Canadian Journal of Educational and Social Studies
Vol. 5(3), 2025, pp. 91-108

ChatGPT: Hero or Villain? Comparative Evaluation by Canadian High School Students and Teachers

Michael Kotchetkov[1] & Trevor Charles[2]

[1,2] Barrie North Collegiate Institute, Barrie, Ontario, Canada
Correspondance: Michael Kotchetkov, Barrie North Collegiate Institute, Ontario, Canada
Email: amdcr408@gmail.com

DOI: 10.53103/cjess.v5i3.364

Abstract

Background: Since its release at the end of 2022 ChatGPT use has become very popular for students and teachers; however, there are no clear instructions on whether it should be banned or allowed for high school-related activities. We assessed the extent, areas, and expectations of current ChatGPT use and evaluated concerns viewed by students and teachers in high school. **Methods**: Two surveys for high school students and teachers were created. Informed consent obtained from all participants before they completed the survey. **Results**: Total of 165 responses from students and teachers were analyzed. Both groups have similar familiarity (~80%) with ChatGPT. Study assistance was the most agreeable domain for all groups. Only about 10% viewed that ChatGPT should be banned. Reduced critical thinking ability and learning motivation; inaccuracy output, ethical dilemmas were viewed as the most common ChatGPT disadvantages. Most students and teachers agreed on <25% of ChatGPT allowance in school-related tasks. 40-50% of students and teachers viewed the need for guidelines on proper ChatGPT use. **Conclusions**: ChatGPT can be both a hero and a villain. There is an urgent need to have clear school ChatGPT guidelines and teaching its correct use in high school setting.

Keywords: ChatGPT, Artificial Intelligence, High School, Teacher, Survey

Introduction

ChatGPT is a generative artificial intelligence (AI) tool able to generate human-like conversational responses. It enables users to refine and steer a conversation towards a desired length, format, style, level of details, and in multiple languages (Heilweil, 2022). ChatGPT was released on 30 November 2022 by OpenAI and has become the fastest-growing consumer software app in history, gaining >100 million users in 2 months (Milmo, 2023). ChatGPT is versatile (Tung, 2023; Eapen et al., 2023). It can generate business ideas; write poetry and song lyrics; write and debug computer programs; compose music, teleplays, fairy tales, essays; answer test questions (sometimes, depending on the test, at a

level above average human test-taker); summarize text; emulate a Linux system; simulate entire chat rooms; play games like tic-tac-toe; or simulate an ATM (at the moment) in online conversations (Edwards 2022; Lee et al., 2024; Reich, 2023; Rider, 2023; Tung, 2023).

Although impressive, ChatGPT is known to produce "hallucinations" (statements that are incorrect or refer to events or objects that do not exist) or inadequate responses to requests (such as current events), and to encode or amplify biases within training data (e.g., stereotypes about groups of people) (Lee et al., 2024;). Some educators expressed concerns of students using AI technology to complete assignments vs. completing assignments without AI assistance (Annamalai, 2024). This wide availability of AI generated a lot of debates and discussions about the quality and ethics of AI-generated work (Fisk, 2023). There are lots of controversies on whether ChatGPT should be banned for high school students due to reasons such as ethical concerns, cheating, inhibit learning; or it should be allowed as learning tools to be incorporated into high school learning activities. Controversy responses to ChatGPT use ranged from a full ban of technology to enthusiastic embrace of AI-generated writing technology (Cetin et al., 2024).

ChatGPT is widely and publicly available; however, there are no clear instructions on allowance, extent of use, or if it should be completely banned for high school students (Nouzri et al., 2024; Levine et al., 2025). In our study we assessed extent, areas, and expectations of current AI use, and evaluated concerns of AI applications for students and teachers in high school if ChatGPT should be incorporated in high school learning.

Materials and Methods

We created two surveys, one for students and the other for teachers in high school. Both anonymous surveys are similar to that aimed at addressing the same questions from the two cohorts. Participants from Barrie, Ontario, Canada were approached. Information on survey study was provided and informed consents were obtained from participants before completing the survey. Building on the few existing surveys in this field (Forero & Herrera-Suarez, 2023; Hosseini et al., 2023; Lee et al., 2024; Rahman & Watanobe, 2023; Szüegyi et al., 2024) we designed our own survey.

The high school students and teachers were asked the following questions: 1) How many years have you been teaching? (for teachers); or what grade are you in? (for students); 2) Are you familiar with using ChatGPT and/or similar AI tool(s) for school-related tasks? (for both groups); 3) In the past 3 months, have you used ChatGPT and/or similar AI tool(s) to prepare for your lessons in the classroom (for teachers) or completing school-related tasks? (for students); 4) In the past 3 months, which subject(s) have you experienced your student(s) using ChatGPT in assisting learning or completing their school-related tasks? (teachers) or which subject(s) have you used ChatGPT in assisting learning or completing

your school-related tasks (students); 5) What topics do you think ChatGPT and/or similar AI tool(s) can be allowed for school-related tasks? (for both groups); 6) To what extent do you think ChatGPT and/or similar AI tool(s) can be allowed for school-related tasks? (for both groups); 7) In your opinion, what is/are the disadvantage(s) for students in using ChatGPT for school-related activities? (for both groups); 8) In your opinion, what is/are the reason(s) for students using ChatGPT for school-related tasks? (for both groups); 9) Why do you think students do not use ChatGPT for school-related tasks? (for both groups); 10) Do you prefer using general internet searches or ChatGPT or both for school-related tasks? (for both groups); 11) Do you think ChatGPT should be incorporated into the classroom? (for both groups); 12) If yes, what types of discussion would you like to have with your students on ChatGPT? (for teachers), or what types of discussion would you like to have with your teacher on ChatGPT? (for students).

Responses were received via Google link accessed through QR codes. Data were transferred to Excel for analysis and storage. Statistical analysis was performed by GraphPad Prism version 10.1. Two-way analysis of variance (ANOVA) was performed to analyze independent variables. Cox proportional-hazards model was used to assess association between years of teacher's experiences and predictor variables. Difference was considered statistically significant when p-value <0.05 (Mishra et al., 2019). No generative artificial intelligence (GenAI) has been used in this paper.

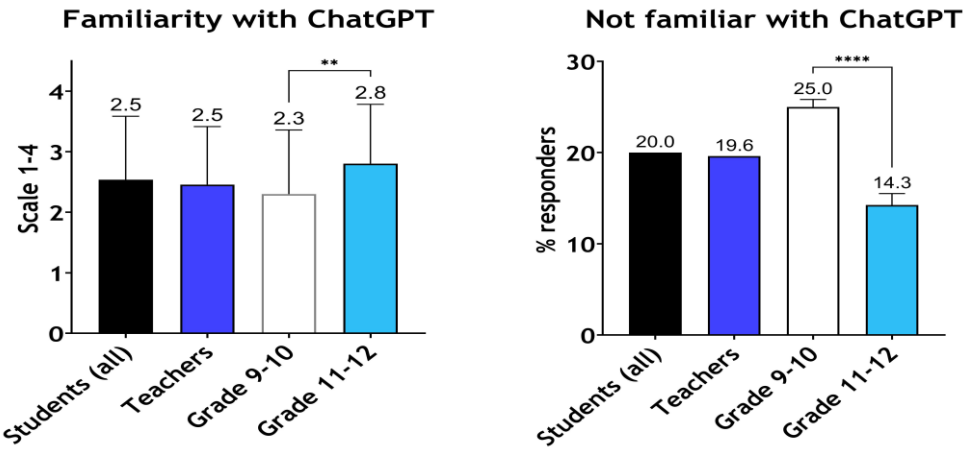
Results

Demographics

A total of 165 responses were received: 46 from high school teachers and 119 from students, including 63 Grade 9-10 (Gr9-10) and 56 Grade 11-12 (GR11-12). Among students there were 60 (50.4 %) males, 56 (47.0%) females, and 3 (2.5%) others. Teacher cohort had 26 (56.5%) males and 20 (43.5%) females. Twenty-eight teachers (60.9%) had >10 years of experience; 18 (39.1%) had <10 years of teaching experience.

Familiarity and Extent of Use of ChatGPT

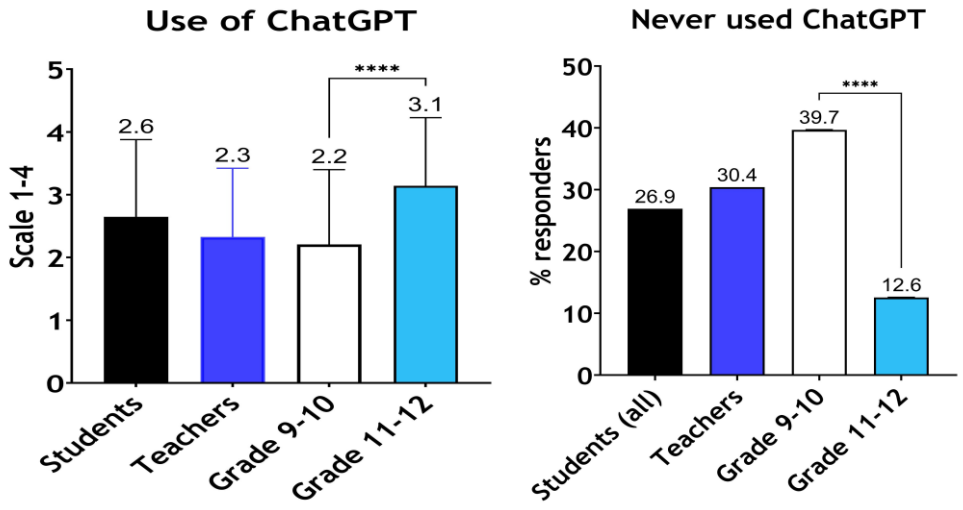
Both students and teachers have similar familiarity with ChatGPT. Within the student sub-groups, Gr11-12 students' familiarity with ChatGPT is higher compared to Gr9-10 ($p=0.008$) (Figure 1a). 25% of Gr9-10 vs 14% of Gr11-12 ($p<0.0001$) are ChatGPT naïve (score=0). Similar to the students (Gr9-12), 20% of teachers are not familiar with ChatGPT (Figure 1b).



(**a**) (**b**)

Figure 1: (a) Level of familiarity with ChatGPT of high school teachers, students Gr9-10 and Gr11-12; (b) Proportion of teachers and students who are not familiar with ChatGPT Results presented as mean +/- SD. ** $p<0.05$, **** $p<0.0001$

The extent of ChatGPT use was similar between teachers and students; however, Gr11-12 more frequently used ChatGPT compared to Gr9-10 ($p=0.008$) and teachers ($p=0.009$) for school-related tasks in the last 3 months (Figure 2a) Almost 40% of Gr9-10 never used ChatGPT compared to only 12.6% of Gr11-12 students ($p<0.0001$); 30.4% of teachers never used ChatGPT, compared to 12.6% of Grade 11-12 and almost 40% Gr9-10 students (Figure 2b).



(**a**) (**b**)

Figure 2: (a) Extent of ChatGPT use by high school teachers and students Gr9-10 and Gr11-12; (b) Proportion of teachers and students who never used ChatGPT
Results presented as mean +/- SD. ** $p<0.05$, **** $p<0.0001$

ChatGPT: Reasons to Use and Areas of Use

As shown in Figure 3, teachers used ChatGPT mostly due to peer pressure, for brainstorming, and assistance in difficult school-related tasks. Only 1/3 used it because of efficiency, curiosity or not enough time. For Grade 11-12 students, curiosity is the most common reason, followed by assistance with difficult tasks, brainstorming and peer pressure. Most Grade 9-10 students used it for brainstorming.

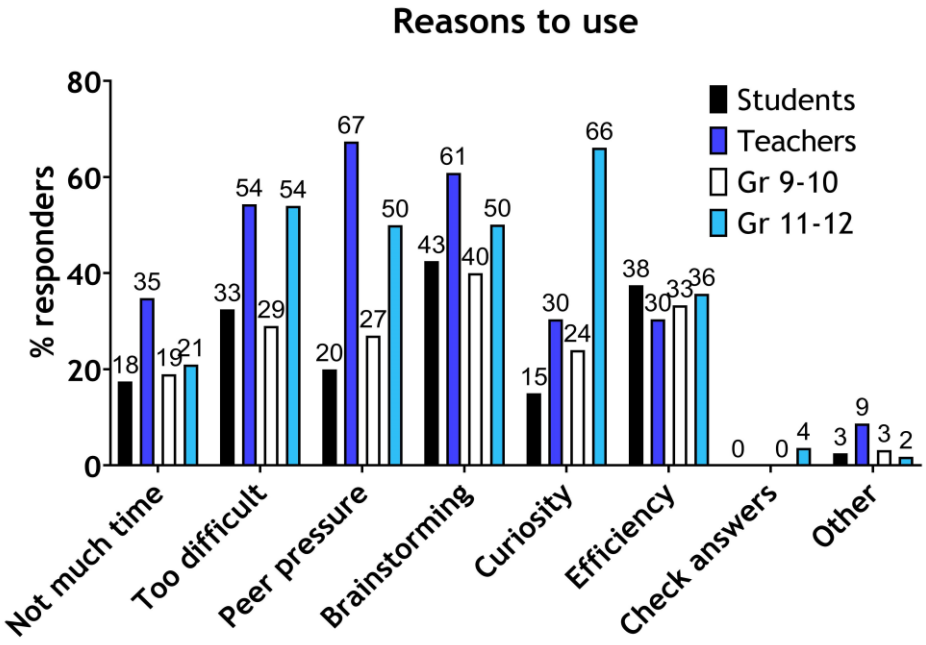


Figure 3: Reasons to use ChatGPT by high school teachers, students Gr9-10 and Gr11-12

As shown in Figure 4, the majority of students and teachers use ChatGPT for math and science, language, and writing, but less for art and social studies. Overall, the use of ChatGPT was the highest among Gr11-12 students in all areas: 75% for math and science compared to 58.7% of teachers and only 36% of Gr9-10 ($p=0.0035$). Significantly less Gr9-10 compared to Gr11-12 use Chat GPT for art and social studies ($p< 0.001$ for both).

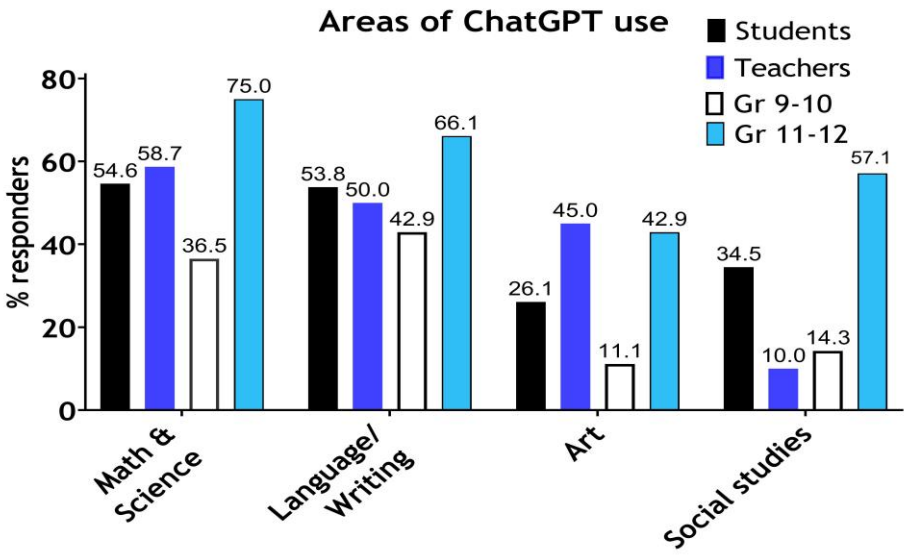


Figure 4: Areas of ChatGPT use by high school teachers, students Gr9-10 and Gr11-12

Preference of Searching

For online searching, only less than 10% of students and 0% teachers prefer only ChatGPT. More Gr9-10 (42.9%) use internet alone compared to teachers (28.6%) and Gr11-12 (17.9%). Between 50 and 75% of students and teachers reported on a combination of internet and ChatGPT use (Figure 5). Teachers with more than 10 years of experience were more likely to prefer using internet vs ChatGPT (HR=0.81, CI 95%).

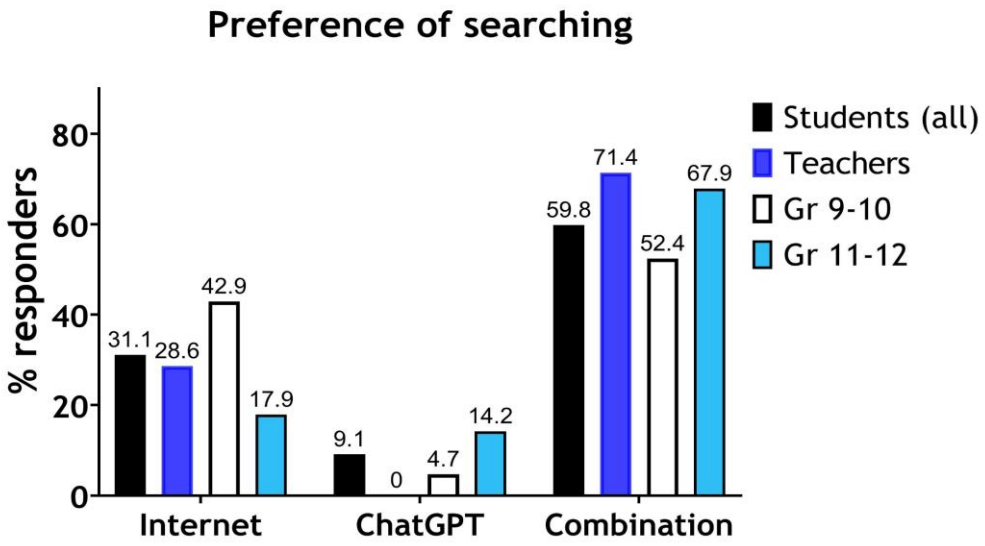


Figure 5: Preference of searching (internet vs ChatGPT vs both) by high school teachers, students Gr9-10 and Gr11-12

ChatGPT Disadvantages and Concerns

Almost no one found Chat GPT without disadvantages. Ethical dilemmas, including cheating and plagiarism was mentioned by 65% of both teachers and students, but more in the Gr9-10 (76%) group. Concerns on inaccuracy of ChatGPT were similarly expressed by all subgroups (52-65%). Decreased motivation was ranked equally high (83-84%) by teachers and Gr11-12 students. The top disadvantage was “loss or reduced ability of critical thinking”, expressed by 98% of teachers and 79% of Grade 11-12 students, compared to 60% of Grade 9-10 students ($p<0.05$ for both), as shown in Figure 6.

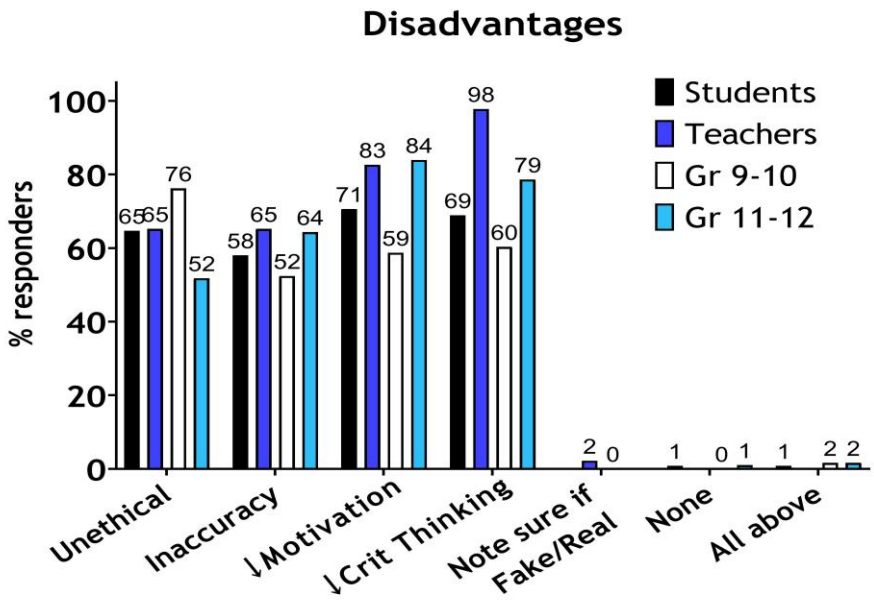


Figure 6: Disadvantages of ChatGPT expressed by high school teachers, students Gr9-10 and Gr11-12

Relating to concerns in using ChatGPT, ethical concerns are significantly more commonly identified by teachers (65%), compared to students in total (48%), p=0.012. It is interesting that Gr11-12 students ranked ethical concerns significantly lower (14% only), compared to Gr 9-10 (43%), p<0.0001. No knowledge in using ChatGPT and its inaccuracy, teacher and parent restrictions were more common among teachers, compared to students, in particular Grade 11-12 (Figure 7).

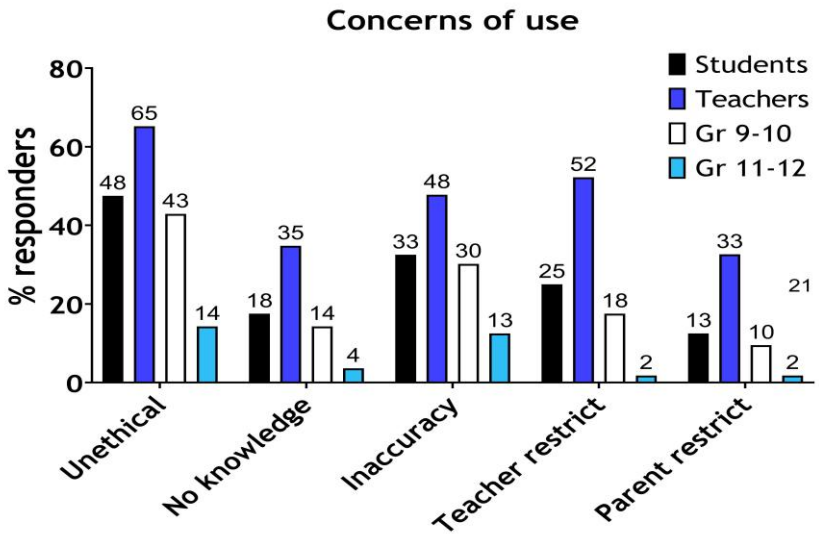


Figure 7: Areas of concern related to ChatGPT expressed by high school teachers, students Gr9-10 and Gr11-12

Whether ChatGPT Should Be Allowed, Areas and Extent of ChatGPT Allowance

More teachers (76.1%) compared to 60% of total students agreed that ChatGPT should be allowed (p=0.0413). The difference between Gr9-10 (54.0%) and Gr11-12 (66.1%) students was not significant. We noticed that ~40% of students prefer no ChatGPT, compared to ~24% of teachers, with more Gr9-10 (46.0%) vs. Gr11-12 (33.9%) (p=0.0036) as shown in Figure 8.

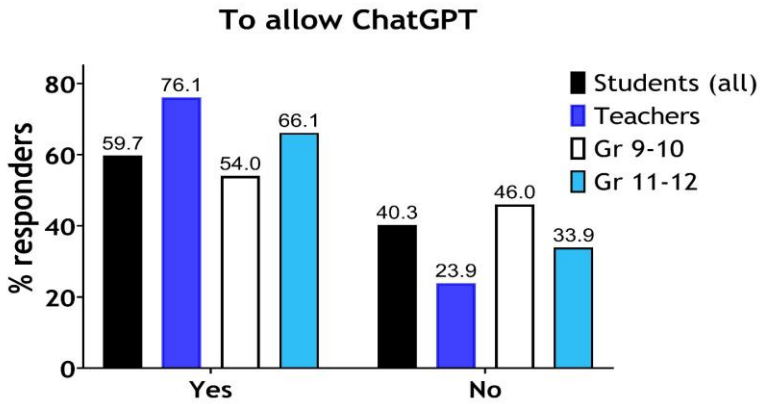


Figure 8: Opinions of high school teachers, students Gr9-10 and Gr11-12 whether ChatGPT should be allowed in high school classrooms

Study assistance, in particular for generating ideas, learning new concepts was the most agreeable domain for all groups (ranged: 79 and 87%) with only small differences among groups. More students, in particular Gr11-12, need ChatGPT for homework help: 66% compared to 37% teachers (p=0.0032). Both students and teachers prefer allowing ChatGPT for a portion of paper only, with no difference between teachers (55%) and Gr11-12 (55%) students. No teachers nor Gr9-10 students viewed that ChatGPT should be used for the majority of paper; however, 25% of Gr11-12 considered this option should be allowed. Only a very small portion of students (2%) expressed that ChatGPT should be allowed to check answers. Only about 10% viewed that it should be banned with no difference among all groups (Figure 9).

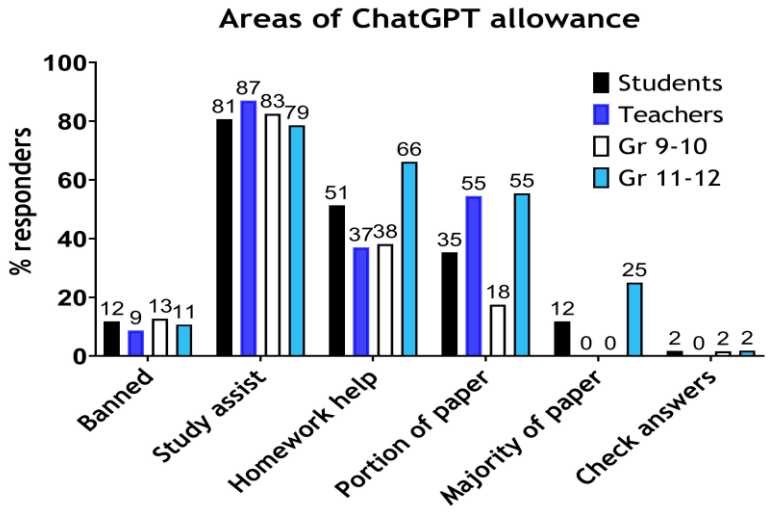


Figure 9: Areas where ChatGPT could be allowed as expressed by high school teachers, students Gr9-10 and Gr11-12

Relating to the extent of ChatGPT use allowance, most students (61.3%) and teachers (76.1%) agreed on less than 25% of ChatGPT allowance in school-related tasks; however, more Gr11-12 (35.7%) chose to extend its use up to 50% compared to teachers (13.0%) ($p < 0.0001$). No teachers (0%) allow the extent of >50% and a very small proportion of students (<5%) extended ChatGPT allowance to over 75% (Figure 10).

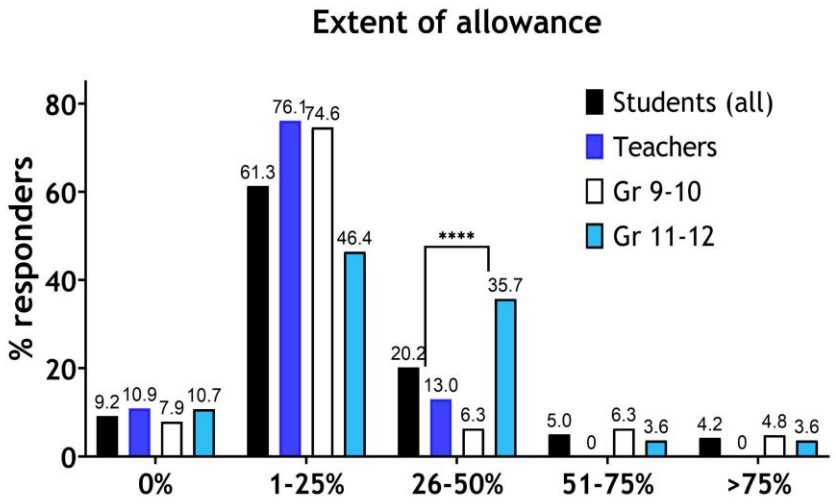


Figure 10: Extent of ChatGPT allowance at school viewed by high school teachers, students Gr9-10 and Gr11-12. **** $p<0.0001$

If ChatGPT Is Incorporated into the School Classroom

As shown in Figure 11, between 40% and 50% of students and teachers, with no statistically significant difference, viewed that guidelines focusing on acceptability and limitation of ChatGPT use are needed. There were significantly more students (45.4%) than teachers (28.3%) identified the need for proper ChatGPT use in class ($p=0.047$), in particular 54% of Gr11-12 students (54%) as compared to 31.7% Gr9-10 ($p=0.036$). 18.5% of students expressed the need to discuss their feelings relating to ChatGPT use compared to 1% of teachers, with no significant difference between Gr9-10 (15.9%) and Gr11-12 (22%). The need to understand consequences of inappropriate ChatGPT use was much higher among students (36.1%) than teachers (2.2%), $p<0.0001$, being more apparent for Gr11-12. Sub-group analysis showed that teachers with less than 10 years of experience preferred teaching students proper use (HR=0.75, CI 95%) compared to the implementation of formal guidelines.

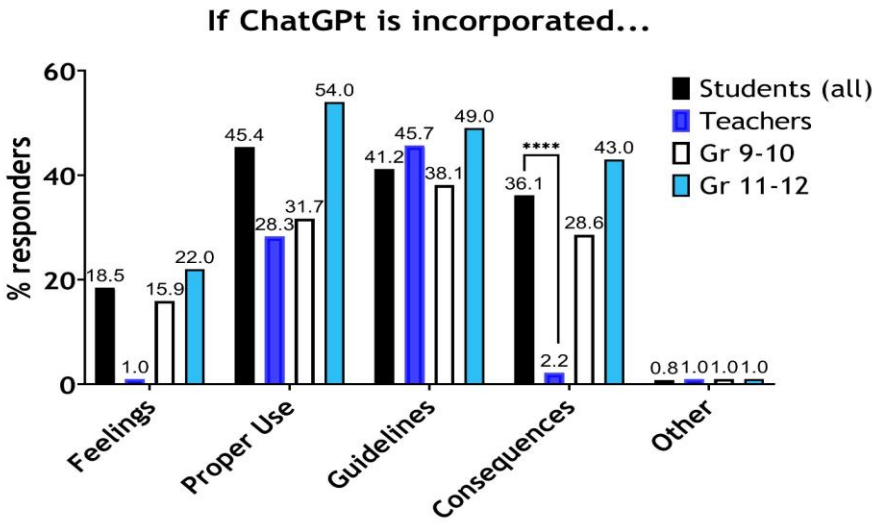


Figure 11: What is needed if ChatGPT is incorporated into school class. **** $p<0.0001$

Discussion

Our study assessed the comparative perception of ChatGPT by teachers and students in the Canadian high school setting; and the survey results showed some similarity to the previously published reports. Our results showed that ChatGPT is now "a reality" and its use in high school cannot be avoided. In spite of its relatively recent release since November 2022, only a small proportion of students and teachers are unfamiliar or have never used ChatGPT for school purposes in the high school setting. According to a survey conducted by Pew Research Center in February 2024, the use of ChatGPT increased from 18% in July 2023 to 23% in February 2024 (McClain C., 2024), showing its use is becoming more popular. In a high school survey conducted by Stanford University comparing cheating behavior before and within a year after ChatGPT release. Most students in this survey did not think that using ChatGPT should be allowed to produce an entire paper or complete a whole assignment (Lee et al., 2024); similar to the results reported in our study.

Our study aimed to assess comparative perceptions of GenAI, in particular ChatGPT, in high school students and teachers. Another survey, conducted in Hungary (Szüegyi et al., 2024), evaluated the use of ChatGPT by university and high school students in 2024. It showed that merely about 1/3 of active ChatGPT users and one-half of non-users were not interested in hearing about ChatGPT in an educational setting. Similarly to our results, saving time/time pressure, brainstorming, curiosity were the common reasons to use ChatGPT for school-related tasks.

In addition, students used ChatGPT for translating in non-English speaking country (Szüegyi et al., 2024). A survey conducted at a U.S. school of pharmacy students showed that over 60% were using ChatGPT for the search of information (Anderson et al., 2024). Though no direct comparison can be made, our study showed that a similar proportion of high school students and teachers prefer the use of both internet and ChatGPT searches compared to only a very small number who prefer only the use of ChatGPT. We found that students of all grades prefer a combined search with both Google and ChatGPT. This may reflect positive personal experiences with using both search engines. A study by Hristidis et al, (2023) comparing ChatGPT vs Google related to dementia and other cognitive decline showed that Google and ChatGPT both have strengths and weaknesses. ChatGPT rarely includes the source of results, while Google more often provides a date for and known reliable source of response compared to ChatGPT, whereas ChatGPT supplies more relevant responses to queries (Hristidis et al., 2023).

Our results confirmed that ChatGPT is not without concerns. It may negatively impact critical thinking and learning motivation in addition to concerns of cheating or inaccurate ChatGPT results. Interestingly, a recent study did not detect any dramatical change in the prevalence of cheating in high-school students before and after ChatGPT release (Lee et al., 2024).

It is vital for young generation who will be living in a world where the use of generative AI tools is a part of their professional and social life, as well as in the workplace to learn how not to rely completely on ChatGPT, but rather find a proper niche for ChatGPT use, and be able to critically assess the information and use it as an important tool to increase productivity. The preparation of this young generation in the understanding of the risks and benefits of ChatGPT use is particularly important since the sophisticated AI may threaten to reasonably replace ever-larger segments of the human workforce and capabilities (Shrier, 2024)

In our study ChatGPT was viewed as an acceptable tool for study assistance, with 80% to 90% of students allowing it for generating new concepts and brainstorming, homework help (35-66%), for a portion of school work (35-55%), but not the majority of tasks for various school subjects, including science and art. Only approximately 10% of both teachers and students who participated in our study viewed that it should be banned in classroom. This is comparable to a study performed in high school principals and teachers showed sufficient knowledge and mostly positive attitude towards ChatGPT use in education despite some risks (Cetin et al., 2024). In our study, more teachers were concerned about reduced students' ability in critical thinking and learning motivation. A study in English teachers in Malaysian high schools also showed the potential danger of ChatGPT to hinder creative thinking as one of the main concerns. This study concluded that teachers should make it very clear to the students that it is a tool to assist students, but they should not rely on it completely (Annamalai, 2024). Other concerns in ChatGPT use

included academic integrity, ethical considerations /plagiarism, and inaccurate information that were raised by teachers, similar to our findings. Interestingly, 2/3 of teachers consistently identified ethical issues as both a disadvantage and a concern in using ChatGPT. On the other hand, although approximately 2/3 of all students considered one of the disadvantages of using ChatGPT in school-related tasks is being unethical, lower percentages of students (48%) identified ethical issues as one of the concerns in actually using ChatGPT, and this is more apparent for the higher Gr11-12 students (14%) when compared to 43% of the younger Gr9-10 students. This may potentially be due to more difficult school work for higher grade students and meeting more demanding schedules for school.

Schools now are deciding on how to address the evolving technology, including use of AI, with different approaches. For example, in December 2023, New York City school and Los Angeles United School Board blocked and banned ChatGPT from all district devices and networks. Philadelphia schools took a different approach, allowing active surveillance, but not blocking ChatGPT (Fisk, 2023). In our study, however 76% of teachers welcomed ChatGPT in classroom. The difference most likely reflect the gaining experience and getting more comfortable with ChatGPT. We showed that 50% of responders supported ChatGPT guidelines/teaching students proper ChatGPT use (e.g., using inaccurate ChatGPT output as teaching materials). We showed that more students than teachers expressed need to discuss feelings & concerns; understand inappropriate use consequences; and learn proper ChatGPT use.

Our cross-sectional study has several limitations. We assessed students and teachers in a small geographical area in Canada at a single point in time. The opinions may represent local preference, and the results may differ with other populations. Since more time has elapsed after the release of ChatGPT, future studies may yield results that differ from a "snapshot" of a Canadian high school populations assessed in early 2025. We anticipate that continued measurements at future time points, including behavior, allowability and areas of allowance could change over time. Our study that provides data from one timepoint will help us to interpret future studies and samples. The sample size / number of responses was not high enough to allow proper correlational studies. We also did not perform formal validation of our survey. The questions we selected were based on previous studies performed by Stanford University group and other groups (Cetin et al., 2024; Hristidis et al., 2023; Lee et al., 2024; Szüegyi et al., 2024)). The ultimate goal of our study was to understand how Canadian high school students and teachers actually use ChatGPT. It is evident from our results that many students already use ChatGPT for educational purposes and ChatGPT will inevitably find its way to high schools. Thus, schools must appropriately equip high school students in facing reality of ChatGPT use, knowing proper and allowable ChatGPT use for learning, understanding advantages and disadvantages with educators' support and preparing them for post-secondary education &

eventually joining the work force. Our conclusions are concurring with early studies that teachers should focus their energy on guiding students to use generative AI responsibly, rather than attempting the difficult task of detecting cheating or defining it (Denouche, 2021; Levine et al., 2025). Clear instructions and guidelines for teachers and students can reduce uncertainties on concerns, including establishing positive ethical and learning habits, and importantly helping to minimize student stress and anxieties on ChatGPT use. If or when ChatGPT is incorporated into high school class, reassessment of mode, extent of ChatGPT application, challenges, as well as unmet needs should be performed in the future.

Conclusion

ChatGPT can be a hero or a villain depending on its use. It is currently used by most students and teachers; and is expected to be more popular. With a majority of students and teachers preferring it to be incorporated in high schools, there is an urgent need to have clear school ChatGPT guidelines and teaching its correct use in high school setting.

Author Contributions: "Conceptualization, M.K. and T.C.; methodology and formal analysis, M.K.; data curation, M.K writing—original draft preparation, M.K.; writing—review and editing, T.C.; supervision, T.C. All authors have read and agreed to the published version of the manuscript."

Funding: "This research received no external funding".

Institutional Review Board Statement: "The study was conducted in accordance with the Declaration of Helsinki and approved by the Simcoe County District School Board Research Ethics Committee, Feb 24, 2025.

Informed Consent Statement: "Informed consent was obtained from all subjects involved in the study."

Data Availability Statement: All data generated or analyzed during this study are included in this published article

Acknowledgments: We acknowledge all study participants who spent their time and efforts. No GenAI has been used for this study or in preparation of the manuscript.

Conflicts of Interest: "The authors declare no conflicts of interest."

Abbreviations

The following abbreviations are used in this manuscript:

AI	Artificial Intelligence
GPT	Generative Pre-training Transformer
QR	Quick Response
ANOVA	Analysis of Variance

References

Anderson, H.D., Kwon, S., Linnebur, L.A., Valdez, C.A., & Linnebur, S.A. (2024). Pharmacy student use of ChatGPT: A survey of students at a US school of pharmacy. *Currents in pharmacy teaching and learning, 16*(11), 102156.

Annamalai, N. (2024). Factors affecting English language high school teachers switching intention to ChatGPT: a Push-Pull-Mooring theory perspective. *Interactive Learning Environments, 33*(2), 1367-1384.

Cetin, Y., Taş, Ö., Alakuş, H., & Kaplan, H.İ. (2024). Examining school principals' and teachers' perceptions of using ChatGPT in education. *Educational Process: International Journal*, *13*(3), 85-96.

Denouche, N. (2021). Plagiagism in the age of massive generative pretrained transformers (GPT-3). *Ethics in Science and Environmental Politics*, *21*, 17-23.

Eapen, T.T., Finkenstadt, D.J., Folk, J., & Venkataswamy, L. (2023). AI and machine learning. How generative AI can augment human creativity. Harvard Business Review. *July-August.* Available online: hbr.org/2023/07/how-generative-ai-can-augment-human-creativity (accessed on 25 April 2025).

Edwards, B. (2022). No Linux? No problem. Just get AI to hallucinate it for you. Ars Technica. Available online: arstechnica.com/information-technology/2022/12/openais-new-chatbot-can-hallucinate-a-linux-shell-or-calling-a-bbs/ (accessed on 25 April 2025).

Fisk, R. (2023). The rise of ChatGPT and generative A.I. and what it means for schools. *AASA Journal of Scholarship and Practice, 20*(1) Spring, 37-46.

Forero, M.G. & Herrera-Suarez, H.J. (2023). ChatGPT in the classroom: boon on baine for physics students' academic performance. Available online: www.semanticscholar.org/reader/87274099417d96f1b988aef466f4b972033580cd (accessed on 25 April 2025).

Heilweil, R. (2022). AI is finally good at stuff, and that's a problem. Available online: www.vox.com/recode/2022/12/7/23498694/ai-artificial-intelligence-chat-gpt-openai (accessed on 25 April 2025).

Hosseini, M., Gao, C.A., Liebovitz, D., Carvalho, A., Ahmad, F.S., Luo Y., MacDonald, N., Holmes K., & Kho A. (2023). An exploratory survey about using ChatGPT in education, healthcare and research. Available online: www.medrxiv.org/content/10.1101/2023.03.31.23287979v1 (accessed on 25 April 2025).

Hristidis V., Ruggiano, N., Brown E.L., Ganta S.R.R., & Stewart, S. (2023). *Journal of Medical Internet Research*, 25, e48966.

Lee, V.R., Pope, D., Miles, S., & Zarate, R.C. (2024). Cheating in the age of generative AI: a high school survey study of cheating behaviors before and after the release

of ChatGPT. *Computer and Education. Artificial Intelligent 7,* 100253.

Levine, S., Beck, S.W., Mah, C., Phalen, L., & Plttman J. (2024). How do students use ChatGPT as a writing support? *Journal of Adolescent & Adult Literacy. 68,* 445–457.

McClain, C. (2024). American's use of ChatGPT in ticking up, but few trust its election information. Available online: www.pewresearch.org/short-reads/2024/03/26/americans-use-of-chatgpt-is-ticking-up-but-few-trust-its-election-information/ (accessed on 25 April 2025).

Milmo, D. (2023). ChatGPT reaches 100 million users two months after launch. *The Guardian.* Available online www.theguardian.com/technology/2023/feb/02/chatgpt-100-million-users-open-ai-fastest-growing-app (accessed on 25 April 2025).

Mishra, P., Singh, U., Pandey, C.M., Mishra, P., & Pandey, G. (2019). Application of student's t-test, analysis of variance and covariance. *Ann Card Anaesth*, *22*(4), 407-411.

Nouzri, S., Elfatimi, M., Cuba, A. (2024). CHATWISE "ChatGPT: as a high school academic tool for writing, innovation, skills, and education". In M. Lahby, Y. Maleh, A. Bucchiarone, S.E. Schaeffer (Eds.) *General Aspects of Applying Generative AI in Higher Education* (pp.141-165). Springer, Cham.

Rahman, M.M., & Watanobe, Y. (2023). ChatGPT for education and research: opportunities, threats, and strategies. *Applied Sciences, 13(9),* 5793.

Reich, A. (2022). ChatGPT: What is the new free AI chatbot? – explainer. *The Jerusalem Post*. Available online: www.jpost.com/business-and-innovation/tech-and-start-ups/article-725910 (accessed on 25 April 2025).

Rider, E. (2023). How ChatGPT will dramatically change the influencer space. Entrepreneur. Available online: www.entrepreneur.com/science-technology/how-chatgpt-will-dramatically-change-the-influencer-space/448386 (accessed on 25 April 2025).

Shrier, D.L. (2024). *Welcome to AI: A human guide to artificial intelligence*. Harvard Business Review Press.

Szügyi, J.S., Szügyi, E., & Takács, M. (May 2024). *Evaluating the use of ChatGPT by university and high school students.* SACI 2024. 18th IEEE International Symposium on applied computational intelligence and informatics. Timsoara, Romania.

Tung, L. (2023). ChatGPT can write code. Now researchers say it's good at fixing bugs, too. *ZDNET*. Available online: www.zdnet.com/article/chatgpt-can-write-code-now-researchers-say-its-good-at-fixing-bugs-too/ (accessed on 25 April 2025).