Learning or Cheating? Reddit Insights on ChatGPT in Academia

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ABSTRACT

This study explores the themes and sentiments emerging in Reddit discussions regarding the use of ChatGPT in academic settings. It aims at understanding common perceptions and user experiences in educational contexts. The research methods include exploratory analysis providing the overview of the data, topic modeling with Latent Dirichlet Allocation (LDA) distinguishing key themes, and sentiment analysis highlighting people's attitudes. The findings reveal a range of emotions from admiration and approval to annoyance and disappointment concerning topics about learning, accusations of cheating and academic integrity. The code is available at https://github.com/strdubtseva/CSS_paper.

KEYWORDS

ChatGPT, Reddit discussions, sentiment analysis, topic modeling

1 INTRODUCTION

The use of advanced artificial intelligence like ChatGPT is becoming more widespread, including in the academic field. ChatGPT, a language model developed by OpenAI, generates human-like text given the textual tasks, making it a powerful tool for various applications such as academic writing or educational assistance. However, its application in educational settings raises public discussions about its impact on learning and academic integrity. These discussions often highlight the dual nature of artificial intelligence (AI): it being an assistant in improving learning or a cause of cheating and decrease of critical thinking. Therefore, the main **research question** of this study is: What themes and sentiments emerge in Reddit discussions about using ChatGPT for academic purposes? Reddit, a popular social media platform known for its diverse and active communities, provides a rich dataset for exploring public perceptions and experiences with ChatGPT in the educational context.

The subsequent section provides a literature review that covers different aspects of ChatGPT and AI in education, including research on their potential to improve learning and concerns about academic integrity. In addition, a subsection of the review discusses Reddit as a valuable data source for the social science research. The methodological part describes the dataset collection procedure and the analytical methods used in this study. This involves an initial exploratory analysis, topic modeling with Latent Dirichlet Allocation (LDA), and sentiment analysis using the Robustly Optimized BERT Pretraining Approach (RoBERTa).

2 LITERATURE REVIEW

2.1 ChatGPT and AI in Education

In 2022, ChatGPT was launched by researchers at OpenAI and immediately gained much attention, particularly in education. This technology is able to generate coherent and relevant text, making it useful for educational assistance, academic writing and other tasks. Researchers reveal its potential to help with research and academic assignments, to improve the quality of writing, to provide individualised support for studying and to decrease stress associated with school or university [3], [10]. Researches also find that chatbots provide a pleasant environment for studying, making online learning more engaging and motivating for students [3], [10]. For teachers and professors AI tools may help with course organization and management [10], as well as with routine teaching activities, such as preparation of lecture slides and tests assessment [3], [6].

However, use of ChatGPT in academic environments also raises concerns about academic integrity and potential misuse. Studies show that despite the benefits of AI technologies for students, the majority of professors often express negative attitudes towards them, noting the lack of trust and possible dishonesty [4]. To maintain academic integrity, educational institutions develop specific policies to address the use of AI and to punish cheating and plagiarism. Artificial intelligence detection softwares, such as Turnitin and Cadmus, are emerging to help in identifying the content generated by AI models [3]. This brief review highlights the dual natural of AI technologies in academia and controversial opinions around them.

2.2 Reddit as a Data Source

Reddit, a popular social media platform, is becoming a valuable source for social scientists. The platform allows users to engage in discussions and share opinions on different topics, providing vast sources of textual social data. It offers an access to different communities organized in subreddits, enabling to focus on specific social groups. With publicly available discussions, free API for collecting data and around 52 million daily active users, Reddit is a rich data source for understanding public perceptions and social dynamics [1], [11]. Moreover, the anonymity of posts and comments that Reddit offers encourages honest interactions, providing researchers with high quality social data [9].

However, researchers report several challenges and issues with data retrieved from Reddit, including the risks of missampled data [9], messiness of data and the potential for biased or unrepresentative samples [1]. Nevertheless, Reddit remains a popular data source for social scientists to study public opinions and interactions.

3 DATA AND METHODS

3.1 Data

The dataset for this research is constructed by collecting posts and their comments about ChatGPT in academia from Reddit website. Reddit is organized in communities called subreddits (such as ChatGPT or AskAcademia), where users can post and comment on topics relevant for these communities, allowing for discussions and

feedback. Consequently, this platform is a good source for large amounts of social data due to its popularity and activity, the accessibility of its discussions, and the anonymity that encourages the sharing of honest opinions [1].

The Python PRAW package provides a simple access to Reddit's API to extract the content of posts and comments in specified subreddits [2]. In order to retrieve discussions related to use of ChatGPT in academia the following subreddits are chosen for analysis: ChatGPT, college, PhD, Professors, ArtificialInteligence, AskAcademia. The search queries are designed to capture relevant discussions by searching the titles and texts of posts for keywords such as "university," "college," "exam," "professor," and "ChatGPT." The extracted posts are filtered to include the most commented 20 posts of all time for each subreddit, ensuring that deleted, removed, and moderating comments are excluded from the dataset. Finally, the titles and texts of the posts are manually checked for relevance and spam to ensure appropriate content of the discussions, resulting in the total of 80 posts with 5997 comments.

3.2 Methodology

The research methodology for answering the research question consists of three main parts: an initial exploratory analysis of the dataset, retrieving key themes with topic modeling, and a sentiment analysis. Prior to the analysis part, data preprocessing is conducted to ensure the quality and consistency of the textual data.

3.2.1 Data Preprocessing. Text processing consists of several steps, starting with removal of URLs and special characters (punctuation, numbers). Lower case text is then tokenized into individual words. Lemmatization (grouping of inflected words) is applied to consider all the variations of the same words. Finally, common English "stopwords" are removed from the dataset, together with additional stopwords relevant to the context of the study (such as "ChatGPT", "university"). This preprocessing ensures that the text data is clean, consistent, and ready for the subsequent analysis.

3.2.2 Exploratory Analysis. Exploratory text analysis presents different statistics to understand the nature of comments in subreddits. One of them is the average length of comments, which is 47 words, indicating that the comments are usually quite long and informative. Word frequencies are visualized using word clouds, which illustrate the most common words in each subreddit, providing an initial overview of the main ideas in the comments.

In word clouds the most frequently used words are highlighted with a large font size. Figure 1 shows that slightly different ideas are discussed in the subreddits. In ChatGPT, College and AskAcademia subreddits, discussions center on the utility of ChatGPT for academic assignments, with terms like "work," "make," "paper", and "cheat". PhD students talk about ChatGPT as a research assistant, using words such as "tool", "think", and "help". Professors discuss classroom management and teaching, highlighted by "class" and "course". The words "degree", "work", "job" in ArtificialInteligence subreddit suggest that users might speak about the impact on educational qualifications.

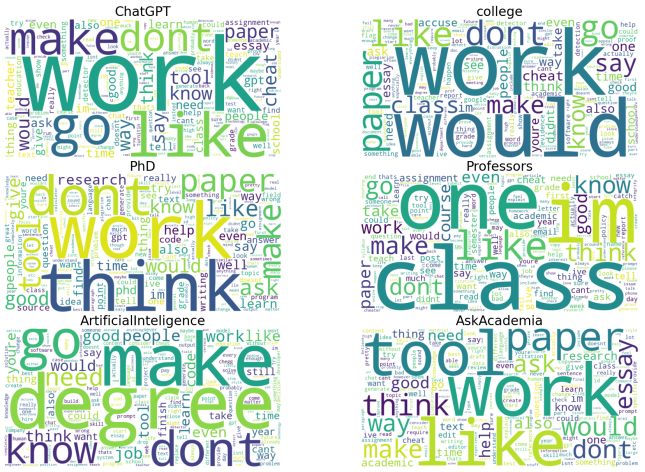

Figure 1: Word clouds of most frequent terms in subreddits

In addition, the Term Frequency-Inverse Document Frequency (TF-IDF) metric is calculated to identify the most important words in each subreddit, diminishing the importance of terms that are common in all posts. Table 1 presents the top 20 words ranked by their TF-IDF scores for each subreddit. Each row corresponds to a rank (from 1 to 20), and each column represents a different subreddit. Table 1 further refines the insights from word clouds, showing the different focus of discussions in subreddits. Calculating both word frequencies and TF-IDF scores ensures capturing both common and unique terms.

Rank	Artificial Inteligence	Ask Academia	Chat GPT	PhD	Professors	college
1	degree	work	work	work	class	work
2	make	like	like	think	one	would
3	go	tool	go	dont	im	like
4	dont	paper	make	paper	like	dont
5	know	would	dont	tool	make	paper
6	need	think	paper	make	think	go
7	people	dont	would	like	know	make
8	work	make	know	ask	go	say
9	job	essay	tool	good	dont	know
10	think	ask	cheat	would	work	cheat
11	good	way	way	know	good	class
12	would	good	say	give	paper	people
13	like	also	think	research	course	think
14	tool	help	people	time	even	one
15	code	need	ask	say	take	im
16	even	research	time	go	cheat	way
17	youre	academic	essay	people	assignment	take
18	learn	thing	teacher	well	would	ask
19	thing	go	good	im	say	even
20	time	know	need	help	way	also

Table 1: Top 20 words in subreddit based on TF-IDF

3.2.3 Topic Modeling. Topic Modeling technique helps to further discover the key topics discussed by Reddit users about ChatGPT in academia. The most popular model among social scientists, Latent Dirichlet Allocation (LDA), is used to retrieve the topics. In general, LDA is an unsupervised machine learning method for distinguishing hidden topics in documents based on co-occurrences of words in these documents [5].

The Python Gensim library includes the functions to perform LDA and related analysis [13]. Since LDA model is parametric, an iteration over different number of topics and passes is conducted to choose the best parameters based on the coherence of topics (measurement of the degree of semantic similarity between words within a topic). This analysis results in groups of words that are likely to appear together and form a coherent topic.

3.2.4 Sentiment Analysis. Finally, sentiment analysis is performed by the Robustly Optimized BERT Pretraining Approach (RoBERTa) neural network, a transformer model which was created for natural language processing tasks [7]. This model was fine-tuned on GoEmotions dataset by Sam Lowe, enabling it to distinguish up to 28 different emotions in texts (including neutral) [8]. Consequently, the fine-tuned model is used to analyze the comments from subreddits to reveal the feelings of users about use of ChatGPT in academic settings with Python Transformers library [12].

4 RESULTS

4.1 Topic Modeling

Firstly, the LDA model resulted in seven moderately coherent topics of discussions about ChatGPT in education. These topics provide insights into how students, professors, and others in academia perceive and use ChatGPT.

Academic Path and Skills Development: The first topic discusses ChatGPT as a tool for navigating an academic path and developing useful skills. Terms like "degree," "job," "learn," and "skill" show a focus of discussions on the practical aspects of education and future career. The words such as "code," "class," "tool," suggest that users discuss how ChatGPT helps in acquiring new skills, like coding and completing coursework. The mention of Chegg (a learning platform with AI) might suggest that ChatGPT is compared or used together with other AI tools for learning. **Using ChatGPT to Cheat:** The next topic involves conversations about cheating using ChatGPT with terms like "cheat", "essay", "paper", assignment", "test" and "help". **Cheating and Detection Tools:** This topic also concerns cheating, but terms like "detector", "accuse", "evidence", "prove" suggest that students get possibly wrongly accused of cheating by AI detection tools. **ChatGPT Limitations:** This topic possibly discusses weaknesses and mistakes of ChatGPT. The words like "oral", "nuanced", "subjective", "credible" and "inappropriate" highlight AI's ineffectiveness for the tasks where personal opinion and deep understanding are required. **Emotional Impact of Cheating**: This topic again raises concerns about cheating, but terms like "support", "emotional", "relationship" might indicate discussions about emotional consequences after cheating with ChatGPT. Students may be discussing guilt, stress and relationships issues that follow. **Preventing Cheating**: The words such as "paper", "detector", "turnitin", and "class" might suggest that this topic contains discussions among professors about preventing cheating. It focuses on how AI detection toools like Turnitin may help to decrease cheating practices among students. **Learning and Research**: This topic discusses ChatGPT as a tool for learning and conducting research with terms like "paper", "tool", "learn", "help", "find" and "research".

Overall, people discuss ChatGPT's potential for skill development and helping with academic tasks, the ethical and emotional aspects of its use for cheating, concerns about academic integrity and limitations of ChatGPT. These discussions highlight both the benefits and challenges associated with ChatGPT in educational sphere.

4.2 Sentiment Analysis

Secondly, sentiment analysis identifies the emotions students, professors and other academics express discussing the topics that emerge around ChatGPT.

The RoBERTa model results in proportional values of 28 possible sentiments in each comment. For further analysis, each comment is assigned to the sentiment with the largest proportion. Subsequently, the analysis of the model results show that the most prevalent sentiment is **neutral**, which represents about half of all the comments. This outcome aligns with the expectation that individuals typically refrain from expressing strong opinions.

After filtering out neutral comments, the second most prominent sentiment is annoyance. This is evident both in the percentage of comments with prevailing annoyance (13.7 %) and in the percentage of comment scores (19.2 %), which is a combined measure of likes and dislikes (see Figure 2, Figure 3). Approval and curiosity hold the second and third position in both metrics, followed by amusement, disapproval and admiration. Interestingly, the high number of comments and likes for both positive and negative sentiments suggests a controversial nature of the topics discussed, indicating diverse and polarized opinions within Reddit academic communities.

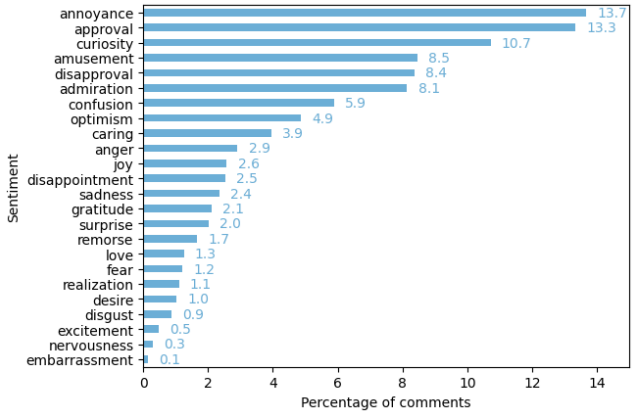

Figure 2: Percentage of comments with represented sentiments (excluding neutral)

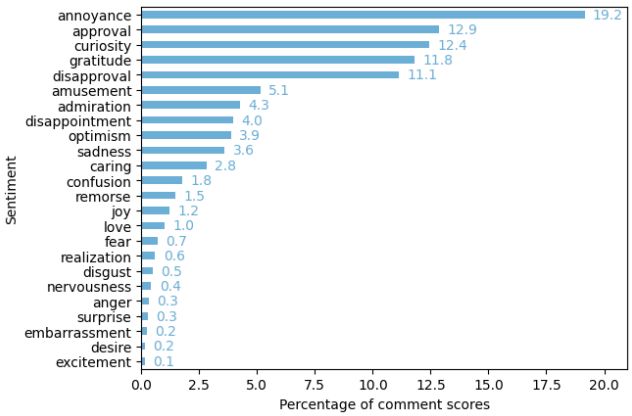

Figure 3: Percentage of comment scores with represented sentiments (excluding neutral)

Figure 4 illustrates the distribution of sentiments across different subreddits. It highlights that discussions about ChatGPT in education are most commonly associated with annoyance, approval and curiosity across all subreddits. The ChatGPT subreddit shows a large amount of curiosity and gratitude sentiments, indicating an evolving interest and high appreciation for the technology in this community. Annoyance sentiment is highly represented by Professors and college subreddits, suggesting some negative experience among both students and teachers. Students also express much disappoint and disapproval about ChatGPT in educational settings. While professors express more curiosity and admiration than students. This distribution of sentiments once again shows that AI in education has both benefits and challenges associated with it, resulting in both positive and negative sentiments.

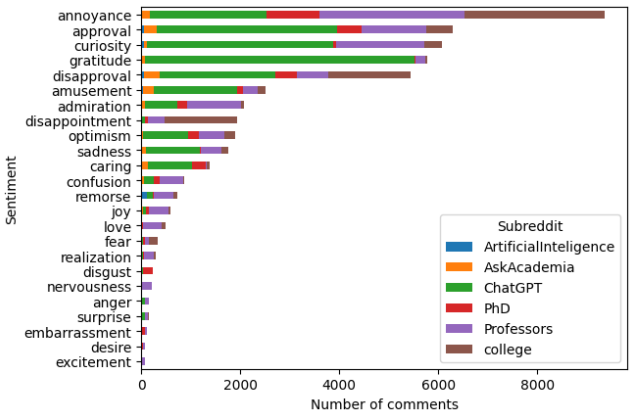

Figure 4: Number of comments with represented sentiments in subreddits (excluding neutral)

Finally, several posts that motivated the most emotional comments are analysed, showing some examples of intense public discussions about ChatGPT in different subreddits.

The three posts that provoke the most **annoyed** comments are the following: "Sick of all the robots in my course." from college subreddit, "Student has achieved the Cheating Trifecta!" and "Another Rant about Students" from Professors subreddit. They reflect negative attitudes of both students and professors towards the use of ChatGPT for cheating. Posts that received the most **approval** include "Do you find academics using ChatGPT? How?" from AskAcademia and "I wish ChatGPT had been around when I was in grad school just to troubleshoot my R code" from PhD, with positive attitudes towards the usefulness of ChatGPT for academic tasks. On the other hand, the posts "Explicitly using AI language models to facilitate learning (Seeking insights from academics)" and "Ethics of passing off AI generated text as your own." caused significant **disapproval**, with ethical concerns and skepticism about ChatGPT. The post "Are you using ChatGPT to help with your research?" in PhD subreddit gained many approval and disapproval comments, suggesting a debate about the appropriate use of ChatGPT for doctoral research.

Overall, all the communities discuss both the potentials and risks associated with AI technologies in academic settings. This dichotomy of opinions highlights the complex and multi-sided impact of AI technologies like ChatGPT on academic environment.

5 CONCLUSIONS

In conclusion, this research identifies a large discourse about the use of ChatGPT in academic settings in Reddit discussions. While many people see ChatGPT as a valuable tool for skill development, research assistance, and learning, there are significant concerns about its misuse for cheating, ethical and emotional impacts, and maintenance of academic integrity. The prevalent sentiments of annoyance, approval, disapproval and curiosity reflect that academic community is adressing both the benefits and challenges of integrating AI technologies in education.

However, this study has several limitations that should be addressed. Firstly, the use of LDA for topic modeling, while useful for identifying key topics, may not capture the full spectrum of the discussions. A relatively simple probabilistic model may simplify the diverse nature of Reddit comments too much. Secondly, the sentiment analysis, performed using a pre-trained RoBERTa, may also not perfectly capture the specific contextual sentiments expressed. Thirdly, the data collection is limited to 20 most commented posts in six specific subreddits which may not fully represent the broader academic community's perceptions about ChatGPT. Further research might use more advanced methods, as well as a larger dataset to provide a more comprehensive analysis of topics and sentiments about AI technologies in academia.

REFERENCES

[1] Ashley Amaya, Ruben Bach, Florian Keusch, and Frauke Kreuter. 2021. New data sources in social science research: Things to know before working with Reddit data. *Social science computer review* 39, 5 (2021), 943–960.

[2] B. Boe. 2012. PRAW: The Python Reddit API Wrapper. https://github.com/praw-dev/praw/. Accessed: 2024-07-03.

[3] Yogesh K Dwivedi, Nir Kshetri, Laurie Hughes, Emma Louise Slade, Anand Jeyaraj, Arpan Kumar Kar, Abdullah M Baabdullah, Alex Koohang, Vishnupriya Raghavan, Manju Ahuja, et al. 2023. Opinion Paper:"So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications

of generative conversational AI for research, practice and policy. *International Journal of Information Management* 71 (2023), 102642.

[4] Nayab Iqbal, Hassaan Ahmed, and Kaukab Abid Azhar. 2022. Exploring teachers' attitudes towards using ChatGPT. *Global Journal for Management and Administrative Sciences* 3, 4 (2022), 97–111.

[5] Hamed Jelodar, Yongli Wang, Chi Yuan, Xia Feng, Xiahui Jiang, Yanchao Li, and Liang Zhao. 2019. Latent Dirichlet allocation (LDA) and topic modeling: models, applications, a survey. *Multimedia tools and applications* 78 (2019), 15169–15211.

[6] Gabriela Kiryakova and Nadezhda Angelova. 2023. ChatGPT—A challenging tool for the university professors in their teaching practice. *Education Sciences* 13, 10 (2023), 1056.

[7] Yinhan Liu, Myle Ott, Naman Goyal, Jingfei Du, Mandar Joshi, Danqi Chen, Omer Levy, Mike Lewis, Luke Zettlemoyer, and Veselin Stoyanov. 2019. Roberta: A robustly optimized bert pretraining approach. *arXiv preprint arXiv:1907.11692* (2019).

[8] Sam Lowe. 2020. Roberta base go emotions. https://huggingface.co/SamLowe/roberta-base-go_emotions. Accessed: 2024-07-03.

[9] Alexey N Medvedev, Renaud Lambiotte, and Jean-Charles Delvenne. 2019. The anatomy of Reddit: An overview of academic research. *Dynamics on and of Complex Networks III: Machine Learning and Statistical Physics Approaches 10* (2019), 183–204.

[10] Chinedu Wilfred Okonkwo and Abejide Ade-Ibijola. 2021. Chatbots applications in education: A systematic review. *Computers and Education: Artificial Intelligence* 2 (2021), 100033.

[11] Nicholas Proferes, Naiyan Jones, Sarah Gilbert, Casey Fiesler, and Michael Zimmer. 2021. Studying reddit: A systematic overview of disciplines, approaches, methods, and ethics. *Social Media+ Society* 7, 2 (2021), 20563051211019004.

[12] Thomas Wolf, Lysandre Debut, Victor Sanh, Julien Chaumond, Clement Delangue, Anthony Moi, Pierric Cistac, Tim Rault, Rémi Louf, Morgan Funtowicz, Joe Davison, Sam Shleifer, Patrick von Platen, Clara Ma, Yacine Jernite, Julien Plu, Canwen Xu, Teven Le Scao, Sylvain Gugger, Mariama Drame, Quentin Lhoest, and Alexander M. Rush. 2020. Transformers: State-of-the-Art Natural Language Processing. arXiv:1910.03771 [cs.CL] https://github.com/huggingface/transformers.

[13] Radim Řehůřek and Petr Sojka. 2010. Software Framework for Topic Modelling with Large Corpora. In *Proceedings of the LREC 2010 Workshop on New Challenges for NLP Frameworks*. ELRA, Valletta, Malta, 45–50. http://is.muni.cz/publication/884893/en