing ChatGPT in teaching or learning activities. Finally, they will discuss the concerns and needs associated with integrating AI tools into education.
- Week 5+6 Task 2: AI in Education (II) AI Experimentation Assignment: The objective of this task is to provide student teachers with a comprehensive understanding of AI chatbots, including their strengths, areas for improvement, and potential impact on education. By exploring AI chatbots objectively, student teachers can make informed decisions about their future use in educational scenarios. Their insights and reflections contribute to a deeper understanding of AI's role in the classroom.
- Week 7+8 Task 3. AI in Education (III) Evaluation of AI Tools in Education: In this assignment, student teachers evaluate an AI tool used in education, focusing on its features, benefits, and potential challenges. The second objective is to determine the tool's potential to enhance learning outcomes in diverse educational contexts.

The Spring 2024 Educational Technology II course featured one AI-related assignment:

- Week 7+8 (AI Perception Survey): In this survey assignment, student teachers share experiences and perspectives, as well as the students and teachers at their school placements, regarding the use of AI, specifically generative AI tools, in educational settings. The survey contains three sections: Section 1: Personal Use of AI Tools, Section 2: Perception and Use in Teaching Practice, Section 3: School's Stance on AI Tools.

Assignment

Fall 2023 Educational Technology Lab I (3 AI Assignments):

Week 3+4 Task 1. AI in Education (I) Introduction and Discussion: Student teachers review provided resources and share their analysis or experiences on the discussion board. They can choose one prompt from the following: 1) Discuss the potential advantages and disadvantages of using AI tools like ChatGPT in the classroom. 2) Explore the idea of AI Chat tools as valuable resources for teachers in lesson planning, activity design, or idea generation, 3) Consider the role of AI Chat tools as beneficial resources for students in accessing ideas or resources, 4) Reflect on any concerns about integrating AI Chat tools into education, and 5) Evaluate the need to reconsider assessment methods, as suggested by Emma Pass in her presentation.

Week 5+6 Task 2. AI in Education (II) AI Experimentation Assignment: Student teachers sign up for an AI Chatbot account and select a function related to teaching or learning. They develop a prompt for the Text-based AI Chatbot and feed it into the system. Students then evaluate the results and try two more follow-up prompts with varying specificity. Finally, they reflect on their experience and process. (Credits: AI Experimentation in Education Assignment created by Robert Rose, University of North Florida, WAWA assignment created Dr. Sasha Sidorkin, California State University, Sacramento)

Week 7+8 Task 3. AI in Education (III) Evaluation of AI Tools in Education: Student teachers evaluate a selected AI tool, examining its features, target audience, subject areas, pricing, and other relevant aspects. They reflect on the tool's potential to enhance learning outcomes in diverse educational contexts.

Spring 2024 Educational Technology II (1 AI Assignment)

Week 7+8 (AI Perception Survey): Student teachers participate in a survey sharing their experiences and perspectives, along with those of their school placements, regarding the use of AI, specifically generative AI tools, in educational settings. The survey includes three sections: Personal Use of AI Tools, Perception and Use in Teaching Practice, and School's Stance on AI Tools.

Evaluation Rubric

Criteria	Assessment	Student completed this activity / 15 pts
Prompt Development	<ul style="list-style-type: none"> Full Marks: Clear and well-defined prompt that effectively communicates the desired task to the AI Chatbot. Clarity and originality of the idea. Inclusion of specific examples and supporting points. Instructions on style, audience, and genre. Integration of additional texts and explanation of their use. Partially Met: Vague or poorly defined prompt No Marks: No prompt provided 	3 pts
Follow-up Requests	<ul style="list-style-type: none"> Full Marks: At least two meaningful follow-up requests provided to refine and improve the AI Chatbot output. Prompt improvement and iteration. Adequacy of the writing, including grammar, syntax, style, and organization. Incorporation of the original idea provided through the prompt. Critical analysis and identification of areas for improvement. Partially Met: Only one or two follow-up requests provided. No Marks: No follow-up requests provided 	3 pts
Documentation and Template Usage	<ul style="list-style-type: none"> Full Marks: All prompts, follow-up questions, and generated outputs properly documented using the provided template. No Marks: Incomplete documentation or not using the provided template 	2 pts
Personal Reflection	<ul style="list-style-type: none"> Full Marks: Thorough reflection addressing 3 questions and demonstrating critical thinking about the experience. Partially Met: Reflection covers 3 questions but lacks depth or critical thinking. No Marks: Superficial reflection that does not address any of the suggested questions 	7 pts
Extra Credit	<ul style="list-style-type: none"> Full Marks: Exceptional creativity or unique insights in prompt development, follow-up requests, or personal reflection (up to 2 points) 	0 pts

(Credits: AI Experimentation in Education Assignment created by Robert Rose, University of North Florida, WAWA assignment created Dr. Sasha Sidorkin, California State University, Sacramento)

Evidence of Student Growth

The AI in Education Discussion Assignment revealed student teachers' thoughtful consideration of the implications of AI tools like ChatGPT in the classroom. They explored potential benefits and drawbacks, with key concerns emerging around topics like AI replacing human effort, impacts on critical thinking and writing skills, potential biases, academic integrity, and the changing role of educators. Here are the key concerns that emerged:

1. The Sadness of AI Substituting Human Effort: Some student teachers expressed a sense of melancholy at the prospect of AI replacing human effort.
2. Beyond Cheating: Cognitive Impact and Brain Function: The group discussed how excessive reliance on AI for answers could impact students' critical thinking skills and cognitive development.
3. The Value of Writing Process and Intellectual Struggle: Student teachers emphasized the importance of the writing process and wondered if AI tools could adequately replicate this valuable experience.
4. Bias and Misinformation: Concerns were raised about potential biases embedded in AI algorithms.

5. **Cheating and Originality:** The group grappled with the fine line between using AI as a resource and engaging in outright cheating.
6. **Role of Educators and Ethical Considerations:** Lastly, student teachers recognized their pivotal role as educators. They acknowledged the need to guide students in responsible AI usage, emphasizing ethical considerations.

In the **AI Experimentation Assignment**, student teachers explored the use of a text-based AI chatbot, reflecting on its potential as either a net positive or negative for education. Overall, the responses were positive, though they emphasized the need for cautious and supplemental application. One student expressed initial skepticism but became a proponent after the exercise, stating, “I honestly have never used the AI Chatbot before but have heard many different things about it, both negative and positive. After doing this activity, I am a fan of this especially for the field of education.” This sentiment was echoed by another who remarked, “After experimenting with ChatGPT, I see it in a more positive light, but I still would use it cautiously.”

Students appreciated the chatbot’s rapid idea generation, which can be honed with precise prompts to align with educational objectives. Its utility was noted in providing teaching tips and facilitating classroom management, although concerns were raised about overreliance and potential inaccuracies. Many recognized the chatbot's capability to alleviate teachers' workloads by automating routine tasks such as assessment creation and lesson planning. However, the importance of skillful prompt crafting was emphasized to maximize the AI's effectiveness.

The feedback indicates that while AI tools like ChatGPT are valuable, their integration should carefully balance efficiency with the preservation of essential human elements in teaching. Despite AI's potential as a significant aid, the creativity of teachers and the need for tailored educational strategies are crucial, reinforcing AI's role as a supportive, not replacement.

The **AI Perception Survey** completed by 153 out of 210 student teachers provides an insightful look into their views and experiences with AI tools in education, structured into three sections.¹

In the **Personal Use of AI Tools section**, a substantial 88.9% of respondents reported using generative AI tools for personal learning or teaching preparation, with 92% specifically using text generators like ChatGPT and 26.1% employing AI-driven content creation tools. Additionally, 63.8% acknowledged that incorporating AI tools has altered their perception of learning and studying.

The **Perception and Use in Teaching Practice** section revealed mixed feelings about the adoption of AI in future classrooms: 49% of participants were in favor, 41.2% were uncertain, and 9.8% opposed it. The predominant concerns about integrating AI into teaching centered around an overreliance on technology (74.5%) and ethical issues (68%).

In the **School's Stance on AI Tools** section, the responses indicated a significant disparity in attitudes at their current teaching schools, with only 20% viewing AI usage positively, while a majority of 75.8% perceived it negatively.

These findings suggest that while there is a strong engagement with AI tools among student teachers for personal and preparatory purposes, there is considerable caution and resistance when considering their broader integration into educational practices and environments.

The findings from the open-ended question in the survey reflecting on student teachers’ experiences or observations, how do they think AI tools can impact student engagement and learning outcomes are summarized below.

¹ In summarizing student responses, the author used AI-assisted synthesis to consolidate their insights effectively.

Mixed Opinions: Some student teachers find AI tools helpful for creating engaging lessons and managing administrative tasks. Others express concerns about students becoming overly dependent on these tools.

- **Creativity and Critical Thinking:** student teachers worry that AI tools might stifle students' creativity and critical thinking skills. While AI provides useful information, it should not replace the effort and thought process that goes into learning.
- **Accessibility and Engagement:** Many student teachers believe AI tools can make learning more accessible and engaging for students. They provide personalized learning experiences, immediate feedback, and support for diverse learning needs.
- **Need for Training:** There is consensus on the need for more training to use AI tools ethically and effectively in the classroom. In summary, student teachers believe that AI tools offer great potential, but thoughtful implementation and ongoing training are essential to maximize their positive impact on student learning.

Conclusion and Reflections

The integration of AI tools in my teaching credential courses has been largely successful, with students demonstrating enthusiasm for experimenting with AI chatbots and AI in education. The learning experiences have positively impacted students' perceptions of learning and studying, as evidenced by 63.8% of survey respondents noting a change in perspective after using AI tools. Over 65% rated generative AI highly effective for personal learning and teaching preparation. To build on this, providing ongoing resources, balanced perspectives, and skill-building opportunities will be key.