

Exploring the Perspectives of Graduate Students on Generative AI Chatbots in Educational Contexts

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Motivation

Generative AI Chatbots, such as ChatGPT has gained significant attention [1]. Several studies [2, 3] demonstrated the potential benefits of generative AI chatbots, for example, ChatGPT can be used as

- **a support tool** in educational tasks [3],
- **taking assistance** while completing an assignment [2], and
- **data analysis** [4]

It also poses numerous challenges, such as

- providing an opportunity to **cheat** in assignments [2]
- it often generates **invalid solutions** [4]

Motivation

None of the prior studies [2,3,4] focused specifically on graduate students and how those students use these generative AI chatbots.

In our study, we focus specifically on graduate students and how those students understand the capabilities and limitations of these generative AI chatbots.

Research Questions

- **RQ1:** How do graduate students use generative AI chatbots (e.g. ChatGPT, Google Bard) in educational contexts?
- **RQ2:** How do they understand the capabilities and limitations of these chatbots? What are their future outlook and expectations pertinent to these chatbots?
- **RQ3:** How might we design new solutions to enhance their experience with these chatbots in educational contexts?

Contribution

Will inform HCI community -

- about how graduate students use generative AI chatbots and their perspectives
- about design implications focusing on graduate students

Research Plan

- Semi-structured Interviews (6 participants)
- Designing User interface Diagrams (5 features)
- User Evaluation (5 participants)

Semi-structured Interviews

Semi-structured Interviews

Name	Education Level	Age	Pronouns
P1	PhD	25	He/Him
P2	PhD	26	He/Him
P3	PhD	27	He/Him
P4	PhD	25	She/Her
P5	MSc	23	He/Him
P6	PhD	26	She/Her

Table 1. Demographics of interviewed graduate students (n=06)

Themes	Description
Purpose and value of generative AI chatbots	Why graduate students use generative AI chatbots.
Assumptions about generating AI chatbots	The assumptions of graduate students related to the capabilities and limitations of generative AI chatbots.
Challenges while using generative AI chatbots	The issues graduate students encounter while using generative AI chatbots.
Expectations from generative AI chatbots	The expectations of graduate students while using generative AI chatbots.

Table 2. Themes and associated descriptions

Semi-structured Interviews

Purpose and value of generative AI chatbots

*‘If I want to **plot something really quick** or if I don’t want to waste time googling, then I can get help from those chatbots.’ (P1)*

*‘Previously, I **used to read a lot of blogs or articles to implement a system**. And now I spend a lot less time on the reading part rather I **ask ChatGPT or BARD to write that code for me or explain that thing to me**. So, I think my learning has gone through a different kind of shift due to those chatbots.’ (P4)*

Semi-structured Interviews

Assumptions about generating AI chatbots

*“Those chatbots **always miss some key points**. Even if you mentioned them in the prompts, those chatbots are always going to miss it.” (P3)*

Semi-structured Interviews

Challenges while using generative AI chatbots.

- Too detailed responses
- Inaccurate responses
- Privacy issues

*“The issue is that often I have to make sure that ChatGPT is giving me the right information because it can give me **wrong answers**, or **some made-up answers** which can be harmful. So, I’m using it mostly for coding purposes, not for getting information about scientific articles or reading purposes.” (P2)*

Semi-structured Interviews

Expectations from generative AI chatbots.

*‘Often the responses are **too detailed**. I want the responses to be **on point and concise**’. (P6)*

Design Implications for User Interface Diagrams

Design Implications for User Interface Diagrams

Concise Response

User: I want to learn about Generative AI

ChatBOT: Generative AI is a fascinating field! It's a branch of artificial intelligence focused on creating or generating new content, often in the form of images, text, music, or other media. These AI models are designed to understand patterns from existing data and use that understanding to generate new, original content.

Click on the following options to learn more about generative AI.

[Types of Generative Models](#)

[Applications of Generative AI](#)

[Learning Generative AI](#)

Send a message

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Mentioning Source

User: What is AI?

ChatBOT: AI stands for artificial intelligence. It's a branch of computer science that focuses on creating systems or machines capable of performing tasks that typically require human intelligence. AI encompasses various techniques such as machine learning, where algorithms learn from data, natural language processing, which enables machines to understand and process human language, computer vision for interpreting and understanding visual information, and robotics for creating physical systems that can operate autonomously or semi-autonomously. AI aims to simulate intelligent behavior, enabling machines to perceive, reason, learn, and solve problems.

I received this information from the following sources

[1] <https://www.ibm.com/topics/artificial-intelligence>

[2] https://en.wikipedia.org/wiki/Artificial_intelligence

Send a message

Send

Design Implications for User Interface Diagrams

Prompt Suggestions

User: Print 1-5 in Python

ChatBOT: Certainly! Here's a simple way to print numbers from 1 to 5 in Python using a loop:

Code Snippet

```
for i in range(1, 6):  
    print(i)
```

Prompt Suggestions

Describe steps of
the code

Describe complexity
of the code

Print 1-10 in Python
using while loop

Send a message

Send

Run and Modify Code

User: Print 1-5 in Python

ChatBOT: Certainly! Here's a simple way to print numbers from 1 to 5 in Python using a loop:

Code Snippet

Modify

Run the code

```
for i in range(1, 6):  
    print(i)
```

```
1  
2  
3  
4  
5
```

Send a message

Send

Multimodal Forms of Prompting

Upload PDF

Upload Image

Send a message

Send

User Evaluation

User Evaluation

Name	Education Level	Age	Pronouns
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U3	MSc	23	He/Him
U4	PhD	25	She/Her
U5	PhD	28	He/Him

Table 3. Demographics of participants in user evaluation (n=05)

User Evaluation

	Concise Response	Mentioning Source	Prompt Suggestions	Run and modify the Code	Multimodal Question Asking Opportunity
The feature would enable me to accomplish tasks more quickly	4.2	4.0	4.6	4.0	4.4
The feature would improve my task performance	3.8	3.6	4.2	3.8	4.2
The feature in my task would increase my productivity	4.2	4.2	4.6	4.0	4.4
The feature would enhance my effectiveness of the task	4.0	4.0	4.6	4.2	4.8
The feature would make it easier to do my task	4.2	4.2	4.8	4.2	4.6
I would find the feature useful in my tasks	4.6	4.4	4.8	4.4	4.8
I want this feature to be integrated into the system	4.4	4.4	4.8	4.2	4.8
If the feature is available, I would use the system more	4.4	4.2	4.6	4.2	4.8

Table 4. Mean of Usefulness of features (n=05) (Response scale: 1=Strongly Disagree, ' 5=Strongly Agree)

User Evaluation

Regarding **'Run and Modify the Code'** feature,

'Rather than showing side by side, the output should be shown after the code snippet section'. (U2)

Discussion

- Dependency on Generative AI Chatbots
- Challenges of Students
- Appreciation for New Features

Limitations

- Our participants were mostly CS major
- We drew diagrams for five features.
- We did not develop a working prototype of design features where users can interact with those features.

Future Work

- In-depth User Studies
- Expand User Testing
 - Increase and diversify participant demographics
- Refinement
 - Focus on refining features with user feedback
- Long-Term Impact Study
 - Investigate impacts on productivity, learning outcomes, and user behavior over time.

Conclusion

- Assumptions of students
- Challenges of students
- New Features Evaluated
- Positive Reception of Features

References

- [1] Xiao Zhan, Yifan Xu, and Stefan Sarkadi. Deceptive ai ecosystems: The case of chatgpt. arXiv preprint arXiv:2306.13671, 2023.
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- [3] Michel Albonico and Paulo Júnior Varela. A report on the use of chatgpt in software engineering and systems analysis courses. In Proceedings of the XXXVII Brazilian Symposium on Software Engineering, pages 303–311, 2023.
- [4] Yong Zheng. Chatgpt for teaching and learning: An experience from data science education. arXiv preprint arXiv:2307.16650, 2023.

Thank You

Any Questions?