

Undergraduate Thesis Prospectus

AI Tools in Education: Impact on Academic Integrity and Learning Outcomes

(technical research project in Computer Science)

The Competition for the Future of Artificial Intelligence in Secondary Education in the United States

(sociotechnical research project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **General Research Problem:**

*What is the proper place of artificial intelligence in education?*

The increasing integration of AI tools, such as ChatGPT, in educational settings prompts a critical question about their appropriate role in learning environments. These tools have the potential to enhance learning efficiency and accessibility, but they also raise concerns about dependency and the erosion of critical thinking skills. This research aims to evaluate how AI can be effectively integrated into education while preserving the fundamental goals of learning. The study will address both the opportunities AI tools present and the challenges they pose to educators, administrators, and students.

## **Technical Research Project:**

### **AI Tools in Education: Impact on Academic Integrity and Learning Outcomes**

*To what extent do AI tools, such as ChatGPT, affect students' development of critical thinking and problem-solving skills in educational environments?*

This technical research project aims to analyze the effects of AI tools on student learning processes, with a particular focus on cognitive skill development and academic performance. The research will compare AI-assisted and non-AI-assisted educational settings to identify shifts in learning behaviors, retention of subject knowledge, and overall cognitive growth.

The primary goal of this project is to measure and compare cognitive skill development between students who regularly use AI assistance and those who do not. The findings will aim to inform best practices for integrating AI in educational settings in a way that supports both cognitive development and academic integrity.

### State of the Art

AI in education is a rapidly evolving field. Studies by Zhang (2017) and Smith (2019) highlight the potential of AI to enhance learning efficiency while simultaneously raising concerns about its impact on academic integrity. Current AI implementations, such as ChatGPT, primarily focus on providing informational support but lack structured strategies to promote cognitive skill development or prevent dependency on AI tools. This research addresses a critical gap by investigating AI's influence on essential learning skills, including critical thinking and problem-solving.

### Methods

Data will be collected through a combination of controlled surveys and performance evaluations conducted in classrooms with and without AI tools. Statistical analysis will be used to identify significant differences in academic and cognitive performance outcomes, providing insight into the impacts of AI-generated assistance on student learning.

### Expected Outcome

This project aims to produce actionable guidelines for using AI tools in education to maximize their benefits while minimizing risks to cognitive development and academic independence. The findings could serve as a foundation for future research and policy recommendations, helping educators and administrators make informed decisions about AI integration in classrooms.

### **Sociotechnical Research Project:**

#### **The Competition for the Future of Artificial Intelligence in Secondary Education in the United States**

*In the US, how are middle and high school students, educators, and administrators competing to determine the place of AI tools in education?*

This research explores the tensions among key stakeholders and their competing perspectives on AI tools in education:

- Participants:
  - *Students*: Many students view AI tools as a means of convenience and efficiency. For instance, a Reddit user noted, “I don’t see the problem with using ChatGPT for homework if it saves time.” However, concerns exist about overreliance on such tools, potentially undermining genuine learning efforts.
  - *Educators*: Teachers express fears that AI may erode critical thinking skills and academic integrity. As one teacher stated, “AI could replace thinking if it’s not used responsibly” (*Teacher Network*, 2024).

- *Administrators*: School administrators face the challenge of balancing innovation with academic standards. While they aim to embrace technological advancements, they must also address concerns about fairness and accessibility.
- *AI Companies*: Companies like OpenAI emphasize that their tools are meant to enhance education rather than replace traditional methods. OpenAI's official statement promotes responsible use to augment, not substitute, teacher-led learning.
- **Published Research**: Studies like Zhang (2017) and Smith (2019) highlight the potential benefits of AI in education, such as increased efficiency and personalized learning. However, gaps remain in understanding the long-term effects on student development, particularly critical thinking and problem-solving skills.
- **Unsettled Questions**:  
How can AI tools be integrated into classrooms without undermining academic integrity?  
What policies and frameworks are needed to address the competing interests of students, educators, and administrators?

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