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Individualized Learning as an AI Tool: A Technical Report

Petsimnan Blessing Dayit

Lipscomb University, pbdait@mail.lipscomb.edu

Kasen Holt

Lipscomb University, kxholt@lipscomb.edu

Nuala Roper

Lipscomb University, rfroper@mail.lipscomb.edu

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Recommended Citation

Dayit, Petsimnan Blessing; Holt, Kasen; and Roper, Nuala, "Individualized Learning as an AI Tool: A Technical Report" (2024). *Student Works*. 11.

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Individualized Learning in AI as a Tool; A Technical Report

April 12, 2024

Prepared For

Dr. Kirsten Boatwright
Professor, Technical Writing EN3143
Lipscomb University, Nashville, TN

Team Members:

Blessing Dayit
Kasen Holt
Nuala Roper

Executive Summary

The purpose of the report's research is to test and analyze whether Artificial Intelligence (AI) platforms can be used as beneficial tools for individualized learning at Lipscomb University without violating the Academic Integrity Policy. The methods section evaluates AI on the scopes of accuracy, analytical thinking, and adaptability. The results demonstrated how each platform responded to the prompts within the lines of the scope. The answers they gave were accurate, detailed, and contained various adaptations to make explanations clearer for the user. The team concluded that AI can be used at Lipscomb as a beneficial tool for students in their distinct learning processes while still coinciding with the Academic Integrity Policy.

Introduction

This report investigates the new and rapidly growing field of Artificial Intelligence (AI) and how it may be used to aid students in their studies. AI refers to a computer system capable of performing complex tasks that historically only humans could do, such as decision making, problem solving, and reasoning. AI, at its core, can be as basic as translating one language to another or giving personalized recommendations based on previous history, similar to when Netflix and advertisements generate content. However, the team looks into the AI referred to as a machine that interacts with a user back and forth, generating rapid responses to prompted questions [1].

Today, the biggest question is if generative artificial intelligence will outgrow and outsmart human intelligence. There are many different views concerning this topic that should be further researched and understood. In this project, the team tested and analyzed three different AI platforms to decide if AI is a beneficial learning tool for students at Lipscomb University without violating the Academic Integrity Policy.

Lipscomb's Academic Integrity Policy states, "Unauthorized use of technology is the utilization of tools in the creation of academic work that are not explicitly permitted by the instructor, with or without citation. This includes, but is not limited to, the use of internet applications, research databases, citation generators, authoritative sources of information, and artificial intelligence (AI) tools. Students and faculty have access to research librarians who can provide guidance on the authorized use of technology for academic work." [2]. The phrase "but is not limited to" leaves a gray area for students to misuse and abuse the power of AI that can be beneficial to their learning capabilities. The team researched and concluded how this platform can be used without crossing the line.

Methods

Scope

Data collected for this project consisted of testing three different Generative Artificial Intelligence platforms: ChatGPT, Microsoft Bing, and DeepAI Chat. The research aimed at how AI can aid individualized learning for students by being accurate sources of information and engaging them to think critically rather than simply providing an answer. These standards of evaluation agree with Lipscomb's Academic Integrity Policy.

Data Collection

Each person in the team asked a different platform the same standard questions to understand its ability to answer the questions. The first set of questions were on accuracy, the team asked basic factual questions to see if the responses given were true.

Using Lipscomb University's Academic Integrity Policy as a standard, the team analyzed how well the platform produced analytical answers, thus prompting further critical thinking by the user. If any platform gave the user with an explanation rather than a candid answer, the team declared that it was clear that platform made the user think and solve problems through their own process.

Lastly, the team researched and asked questions about how the platforms adapt to the user's needs. Some platforms can change their answer based on what they perceive their user to best learn from. The limits are challenged here such as looking more into graphics and illustrations. If a platform can do this effectively, it is more useful and considered a learning tool.

Results

Figure 1 shows the result rankings on a 1-10 scale, representing percentages out of 100%, for accuracy, analytical thinking, and adaptations of each platform performance.

Accuracy

All the platforms were able to give accurate and correct answers when they could. The team found that the AI can produce correct answers quickly for questions pertaining to subjects such as history or the general topics of math and science but fail at providing answers when asked to solve a specific problem. Therefore, in Figure 1 below, the average of accuracy across all platforms is ranked 80%, since mostly the answer can be found but not all the time when the questions become too technical.

Analytical Thinking

The platforms cannot compute and give out specific answers to math and science questions, however they can give detailed processes of steps to follow to solve a problem. The team was pleasantly surprised with this finding as the responses would supply more detail than what was originally asked. However, none of the platforms were able to prompt the user with questions that could potentially guide and help the user through the learning process. The average percentage was similar between the three platforms with Microsoft Bing claiming the highest percentage due not only to the steps and words it was able to output, but graphics and video links for further research. (Figure 1)

Adaptability

The features of adaptations across the platforms are what varied the most. Figure 1 displays ratings of how beneficial the adaptations were to the user, while Table I lists the pros and cons of each platform. Although DeepAI Chat was similar in the two other areas investigated, it performed poorly when seeking special features. DeepAI Chat is able to go into different chat modes such as impersonating Albert Einstein, a best friend, or even a counselor and further summarize explanations. ChatGPT found its residence in the median as it could read aloud and prompt more critical thinking than the others. And Microsoft Bing exceeded the others by far, producing the most beneficial tools such as reading aloud, illustrations, and links for further explanations for the user to use. Fortunately, they all have a memory function to pull information from previous chats. From this, it can be concluded that a AI is beneficial to student learning depending on which platform the user decides to utilize.

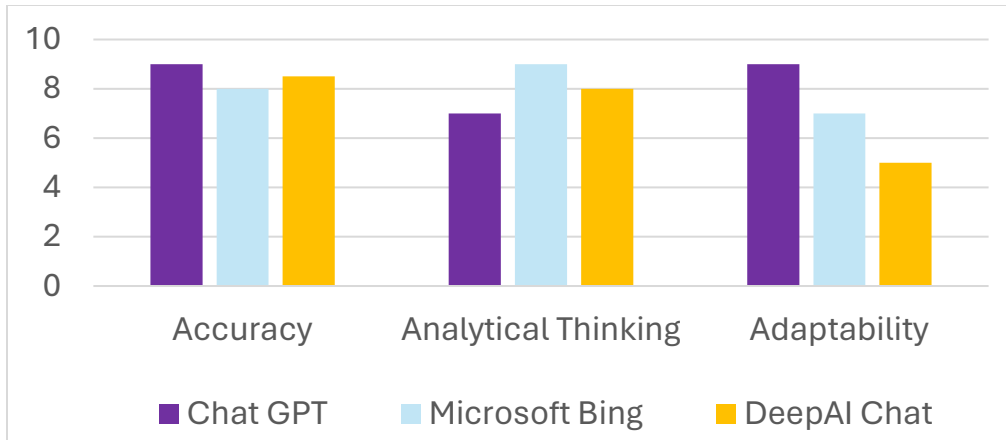


Figure 1: Capability Comparisons of Different AI Platforms

Discussion

Based on the research and results obtained, the team concluded that AI can be a useful learning tool for students while also agreeing with Lipscomb's Academic Integrity Policy. The outcomes were positive when compared to the evaluation standards in accuracy, analytical thinking, and adaptability.

The accurate answers simply provide credibility for students to trust when utilizing the platform for help. The detailed steps of processes foster analytical thinking as this creates a space for critical thinking for the student as they must now understand and apply it to their own problem. Since the platforms do not flat-out present the answer, cheating is not considered here as the user must think deeper into their own works. The more detailed responses provide a clearer explanation.

The various adaptations provide users with the extra tools they may need to thoroughly understand the content. The read aloud function could assist auditory learners or people who have trouble reading. Illustrations are great for visual learners and put more real-world applications into context.

From the three areas researched, the conclusion is that due to the credibility, analytical steps, and adaptations of the platforms, AI is beneficial to students to use as another learning tool, just as tutors, professors, or videos may be used to further understand content outside of the classroom. By using AI, this learning process can be done in a more efficient manner as accurate responses are given quickly and at any time with extra features that may help the certain individual. The evaluation standards still coincide with Lipscomb's Academic Integrity Policy because the answers provide true facts, foster critical thinking, and conform to what students may need without violating any regulations.

Table I
Pros and Cons of Different AI Platform's Adaptability Functions

	<i>Pros</i>	<i>Cons</i>
Chat GPT	Memory function Read aloud Provides explanations to foster critical thinking	Incorrect math answers No graphics
Microsoft Bing	Memory function Read aloud Graphics Links for more explanation	Incorrect math answers
Deep AI Chat	Memory function Different chat modes Summarize explanation option	Incorrect math answers No graphics Cannot read aloud

References

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Appendix A – Questions for AI Platforms

ACCURACY

1. When was the United States of America founded?
2. How does rain work?
3. Who were the Mayans?
4. What are the planets of our solar system?
5. Who was Christopher Columbus, and what did he discover?

ANALYTICAL THINKING

1. Can you create flashcards on how rotational motion works?
2. What are some time management tips?
3. Can you explain to me how to factor a polynomial?
4. How does color theory work?
5. What are the processes in baking a cake versus cupcakes?

ADAPTATIONS

1. Give me a graphic on how photosynthesis works.
2. Can you read aloud an expert from a book?
3. Draw for me a picture of children playing outside in the rain.
4. Display how basic sentence structure works.
5. Can you summarize for me this passage "...”?

Appendix B – Meeting Minutes

Meeting Minutes for Tuesday, March 5, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper
Holt took the meeting minutes

TOPICS DISCUSSED:

- Decided to take meeting minutes to help us keep up with the process
- Introduction to Tech Report, read over syllabus to further understand objective of the project
- A lit review is a review of the literature, article, what was read

DECISIONS MADE:

- Discussed about what topic we would like to investigate for AI research

FUTURE ACTIONS:

- Each partner will find an article over AI to report back with a summary of what they read and learned

Meeting Minutes for Thursday, March 7, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper with Dr. Boatwright
Holt took the meeting minutes

TOPICS DISCUSSED:

- Dr. Boatwright explained with us:
 - Defining lines of a research space
 - Testing generative AI and its limitations
 - Lipscomb's Academic Integrity Policy
 - Objective of project
 - Learned and understood what is missing from the readings that we can investigate

DECISIONS MADE:

- Looked over articles to decide that we want to research about how AI can be used as a tool for individualized student learning

FUTURE ACTIONS:

- Next meeting will be after Spring Break on March 19th

Meeting Minutes for Tuesday, March 19, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper

Holt took the meeting minutes

TOPICS DISCUSSED:

- Created a general project plan

DECISIONS MADE:

- Created questions to ask each platform
- Platforms:
 - Nula – ChatGPT
 - Blessing – Bing
 - Kasen – DeepAI Chat

FUTURE ACTIONS:

- Each member will test a different AI platform with pool of questions over the weekend
- Gather research by class period of March 26th

Meeting Minutes for Thursday, March 28, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper

Holt took the meeting minutes

TOPICS DISCUSSED:

- Compared findings of research from articles and testing of questions on AI platforms
- Scope topics: accuracy, analytical thinking, and adaptations

DECISIONS MADE:

- Start rough draft of Tech Report:
 - Transmittal Letter – Kasen
 - Cover Letter – Nuala
 - Executive Summary – Kasen
 - Introduction – Kasen
 - Methods – Nuala
 - Results – each write own
 - Discussion – Kasen
 - Illustrations – Blessing
 - References – Blessing

FUTURE ACTIONS:

- Meet Monday April 1st to create poster draft

Meeting Minutes for Monday, April 1, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper

Holt took the meeting minutes

TOPICS DISCUSSED:

- Compare findings to make graphics
- Decisions on completing rough draft of poster (i.e. content layout)

DECISIONS MADE:

- Bar graph of scope areas
- Pro and con table of adaptations

FUTURE ACTIONS:

- Work on perfecting content and poster design over the next week to have completed by April 9th to then proofread over
- May meet on Monday April 8th

Meeting Minutes for Wednesday, April 10, 2024

ATTENDEES:

Blessing Dayit, Kasen Holt, Nuala Roper

Holt took the meeting minutes

TOPICS DISCUSSED:

- Proofread over document

DECISIONS MADE:

- Content layout on the poster

FUTURE ACTIONS:

- Turn in work by Thursday night, April 11