

# Use of ChatGPT in Academia

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**Abstract**— ChatGPT is an AI language developed by OpenAI. It has many applications in academia such as clarifying a topic and assisting with assignments. This report aims to discuss the issues as well as the benefits of ChatGPT in academia based on a survey conducted towards post-secondary students. The survey was asked to post-secondary students through various institutions in Ontario. The results of this survey indicated that ChatGPT is a dangerous tool used by students that raises ethical concerns. ChatGPT can help students write essays, complete programming assignments, and assist with tests, which ultimately could be declared as an ethical concern by post-secondary institutions.

**Keywords**—ChatGPT, OpenAI, ethical issues.

## I. INTRODUCTION

ChatGPT is an AI language model developed by OpenAI. ChatGPT uses a language architecture called Generative Pre-trained Transformer (GPT). GPT models have been excelling at understanding human-prompt and generating human text based on the prompt. Generative models follow an unsupervised pre-training learning method. This technique involves pre-trained the generative model on a massive dataset. The model is then trained to the specifications defined and finally undergoes supervised fine-tuning [1]. The first generative model (GPT-1) was pre-trained on over 7,000 unpublished books allowing the model to learn on long-range information [1]. GPT-1 was a 117 million parameter transformer trained using the objective to maximize likelihood of an event given:

$$L_1(U) = \sum_i \log P(u_i | u_{i-k}, \dots, u_{i-1}; \theta) \quad (i)$$

Where P is the conditional probability of the model using a neural network with parameters trained using stochastic gradient descent and is the size of the context window. GPT-1 underwent supervised fine-tuning, aiming to maximize the likelihood of labelling given tokens {} given the labelled dataset [1]:

$$L_2(C) = \sum_{x,y} \log P(y | x_i, \dots, x_n) \quad (ii)$$

A year later, GPT-2 was released in 2019. GPT-2 is a 1.5 billion parameter transformer that achieved phenomenal results on 7 out of 8 language model datasets [2]. GPT-2 used a different formula to calculate the likelihood of conditional probability [2]. GPT-2 implemented the same supervised fine-tuning algorithm as its predecessor, GPT-1.

GPT-3, released in 2020, contained 175 billion parameters [3], which is nothing compared to the current ChatGPT version. GPT-4 is a 1 trillion parameters transformer that was released in 2023. GPT-4 can read and understand images [4] and performs over 500x better than its predecessor, GPT-3. PT-3, released in 2020 contained 175 billion parameters [3], which is nothing compared to the current ChatGPT version. GPT-4 is a 1 trillion parameters transformer that was released

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In this study, we investigate the use of ChatGPT in academia by asking over 100 students in Ontario post-secondary institutions questions on ChatGPT via a survey. Both benefits and limitations of ChatGPT in academia are vital concepts to be concluded from this survey. After one month of posting it, the results of this survey are presented and discussed.

## II. METHODOLOGIES

### A. Programming Language

Python provides the native backend for compiling and processing the data into charts and figures. The most common utilized data-processing libraries includes Pandas, NumPy and Matplotlib.

### B. Data Acquisition

The survey creating system used was Google Forms. Surveys were then shared using various social media platforms such as Discord, Instagram, and D2L Brightspace Discussion Board. Over 100 responses were collected and compiled into an Excel Spreadsheet as shown in Fig. 1.

### C. Data Analysis

For each chart and graph, the data was compiled into an Excel spreadsheet. The data was then cleaned up and stored into a NumPy array using the Pandas framework. Each Pandas DataFrame object was read and turned into charts and graphs using the Matplotlib library.

Finally, each graph and chart was saved and compiled as an I/O object. Each I/O object was turned into a usable PNG file for documenting.

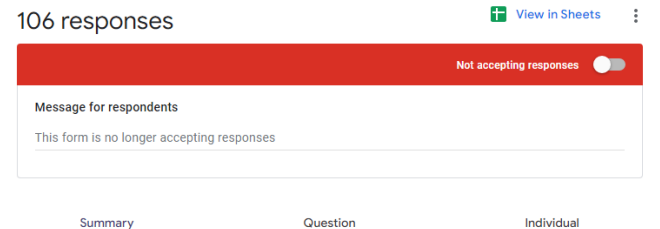


Figure 1. Screenshot of the Google Forms survey responses. 106 responses were compiled into an Excel Spreadsheet via the “View in Sheets” button in the top right corner,

## III. RESULTS AND DISCUSSION

### A. ChatGPT Benefits in Academia

ChatGPT is used by many university students throughout various post-secondary students in Ontario. According to Table I, each program has a different number of ChatGPT

users; however, the majority of students studying Computer Science use ChatGPT.

TABLE I. DISTRIBUTION OF STUDENTS IN DIFFERENT PROGRAMS AND USE OF CHATGPT

	Use ChatGPT	
	Yes	No
Computer Science	49	10
Business Technology Management	4	1
Business Management	6	1
Engineering	9	0
Accounting and Finance	5	1
Life Science	4	2
Other	4	6

ChatGPT has many benefits in academia that don't raise ethical issues/concerns. ChatGPT can include clarifying a topic in a lecture just discussed in class, clarifying key concepts or points that were not elaborated on, or even asking general questions about a lecture that the Professor is unwilling to explain. For each program of study, the use of ChatGPT for academic vs non-academic reasons was outlined on a bar graph, as shown in Fig. 2.

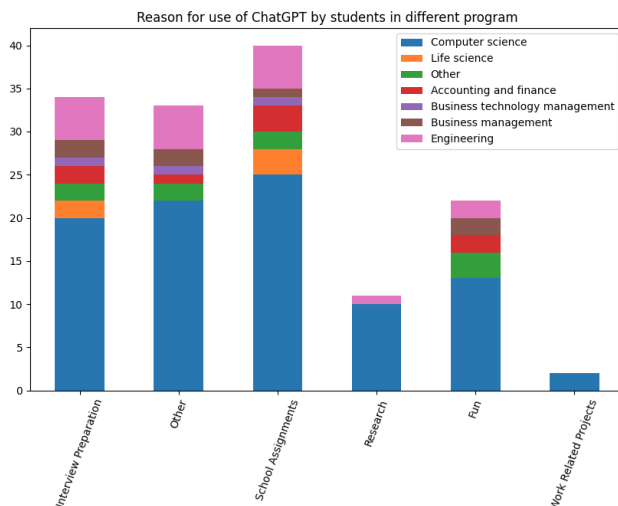


Figure 2. Bar graph made using Matplotlib highlights why students in different programs use ChatGPT. The academic reasons are of following: **Assignments, Research, and Work Related Projects.**

### B. ChatGPT Limitations in Academia

Although ChatGPT can be beneficial to academia, there are a lot of withdrawals that come with using ChatGPT in academia. According to Fig 2, it is evident that many students use ChatGPT for unethical academic reasons. Using third-

party software or somebody else's idea to help you complete school assignments can be considered an academic offence in all post-secondary institutions.

Applying the first formulation of Kantianism makes this situation unethical. Let's assume the rule: "You can cheat on school assignments and use technology or other people to help you complete the assignment." If this rule were universalized, assignments would no longer be a good way to test a student's knowledge of a topic. Therefore a contradiction is present, and using ChatGPT for assignments is considered unethical via Kantianism.

Moreover, ChatGPT can also be limited to each program. For example, university students in the computer science program may rely more on ChatGPT than business management students, as ChatGPT can help clarify programming concepts and knowledge. This makes it so that the use of ChatGPT can be more beneficial for a person studying more about computers compared to a person studying a non-technology-related field. As shown in Fig 3, 75.49% of students think ChatGPT would impact academia.

Perceived Impact of ChatGPT on Academia by students aged 18-24

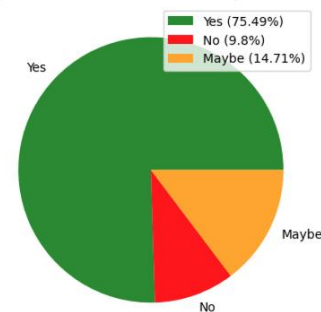


Figure 3. Pie chart made using Matplotlib showing how many students aged 18-24 think ChatGPT would make an impact on academia.

Out of those **75.49%** of students who think ChatGPT make an impact on academia, **47/56** computer science students think ChatGPT would make an impact in academia as shown in Fig 4.

Number of students who said ChatGPT can make an impact in academia vs total students in different programs

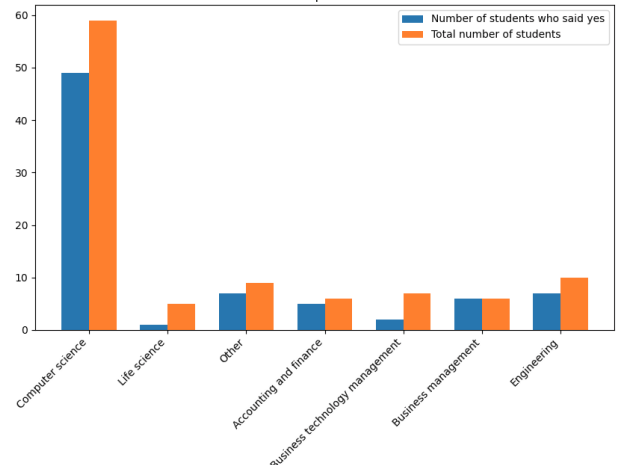


Figure 4. Bar graph comparing how many students in each program say ChatGPT will impact academia compared to overall students who responded in the program. Computer science students are of the most in both categories.

### C. Future of ChatGPT in Academia

Being an AI learning model, GPT can have a massive impact on academia in the future. As seen in the usage of GPT for school-related work, there is a risk that people may get too dependent on it, thus reducing their overall potential to improve their skill set. Due to the high capability of GPT, it may replace specific repetitive jobs. Although it can replace some human jobs, jobs that require emotions and adaptations cannot be replaced by AI.

A study conducted by OpenAI in 2023 concluded that GPT-4 can 90<sup>th</sup> percentile in numerous exams such as the Uniform Bar Exam, AP Exams, Graduate Record Exams, etc. However, it has not been successfully been able to fully solve programming questions. More specifically, GPT-4 has only been able to do 3/75 hard Leetcode questions and 21/80 medium Leetcode questions. These results suggest that although GPT has the ability to think rationally and how to approach a problem, GPT-4 cannot properly program the solution to that exact problem [4].

### IV. CONCLUSION AND FUTURE WORK

The use of ChatGPT in academia has been investigated via a survey sent to different post-secondary students in institutions all over Ontario. The survey results demonstrated that although ChatGPT can be harmful to some aspects of education, it is most helpful and post-secondary institutions should allow the use of them, as long as it is an ethical use.

Future work includes using a bigger sample size to test the survey. People in different provinces and countries may have different opinions on whether ChatGPT should be allowed in academia. Sending this survey to people in more programs allows for more of a truthful opinion on ChatGPT. This survey was primarily distributed to computer science students. Sending it to more people studying other programs, such as engineering, life science, etc., will lead to less biased results as there is less of a need for technology in those programs. The distribution of this survey to professors would also yield more accurate results. Professors who have had students submit their assignments through ChatGPT would have an accurate opinion on whether ChatGPT should be allowed in academia.

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