The Impact of ChatGPT as a Brainstorming Tool on Gifted Students' Persuasive Writing

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Abstract: This study investigated the impact of using ChatGPT 3.5 as a prewriting brainstorming tool on the overall quality of persuasive writing among five gifted seniors majoring in Arabic at the College of Education, Kuwait University. Giftedness, in this study, was not defined by innate advantages such as intelligence quotient (IQ) but was instead viewed from a multidimensional perspective, focusing on academic performance, writing skills, and personal traits that reflect intellectual engagement. Four participants were typically developing gifted students, while one participant was twice exceptional, both gifted and autistic. An integrated single-subject design with multiple probes across multiple baselines was used, with each participant serving as their own control. Repeated measures were used throughout the baseline, intervention, and maintenance phases to monitor intraindividual variability and examine the effectiveness of the intervention. The results indicated a significant increase in mean scores for persuasive essays from baseline to intervention for all participants, with continued improvement during maintenance for all but the twice-exceptional student, whose mean maintenance score remained unchanged from the intervention. While promoting ChatGPT 3.5 as a valuable brainstorming tool for persuasive writing, this study emphasizes its complementary role and recommends that writers engage in brainstorming using multiple resources before writing.

Keywords: artificial intelligence, brainstorming, ChatGPT, gifted students, persuasive writing

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1. Introduction

Since its debut in November 2022, the use of ChatGPT, an artificial intelligence (AI) tool that generates human-like text, has been controversial. Proponents emphasize the benefits of ChatGPT, such as its ability to provide information and ideas, facilitate conversations, support research, assist with writing, and help with text translation, review, and editing (Barrot, 2023; Ciampa et al., 2023; Dergaa et al., 2023; Michel-Villarreal et al., 2023). However, critics raise concerns about issues such as inaccuracies, plagiarism, lapses in integrity, and the potential for students to rely too heavily on ChatGPT without engaging in critical thinking (Barrot, 2023; Singh, 2023; Thorp, 2023). In addition, there are concerns about intellectual bias, as ChatGPT relies heavily on Internet data, which may lead to favoritism or discrimination against certain ideas or cultures (Ray, 2023). These concerns echo a similar debate that arose during the launch of Wikipedia in January 2001 (Naumova, 2023). Nevertheless, it is important to recognize that any developing technology has both strengths and limitations, as well as vulnerabilities.

2. Literature Review on ChatGPT and Writing

Empirical research on the relationship between ChatGPT and writing is still expanding, with the prevailing literature consisting primarily of commentary articles, including review papers, editorials, online publications, and preprint articles. In one study, Algaraady and Mahyoob (2023) investigated the effectiveness of ChatGPT in text correction among English language learners, observing its ability to identify spelling errors rather than more complex issues such as sentence structure and pragmatics. Sallam (2023) conducted a systematic review of ChatGPT's utility in health care education, research, and practice and found that 51 out of 60 datasets highlighted its effectiveness in improving the quality of academic and scientific writing. Similarly, Imran and Almusharraf (2023) reviewed 30 articles, mostly from English-speaking countries, and determined that 70% of them supported ChatGPT's effectiveness as a writing aid in disciplines such as medicine, computer science, and social sciences.

Thus, the literature highlights ChatGPT's potential as a writing aid for a variety of tasks. Nevertheless, additional research from non-English-speaking countries is crucial to cultivate a more diverse and inclusive knowledge base, promote equity in research, and strengthen the validity of findings. It is also noted that most studies have been conducted in the medical field; however, given the transformative impact of AI on various sectors, the study of other disciplines, including education and literacy, is essential. Furthermore, conducting empirical studies with diverse student cohorts is imperative to challenge negative assumptions about ChatGPT, comprehensively assess its strengths and weaknesses, and gain a more in-depth understanding by examining its impact on numerous variables.

3. The Current Study

This study examined the impact of using ChatGPT 3.5 as a brainstorming tool on persuasive writing in gifted students. Specifically, the following research questions were addressed:

1. How did the use of ChatGPT 3.5 as a brainstorming tool impact the overall quality of persuasive essays written by gifted students?
2. To what extent did the effects of the intervention (using ChatGPT 3.5 as a prewriting brainstorming tool) persist over time?
3. How did gifted students engage with and perceive ChatGPT 3.5 as a brainstorming tool prior to writing their persuasive essays?

3.1 Why Brainstorming?

When ChatGPT 3.5 was launched in November 2022, it functioned primarily as a chatbot for interactive conversations while offering features such as text translation, review, and editing. The release of ChatGPT 4 in March 2023 enhanced its ability to provide more in-depth responses while maintaining its core identity as an interactive chat tool. In October 2023, ChatGPT 4 expanded to include image design, file processing, creative content generation, and music composition while still maintaining its identity as an interactive chat application that allows users to expand their knowledge, gather and explore ideas, share thoughts, and assess their credibility and logic during conversations.

Brainstorming, a key part of the prewriting process, aligns with the goals of the interactive conversations that ChatGPT facilitates. Brainstorming involves the ideation process, where writers activate and develop different ideas and themes for their writing (Graham & Perin, 2007b). By fostering a free-thinking environment, brainstorming motivates writers to generate ideas and solve problems related to a topic, facilitating connections between diverse concepts. This dynamic thinking process not only aids in the development and accumulation of ideas but also encourages writers to analyze, evaluate, challenge, eliminate, reorganize, and actively pursue their thoughts (Graham & Harris, 2016). As a result, effective brainstorming helps writers build clear, organized content knowledge, enhances cognitive processes, and strengthens their beliefs and attitudes about writing (Siegle, 2020). Establishing strong self-efficacy in ideation, defined as the belief in one's ability to generate and organize ideas, is significantly correlated with positive attitudes toward writing and improved writing performance (Bruning et al., 2013). It is important to note that brainstorming is an evidence-based practice that leads to a notable 21 percentile point improvement in writing quality (Graham & Harris, 2016; Graham & Perin, 2007a).

It was therefore decided in this study to test the effectiveness of ChatGPT 3.5 in this area. Other writing-related services, such as text review, editing, and translation, were excluded to narrow the study's scope and make brainstorming the sole focus. The exclusion of these services does not mean that they are unimportant or less important than brainstorming, nor does it mean that ChatGPT could not help with this. The issue simply revolves around the desire to narrow the scope of the research and focus on brainstorming, as this is consistent with ChatGPT's core identity and function (i.e., provider of interactive conversations).

ChatGPT 3.5 was selected due to its free access, thus avoiding the subscription fees associated with ChatGPT 4.

3.2 Why Gifted Students?

There are several definitions for characterizing gifted students, each of which has different implications for their identification, eligibility for specialized services, and the nature of those services in distinct ways (Bryant et al., 2020). These definitions often emphasize a multidimensional perspective, focusing less on psychometric traits (e.g., IQ) and more on comprehensive global cognitive problem-solving abilities and specific academic skills (Amka et al., 2021; Bryant et al., 2020; Callahan et al., 2017; Rimm et al., 2018; Trail, 2011; Webb et al., 2007; Yuen et al., 2018). The Davidson Institute for Talent Development (2023) outlines key domains that characterize gifted students, including advanced understanding of core knowledge, curiosity, enthusiasm for unique interests, critical and creative thinking, rapid absorption of information, and the ability to demonstrate quick and good learning outcomes. Gifted students are drawn to complexity, prefer comprehensive and reasoned answers, and require precision in thought and expression. However, they are often overlooked in legislation, education programs, and research, requiring specialized programs to stimulate critical thinking (Callahan et al., 2017; Rimm et al., 2018; Siegle, 2023; Trail, 2011).

In terms of their writing, studies have shown that gifted students have a strong awareness of the writing process—planning, drafting, and revising—while using cognitive strategies such as brainstorming, summarizing, paraphrasing, elaborating, and awareness of text structure, as well as metacognitive strategies such as self-monitoring, thinking aloud, seeking feedback, reflection, and self-regulation (Innali & Aydin, 2020). These factors contribute to their superior writing performance compared to their peers (Kettler & Bower, 2017; Yates et al., 1995). However, research also indicates that, despite their cognitive, personal, and writing abilities, gifted students face challenges that may diminish the quality of their writing.

On one hand, challenges may be related to the nature of the writing tasks and activities themselves. Superficial and repetitive writing tasks, or those that are overly restrictive, can hinder motivation, lower self-esteem, and generate negative emotions (Brown-Anfelouss, 2012). Consequently, this affects gifted students' willingness to actively engage and reach their full potential, which ultimately impacts their writing performance. Thus, it remains essential to provide gifted students, particularly those in mainstream classrooms, with differentiated and meaningful writing tasks and activities that are connected to their lives, stimulate challenge and critical thinking, and allow for significant autonomy, freedom, and choice (Garrett & Moltzen, 2011; Olthouse, 2012; 2014). One-on-one teaching and learning opportunities have also been reported to be successful in writing interventions for gifted students who struggle with motivation in mainstream settings (Bennett-Rappell & Northcote, 2016).

On the other hand, challenges are often linked to the pursuit of perfection and the expectations that others, especially parents and teachers, have for their work (Brown-Anfelouss, 2012; Palmquist & Young, 1992; Siegle, 2023; Siegle & Schuler, 2000; Yates et al.,

1995). Despite having some ideas prior to writing, gifted students may struggle to generate additional ideas due to an intrinsic belief that they need to produce many ideas to achieve perfection, influenced by their potential and high external expectations. This pressure can lead to anxiety and stress, which can negatively affect the quality of their writing (Brown-Anfelouss, 2012). Under this pressure, gifted students have been reported to make rudimentary errors in mechanics and spelling and struggle to organize their thoughts, focusing excessively on details, which disrupts the clarity of the overall narrative and the logical connections between ideas, despite their understanding of the text's structure (Palmquist & Young, 1992; Yates et al., 1995).

Although two recent meta-analyses (Ogurlu, 2020; Stricker et al., 2020) showed no statistically significant differences between gifted and non-gifted students in terms of perfectionism concerns (based on the results of 24 studies)—reinforcing the belief that such concerns are a natural human feeling—both studies were notable for approaching the concept of perfectionism from a dual perspective rather than a one-dimensional perspective. Accordingly, statistically significant differences were found in favor of gifted students in terms of their pursuit of perfection. This drive for perfection compels them to set high standards, leading to pleasure in achievement but also to feelings of dissatisfaction and frustration when these standards are not met, ultimately fostering a self-defeating attitude.

In reviewing the research on writing among gifted and underachieving gifted students (i.e., those who exhibit a discrepancy between potential and actual performance), different methodologies have been used to achieve different objectives. Some experimental studies have measured the writing performance of gifted students compared to their general education peers (Kettler & Bower, 2017; Yates et al., 1995). In contrast, qualitative studies have examined the role of motivation in gifted students' writing, using semi-structured interviews to investigate their characteristics, thought processes, and needs (Brown-Anfelouss, 2012; Garrett & Moltzen, 2011; Olthouse, 2012, 2014). Other studies have adopted a case study methodology that involved one or two students in customized training programs and offered instructional implications based on the findings (Bennett-Rappell & Northcote, 2016; Noel & Edmunds, 2006). Additionally, some theoretical studies have suggested effective instructional practices tailored to the abilities and personalities of gifted students as identified in the literature (Smith, 2008). Other research has examined the cognitive and metacognitive skills of gifted students in writing through self-report measures (Innali & Aydin, 2020).

Notably, in a study that departed from previous methodologies, eight gifted middle-school students evaluated narrative and poetic essays written by students while adult psychologists, professional writers, and teachers were asked to do the same (Kaufman et al., 2005). The results revealed a statistically significant correlation between the gifted students' evaluations and those of the experienced adults and concluded that the gifted students' assessments could be considered reliable, trustworthy, and valid. The results suggest that gifted students possess analytical, critical thinking, and evaluative skills, and they can effectively apply these skills to their own writing.

Given the scarcity of empirical studies that have focused on the impact of ChatGPT on writing, and considering that most previous research on gifted students and writing has primarily emphasized their characteristics, abilities, needs, skills, and their superiority over their peers, there is a clear research gap in addressing gifted students' pursuit of perfection through empirical studies. Previous research suggests that perfectionism-related anxiety and pressure from others' expectations may hinder gifted students' ability to generate the ideas necessary for writing (Brown-Anfelouss, 2012; Palmquist & Young, 1992; Siegle, 2023; Siegle & Schuler, 2000; Yates et al., 1995). But how can this issue be resolved? Investigating whether ChatGPT, used as a brainstorming tool, can help gifted students overcome the challenges associated with idea generation is a compelling area of inquiry. Exploring whether ChatGPT can address the challenges posed by perfectionism and the expectations of others could provide deeper insights into whether the use of ChatGPT and other interactive chatbots offers any advantages in the context of teaching writing to gifted students.

The use of persuasive writing as a dependent variable in this study further complicates the task for gifted students, making the challenges even greater. While content knowledge is a predictor of the quality of persuasive writing (Graham et al., 2019; Olinghouse et al., 2015), simply having many ideas related to the topic is not enough, as persuasive writing demands more. In this form of writing, authors must skillfully formulate compelling arguments, support them with evidence, and engage in hypothetical rebuttals by addressing opposing viewpoints, incorporating reflective critical thinking, and attempting to discredit counterarguments (Graff & Birkenstein, 2007; Toulmin, 2003). Overall, gifted writers must engage in a deep brainstorming process to gather a range of valid ideas while drawing on their innate understanding of the writing process and cognitive and metacognitive writing strategies (Innali & Aydin, 2020) in order to craft compelling, organized, and persuasive essays.

Additionally, constructing an authorial voice that conveys attitude, communicates a clear stance, engages the reader's interest, persuades them, and/or poses significant questions that invite post-reading inquiry is a formidable challenge (Graff & Birkenstein, 2007; Jonsen et al., 2018; Slater & Groff, 2017; Toulmin, 2003). Voice in persuasive writing influences how ideas are shaped and presented. For instance, ideas can be expressed in a serious, sarcastic, exclamatory, or interrogative tone, each of which has a different effect on the audience. Voice also affects the clarity of ideas, the deliberate concealment of certain elements, and the quantity and quality of evidence used to support the main argument—all of which impact the credibility and effectiveness of persuasion. Moreover, voice allows writers to personalize their ideas, making them more relatable to the audience's reality. In essence, while voice may initially seem to be related to style, it is also closely tied to the writer's ability to manipulate a reservoir of ideas, connect them, and strategically present or withhold certain parts. A good brainstorming session equips the writer with a wealth of ideas; a skilled writer knows how to manipulate these ideas to strengthen their persuasive stance.

4. Materials and Methods

4.1 Design

A single-subject design is a rigorous experimental methodology used to evaluate the effectiveness of interventions and to track changes in performance over time, across different settings, or in comparison to alternative conditions (Byiers et al., 2012; Horner et al., 2005; Kazdin, 2011; Zettle, 2020). In contrast to randomized controlled trials and quasi-experimental designs, which rely on between-group comparisons to assess the effects of an intervention, the single-subject design focuses on individual participants, allowing for a more detailed analysis of how specific interventions affect behavior or performance. By using repeated measures at each stage of the experiment, researchers can track a participant's response before, during, and after the intervention, providing a comprehensive understanding of individual changes. Data collected in single-subject studies are often analyzed visually, enabling researchers to observe behavioral changes through graphs that depict both relative and absolute learning outcomes across intervention conditions (Paronson & Baer, 1992).

Typically, a single-subject design involves a small number of participants, usually ranging from three to eight, which emphasizes the focus on individual responses over broad generalizations from larger samples (Byiers et al., 2012; Horner et al., 2005; Kazdin, 2011; Zettle, 2020). This approach allows researchers to closely monitor intraindividual variability and clearly demonstrate the functional relationships between interventions and behavior change. The smaller sample size improves practicality and ethical flexibility, allowing for tailored interventions that meet individual needs while minimizing potential harm. Consequently, a single-subject design is particularly valuable in clinical and educational research and often serves as a precursor to larger randomized controlled trials (Egerhag et al., 2023). In many cases, conducting interventions in larger groups can be logistically challenging. Therefore, a single-subject design offers a more feasible solution in naturalistic settings with fewer participants (Ledford et al., 2018).

This study integrates two common methods in a single-subject design: multiple probes across multiple baselines (Kazdin, 2011). Multiple baselines refer to the introduction of the intervention at different times across groups. In contrast, multiple probes involve assessing the effects of the intervention through occasional rather than continuous measurements during different phases of the experiment. To elaborate, Groups A and B begin the baseline phase together, with repeated measures to collect performance data before the intervention. This establishes a control condition for each participant, allowing each to serve as their own control (Byiers et al., 2012; Horner et al., 2005; Kazdin, 2011; Zettle, 2020). Once sufficient and stable baseline data are gathered for Group A, the intervention is introduced to them while Group B continues the baseline phase, intermittently collecting the remaining probes. After Group A completes the intervention and demonstrates changes in performance, as evidenced by several intermittent probe sessions, Group B begins the intervention. During Group B's intervention, their performance is assessed across several intermittent probe

sessions while Group A transitions into the maintenance phase. Finally, when Group B completes the intervention, they also move into the maintenance phase.

This staggered introduction of the intervention demonstrates the causal effect of the treatment on a target behavior. It allows researchers to determine whether changes in behavior are directly related to the intervention. Although participants experience the intervention at different times, they still serve as their own controls by comparing their baseline data to their intervention and maintenance data (Kazdin, 2011). This design minimizes the influence of external factors (e.g., environmental influences or testing conditions), random variability (i.e., unpredictable variations in behavior), and individual differences (e.g., personal characteristics), which can complicate the interpretation of results in group-based studies (Christ, 2007). Because the same individual is measured multiple times across the different phases of the experiment, any observed changes can be confidently attributed to the intervention, enhancing the reliability and validity of the results (Kazdin, 2011).

4.2 Sample

In the 2023–2024 academic year, the College of Education at Kuwait University enrolled approximately 6,000 students (90% female), including 36 students with officially diagnosed special needs. Within this cohort, 1,126 students were majoring in teaching Arabic (82% female). The College of Education lacks specific criteria for identifying gifted students. Therefore, the decision was made to establish criteria based on existing literature, prioritizing comprehensive global cognitive problem-solving abilities and specific academic skills over psychometric characteristics (Amka et al., 2021; Bryant et al., 2020; Callahan et al., 2017; Davidson Institute for Talent Development, 2023; Rimm et al., 2018; Siegle, 2023; Trail, 2011; Webb et al., 2007; Yuen et al., 2018).

The following criteria were applied: successful completion of both the Writing I and Writing II courses with an A grade in each within the past 4 years (2019–2023), the student must be a senior who has not yet graduated, have a cumulative GPA of ≥ 3.67 (≥ 90%), and demonstrate superior critical thinking skills, passion, and curiosity relative to their peers, as evidenced by a survey of a randomly selected third of their former professors.

Regarding the first criterion, the Writing I course introduces students to practical theories of writing, the writing process, various genres of writing, and evidence-based practices for writing development. To pass the course, students must submit four essays in different genres. Writing II builds on this foundation and requires students to write eight essays in a variety of genres. Completing both courses with an A reflects the ability to demonstrate rapid and good learning outcomes, writing and thinking skills, creativity, and knowledge. In addition, achieving a cumulative GPA of ≥ 3.67 (≥ 90%) indicates an exceptional level of critical thinking, enthusiasm for learning, advanced understanding of core knowledge, and curiosity compared to peers. This assessment was further validated by randomly interviewing one-third of the professors who had taught the candidates throughout college (14 professors per candidate)

to ensure that candidates had demonstrated passion and creative, critical skills both orally and in writing throughout their coursework.

After screening the records of 662 students who had successfully passed both Writing I and Writing II courses in the previous 4 years, only 11 students had earned an A in both courses. After confirming the second and third criteria, three of the 11 students had graduated, leaving eight students who had not yet graduated and maintained a GPA of ≥ 3.67 (≥ 90%). After the interviews to validate the fourth criterion, seven students met the requirement. During the preparatory meeting with the seven students to obtain their consent to participate in the project, it was discovered that one student was 8 months pregnant. Another student, although she initially agreed, apologized at the last moment, citing the need to care for her sister with special needs. Nevertheless, five seniors ultimately decided to take part in the project. All students were enrolled in the graduation project course, which took place in the fall semester of 2023–2024. Verbal and written consent was obtained from all students.

Table 1. Participants' Demographic Data

Participant	Gender	Age	GPA[a]	Ethnicity	Student classification	Special needs	Writing goals
Hajar	Female	23	3.88	Caucasian	Senior	Gifted	Yes
Maryam	Female	24	3.90	Caucasian	Senior	Gifted	Yes
Tahany	Female	43	3.82	Caucasian	Senior	Gifted	Yes
Asma'	Female	25	3.70	Caucasian	Senior	Gifted/EBD[b]/HFASD[c]	Yes
Retaj	Female	23	3.75	Caucasian	Senior	Gifted	Yes

Note. GPA[a] stands for grade point average, which is a standard method of measuring students' academic performance in the College of Education at Kuwait University. Each course is given three credits, and a GPA uses a scale of letter grades: A, B, C, D, and F. Depending on the student's performance, each letter grade is assigned a number of grade points. For example, a grade of A is worth 4 points, and a grade of F is worth 0 points. Each letter grade represents an academic performance (e.g., an A represents an excellent performance, while an F represents a failing performance). EBD[b]: official diagnoses of emotional behavioral disorders (depression) and HFASD[c]: high-functioning autism spectrum disorders. Notably, Asma's intelligence quotient test type and score were not available in her dossier at the College of Education.

Participant demographics are presented in Table 1. Pseudonyms were assigned to all participants to ensure anonymity. Of the participants, four were of low socioeconomic status, and one was of average socioeconomic status. All five students were native Arabic speakers. Four of the five students were typically developing, while one had been formally diagnosed with high-functioning autism spectrum disorder (HFASD) and an emotional disorder (depression) by the Public Authority of Special-Need Affairs.

Regarding the latter student, the concept of "twice-exceptional students," as defined by Equity in Gifted Talented Education (2023), refers to individuals who demonstrate exceptional

ability or the potential for excellence that surpasses others of similar age, experience, or environment, even in the presence of one or more of the disability characteristics listed in federal or state eligibility criteria. Twice-exceptional students, such as gifted students with disabilities, may simultaneously exhibit a complex mix of abilities, strengths, weaknesses, and deficits (Trail, 2011). This complexity often presents challenges for educators in identifying and understanding twice-exceptional students (Bryant et al., 2020). Twice-exceptional students are also referred to as "paradoxical students" (Guenole & Baleyte, 2017).

4.3 Measures

The second author developed 10 persuasive writing prompts that covered diverse domains. Topics ranged from the death penalty and obsessive photo-taking to marriage and divorce, immigration, suicide, cross-gender friendships, LGBTQ rights, awareness of misleading narratives in new media, and the intersection of AI and education. Some prompts were longer than others in order to provide sufficient context. These topics address some of the most pressing issues and reflect the challenges facing many countries around the world. The prompts were validated by two external writing professors from Kuwait University. Their input on appropriateness, clarity, and persuasive elements guided refinements to ensure the quality and effectiveness of the prompts. All writing prompts were presented in Arabic, and the students were instructed to respond in the same language. For each essay prompt, gifted students were required to write 600 words using a 14-point font size and double spacing. All writing was done on their personal computers.

The Persuasive Essay Rubric, provided by SlideShare [Persuasive Essay Rubric | PPT (slideshare.net)], was adapted into Arabic and used to evaluate the overall quality of persuasive essays written by the gifted students. This scoring rubric comprehensively assesses key rhetorical categories of persuasion, including argumentation, use of evidence, recognition, discrediting of opposing viewpoints, and voice. It also evaluates essential writing components that are integral to all rubrics, such as organization, word choice, sentence fluency, and adherence to conventions. Each category was evaluated on a scale from "unacceptable" to "exemplary," guided by clear evaluation criteria that indicated the writer's level of proficiency. Scores on the rubric ranged from 0 to a maximum of 48.

The second author teaches reading and writing courses at Kuwait University; therefore, the responsibility of evaluating the persuasive writing essays was delegated to him. In order to ensure reliable assessment scores, an external rater with 20 years of experience teaching Arabic in a high school was recruited for the study. Before the study began, he and the second author held several meetings to discuss the evaluation process and the mastery of the scoring rubric. The rater was given five persuasive essays written prior to the study to demonstrate his proficiency, and he successfully demonstrated his skills. The external rater was not informed of the details of the project and was unaware that he was assessing essays by gifted writers. He was asked to evaluate all essays independently of the second author throughout the study.

4.4 Procedures and Settings

The phases of the current study were conducted by the second author in two small groups: Group A (Hajar and Maryam) and Group B (Tahany, Asma', and Retaj) based on their scheduling preferences. All phases of the study were conducted in a quiet, unoccupied classroom.

4.4.1 Baseline

Prior to the start of the study, the participants were briefed on the research project. They were informed that they would be asked to write persuasive essays on various topics. Each session was allotted a 70-minute time frame (10 minutes to read the prompt, followed by 60 minutes of writing), and the persuasive writing prompts were randomly assigned. Following the staggered introduction of the intervention (discussed earlier), Group A completed three probe sessions and transitioned to the intervention phase, while Group B remained in the baseline phase. In total, Group B completed five probe sessions during the baseline phase.

4.4.2 Intervention

After establishing a stable baseline, ChatGPT 3.5 was introduced through explicit instruction, and participants were guided to install ChatGPT 3.5 on their personal computers. Each group had three practice sessions prior to the intervention to learn how to use ChatGPT 3.5 for brainstorming. The second author demonstrated ChatGPT 3.5, illustrating how AI technology could expand students' ideas and initial thoughts before actual writing. The practice sessions in this phase covered various topics, including plastic surgery, investment, and domestic violence.

In each practice session, the second author demonstrated how to use ChatGPT 3.5 to gather a wealth of ideas and information. He suggested starting with the classic questions, like "what," "why," "when," and "how," while emphasizing the importance of going beyond them. Students were taught to use their cultural backgrounds to explore intersections with ChatGPT's responses, seek clarification, and identify contradictions. They were also shown how to build logical arguments supported by multiple ideas and how to question opposing viewpoints through dialogue with ChatGPT. Additionally, he demonstrated how to engage in conversations around essential questions that explore how topics connect to our lives and enhance our understanding of ourselves and the world. He also explained how to ask ChatGPT for strategies on effectively presenting ideas to an audience and taught techniques for eliciting more responses from ChatGPT, such as typing "more" after each question to maximize the information obtained. After the instructor's modeling, students engaged in interactive conversations with ChatGPT using their own questions, with each practice session lasting 60 minutes.

Once the practice sessions were concluded, each group participated in four intervention points using writing prompts specifically prepared for the project (mentioned in the *Measures* section). At each point, students had 10 minutes to read the prompt, followed by 20 minutes

of brainstorming with ChatGPT 3.5. The Wi-Fi was then turned off, the ChatGPT browser was closed, and student notes were collected to prevent direct copying and pasting. Students were then given 60 minutes to complete the writing assignment.

4.4.3 Maintenance

Both groups underwent their maintenance sessions 3 weeks after completing the intervention. Group A completed the maintenance session earlier than Group B due to the staggered implementation timeline. All instructions, directions, and allotted time remained consistent with those from the intervention phase.

Overall, Group A had eight writing points (three at baseline, four during intervention, and one at maintenance). Group B had 10 writing points (five at baseline, four during intervention, and one at maintenance). These writing points formed the basis for the statistical analysis in this study.

4.5 Data Analysis

STATA 17 was used for statistical analysis, including measuring mean scores and assessing post-intervention and maintenance gains, while Microsoft Excel was used to generate figures. STATA 17 was also used to determine inter-rater reliability by calculating the Pearson correlation coefficient between raters. The results showed a strong correlation between the raters (r = 0.8054). Inter-rater reliability was further determined using the formula (agreement/agreement + disagreement) x 100, with a minimum of 80% agreement considered necessary for a high-reliability coefficient (Huck, 2012; Kazdin, 2011; Pierangelo & Giuliani, 2012). An inter-rater reliability of 84% was achieved between the first and second raters for the dependent variable, indicating a high-reliability coefficient and ensuring stable and consistent results over time.

5. Results

Research Question 1: How did the use of ChatGPT 3.5 as a brainstorming tool impact the overall quality of persuasive essays written by gifted students?

All participants showed an increase in their mean scores for the overall quality of persuasive essays from baseline to intervention following the introduction of ChatGPT 3.5 as a brainstorming tool. In Table 2, Group A (Hajar and Maryam) showed notable gains after the intervention. Hajar's mean score increased from 29 at baseline to 40 immediately after the intervention, reflecting a percentage increase of 37.9%. Similarly, Maryam's mean score rose from 26 at baseline to 34 during the intervention, representing a percentage increase of 30.7%.

Table 2. Participants' Mean Scores Across Phases

Participant	Baseline	Intervention	% increase	Maintenance	% increase
Hajar	29	40	37.9%	41	2.5%

Maryam	26	34	30.7%	35	2.9%
Tahany	24	38	58.3%	39	2.6%
Asma'	23	36	56.5%	36	0%
Retaj	22	37	68.1%	39	5.4%

Group B (Tahany, Asma', and Retaj) showed an acceleration in their mean scores for the overall quality of their persuasive essays. As outlined in Table 2, Tahany increased her baseline mean score from 24 to 38 during the intervention, marking a percentage increase of 58.3%. Asma' and Retaj also increased their baseline scores from 23 and 22 to 36 and 37, respectively, during the intervention. Their percentage increases from baseline to intervention were 56.5% and 68.1%, respectively. Figure 1 presents a graphical representation of each participant's scores on the dependent variable. The percentage of non-overlapping data (PND) was calculated to quantify the effect size and confirm the functional relationship between the intervention and participants' writing performance. A minimum effect size of at least 90% is considered necessary to document effectiveness, as suggested in the literature (Kazdin, 2011; Scruggs et al., 1987; Scruggs & Mastropieri, 1998). The PND was 100% for all five participants in the baseline, intervention, and maintenance conditions. This indicates the strong influence of ChatGPT 3.5 on the participants' persuasive writing performance. Therefore, the observed improvements in participants' writing performance are most likely due to the intervention.

Table 3 presents each participant's average scores across all components of the Persuasive Essay Rubric used in this study to further understand the gains in the participants' overall quality of persuasive essays. Participants made significant gains (≥ 50%) in categories directly related to persuasive writing: the argument, supporting evidence, opposing viewpoints, and voice and tone. In contrast, other categories related to general writing skills—such as organization, word choice, sentence fluency, and conventions—remained stable or showed only small, insignificant increases compared to the gains in the rhetorical categories of persuasion.

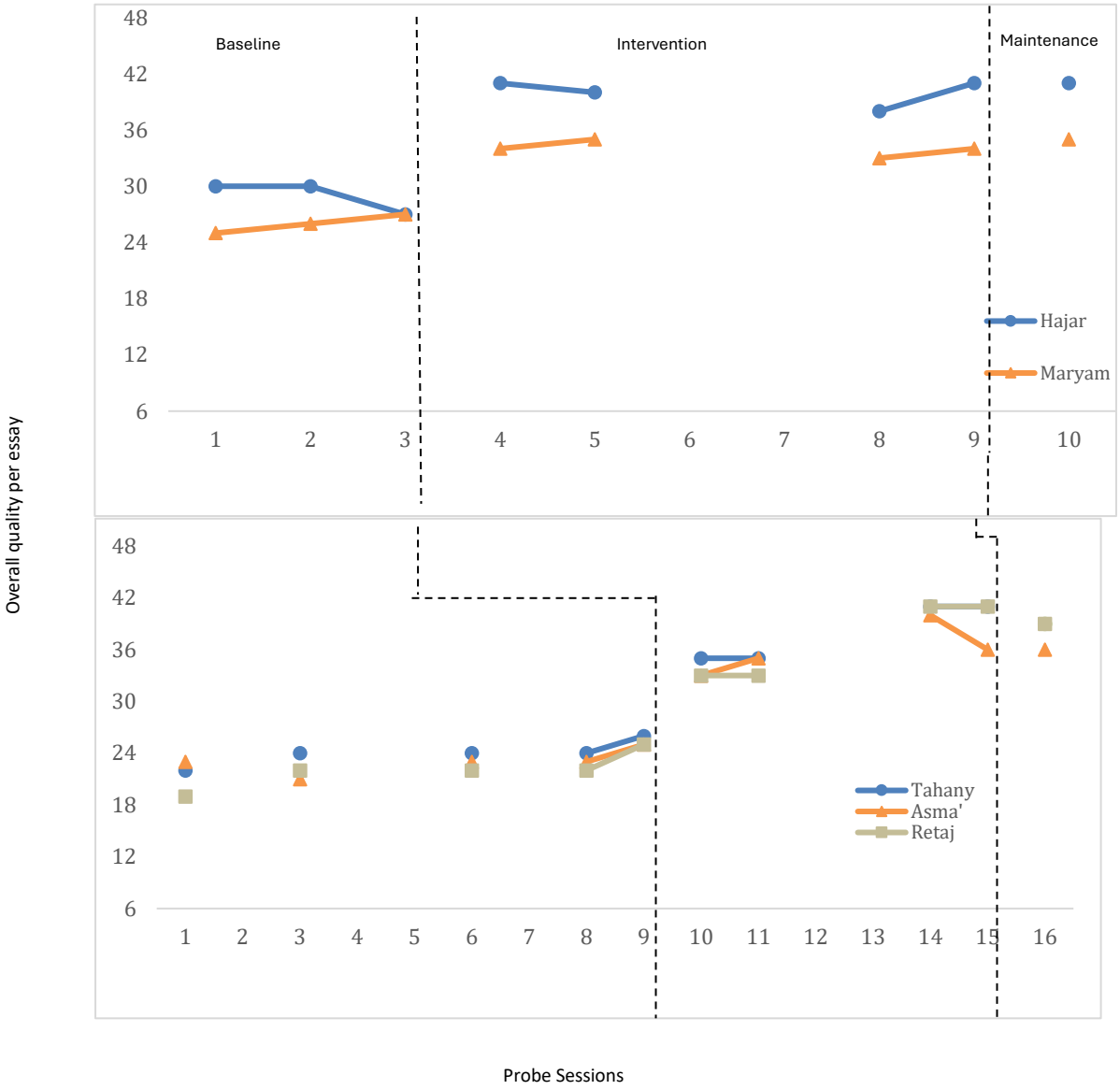

Figure 1. Overall Quality per Essay.

Table 3. Averaged Detailed Participant Scores Across Phases

Writing component	Participant: Hajar (Group A)				
	Baseline	Intervention	% increase	Maintenance	% increase
Argument	4	5.75	43.75%	6	4.34%
Supporting evidence	3	4.75	58.33%	5	5.26%
Opposing viewpoints	2.6	4.75	82.69%	5	5.26%
Voice and tone	2	4.75	137.5%	5	5.26%
Organization	4.4	5	11.11%	5	0%
Word choice	4	5	25%	5	0%
Sentence fluency	4	5	25%	5	0%
Convention	5	5	0%	5	0%
Writing component	Participant: Maryam (Group A)				
	Baseline	Intervention	% increase	Maintenance	% increase
Argument	3	4.5	50%	4.5	0%
Supporting evidence	2	3	50%	3	0%
Opposing viewpoints	2	3.25	62.5%	4	23.07%
Voice and tone	2	3.25	62.5	3.5	7.69%
Organization	4	5	25%	5	0%
Word choice	4	5	25%	5	0%
Sentence fluency	4	5	25%	5	0%
Convention	5	5	0%	5	0%

Table 3. continues

Writing component	Participant: Tahany (Group B)				
	Baseline	Intervention	% increase	Maintenance	% increase
Argument	2	5.25	162.5%	5.75	9.52%
Supporting evidence	2	4.25	112.5%	4.5	5.88%
Opposing viewpoints	1.5	4.5	200%	4.5	0%
Voice and tone	1.5	4	166.66%	4.25	6.25%
Organization	3.9	5	28.20%	5	0%
Word choice	4.4	5	13.63%	5	0%
Sentence fluency	4.7	5	6.38%	5	0%
Convention	4	5	25%	5	0%
Writing component	Participant: Asma' (Group B)				
	Baseline	Intervention	% increase	Maintenance	% increase
Argument	2	5	150%	5	0%
Supporting evidence	1.4	5	257.14%	5	0%
Opposing viewpoints	1.2	4.5	275%	4	-11.11%
Voice and tone	1.8	3.5	94.44%	4	14.28%
Organization	3.6	4	11.11%	4	0%
Word choice	4	5	25%	5	0%
Sentence fluency	4	4	0%	4	0%
Convention	5	5	0%	5	0%

Table 3. continues

Writing component	Participant: Retaj (Group B)				
	Baseline	Intervention	% increase	Maintenance	% increase
Argument	2	5	150%	6	20%
Supporting evidence	1.7	5	194.11%	5	0%
Opposing viewpoints	1.3	5	284.61%	5	0%
Voice and tone	1	3	200%	4	33.33%
Organization	3	4	33.33%	4	0%
Words choice	4	5	25%	5	0%
Sentence fluency	4	5	25%	5	0%
Convention	5	5	0%	5	0%

Research Question 2: To what extent did the effects of the intervention (using ChatGPT 3.5 as a prewriting brainstorming tool) persist over time?

In the maintenance phase, Hajar and Maryam (Group A) achieved mean scores of 41 and 35, with percentage increases of 2.5% and 2.9%, respectively. Tahany and Retaj (Group B) both achieved mean scores of 39 during the maintenance phase, representing increases of 2.6% and 5.4%, respectively. In contrast, Asma' (Group B) did not show an increase in her mean score during the maintenance phase (36), representing a 0% increase. Thus, the results indicated an improvement in mean scores during maintenance for all participants except for Asma' (twice-exceptional: gifted with multiple disabilities—HFASD and EBD), whose mean maintenance score remained the same at 36 as during the intervention. The findings underscored the participants' continued ability to write persuasive essays effectively, using the themes and ideas generated using ChatGPT 3.5 as a brainstorming tool.

Research Question 3: How did gifted students engage with and perceive ChatGPT 3.5 as a brainstorming tool prior to writing their persuasive essays?

This research question relates to social validity, defined by Horner et al. (2005) as the degree to which an intervention (an independent variable) produces substantial changes in outcomes and is perceived as valuable. A focus group was set up to investigate how students interacted with and perceived ChatGPT 3.5. Participants were asked about their experiences with ChatGPT 3.5 as a brainstorming tool compared to traditional brainstorming (e.g., independent reading, peer discussion). Experiences included the contributions ChatGPT 3.5 made, its perceived benefits for persuasive writing, and its suitability for other writing genres. Participants were also asked about any potential negative effects of using ChatGPT 3.5 as a writer and whether they had strategies for managing the abundance of ideas it generated. Their opinions about ChatGPT's weaknesses, satisfaction with the research project, and any desired changes to the study procedures were also explored.

Applying Rubin and Rubin's (1994) analysis process to the focus group responses—coding the most frequently repeated ideas and thoughts—participants indicated that this was their first experience using ChatGPT 3.5 to support brainstorming. Participants were positive about ChatGPT 3.5, citing its efficiency in terms of time and effort, directness, brevity, abundance of ideas generated, and lack of intrusive pop-up ads. They also noted that ChatGPT 3.5 excels at addressing socially sensitive topics that many may be reluctant to discuss (e.g., cross-gender friendships and LGBTQ rights). Participants also highlighted that ChatGPT 3.5 serves as a suitable substitute for individuals with intellectual limitations (i.e., less knowledgeable) in real-life discussions. ChatGPT's continuous availability was also underscored as being particularly useful for generating or discussing ideas at night, when real people may not be available. However, they acknowledged drawbacks, such as the program's lack of historical context in some writing topics, repetition of ideas even when the same question was asked but with different wording, and its inability to answer current questions because the last update was 2 years ago.

In this regard, Maryam stated the following:

> When I wanted to write, specifically to persuade the reader of my point of view, I used to read excessively about a particular topic for long periods of time, classifying and organizing supporting ideas and jotting them down in a separate journal, picking out the good thoughts (that support my point of view), and crossing out unneeded ideas. ChatGPT 3.5 led me directly to the necessary point(s) to support my claim(s) for the persuasive essays, and I found myself in this aura of the previous versions of the point of view I am writing about/taking throughout the entire issue. That was REALLY excitingly cool!

A valuable perspective that was highlighted was the way ChatGPT 3.5 narrates or provides information in a conversational way, as stated by Asma', one of the gifted participants with multiple disabilities, including HFASD and EBD. Asma' reflected:

> Since I have depression (EBD), I feel lonely and depressed, especially for long periods of time during the day and night. Due to the severity of my depression, I often need a good cry to relieve the amount of depression I have, especially when I decide not to take medication for depression. I go for writing, and I write about anything that comes to mind. Because I also have autism, I have a REALLY hard time putting into words all the volcanic/eruptive ideas running and the flow of thoughts I do have in my mind. I know the topic I want to write about very well, but I have deficits in processing, organizing, and composing it in a coherent way. I do not know what to put first and next; will it be understood by my reader? (especially for school writing assignments). ChatGPT 3.5 just provided me with the essence of what I am writing about . . . precisely and concisely. As if someone were talking to me, answering my questions directly, without jargon or long-winded narratives of evidence and information.

Participants raised important considerations about the use of AI technology. They emphasized that, as with any technological tool, users should be aware that ChatGPT 3.5 provides opinions from the perspective of its creators without necessarily accounting for cultural, ethnic, or regional differences. For older students like Tahany, who were accustomed to using paper resources and printed materials, adapting to updated technological applications has been a notable shift. Tahany explained:

> One of the weaknesses, or, let's say, points to improve when using ChatGPT 3.5, is that, as a student, I should NOT solely depend on it as a source of information to brainstorm my ideas. Although ChatGPT 3.5 provides answers to topics I am looking for, many are away from human interaction that could also be read and heard (by author voices) in books and research manuscripts (even through the online versions). I am from previous generations of reading books and magazines as my favorite hobbies, and I use scientific journals (for schoolwork) to get the needed information from their actual, original resource (for example, the author, novelist, or researcher). While using ChatGPT 3.5 to brainstorm ideas, I kept asking myself, "Nice thoughts, but are they valid? Are they true? How can I make sure they are?"

> Thinking about my future students in schools, they should be taught how to use ChatGPT 3.5 as a resource from multiple sources out there in the field when they want to write.

6. Discussion

This study examined the impact of ChatGPT 3.5 as a brainstorming tool on the overall persuasive writing quality of five gifted students. The results clearly indicated significant post-intervention improvements for all students. These improvements were maintained over time for all but one student, who demonstrated consistent performance in both the intervention and maintenance phases. Overall, the findings support the idea that ChatGPT 3.5 is an effective brainstorming tool for gifted students that positively impacts their persuasive writing performance.

These results align with the existing literature, which consists primarily of editorials, commentaries, and preprint articles that recognize the potential of ChatGPT as a robust writing support tool (Barrot, 2023; Ciampa et al., 2023; Dergaa et al., 2023; Imran & Almusharraf, 2023; Michel-Villarreal et al., 2023; Ray, 2023; Sallam, 2023). Furthermore, the findings provide additional evidence for previous research that has convincingly highlighted the significant impact of brainstorming on enhancing writing quality (Graham & Harris, 2016; Graham & Perin, 2007a).

Previous research suggests that gifted students' drive for perfectionism, combined with the pressure of others' expectations, can be stressful and may reduce their ability to generate ideas and organize thoughts, leading to chaotic text structure and basic spelling errors, which ultimately impact the quality of their writing (Brown-Anfelouss, 2012; Palmquist & Young, 1992; Siegle, 2023; Siegle & Schuler, 2000; Yates et al., 1995). This study aimed to investigate whether using an interactive chatbot, such as ChatGPT 3.5, provides benefits in this context and helps overcome the ideation challenges associated with gifted students' pursuit of perfectionism. The results indicated that the intervention was effective, suggesting that using interactive AI chatbots to teach writing to gifted students may help address these challenges.

To better understand the improvements in participants' overall persuasive essay quality reported in this study, it is crucial to explain the gains in their detailed scores. Participants achieved significant gains in categories directly related to persuasive writing (Table 3). The improvement in the "Argument" component reflects the effectiveness of ChatGPT 3.5 in enhancing gifted students' ability to construct clearer, deeper, and more persuasive arguments with logically connected ideas. The substantial increase in the "Supporting Evidence" component indicates an improved ability to generate and use a wealth of ideas to strengthen their positions.

Gains in the "Opposing Viewpoints" component indicate development in the critical presentation of diverse viewpoints, as evidenced by their success in recognizing and refuting counterarguments. In addition, the exposure to diverse ideas in various styles provided by ChatGPT 3.5 improved gifted students' "Voice and Tone," enabling them to convey and manipulate ideas more engagingly, persuasively, and emotionally resonant. Overall, it appears

that gifted students used the intellectually rich brainstorming experience provided by ChatGPT 3.5, combined with their innate understanding of the writing process and their cognitive and metacognitive writing strategies—particularly their ability to reflect and self-evaluate (Innali & Aydin, 2020; Kaufman et al., 2005)—to craft compelling, persuasive essays.

Other categories related to general writing skills (e.g., organization, sentence fluency, word choice, and conventions) remained stable or showed only small, insignificant increases compared to the gains in the rhetorical categories of persuasion (Table 3). ChatGPT produces organized and fluent sentences with coherent textual structures that, while brief, are rich in vocabulary, use punctuation effectively, and are almost free of spelling errors. The systematic reading of these elements by gifted students during the intervention likely had some impact, however small. As they read, proficient readers become familiar with standard spelling, fluent and organized sentences, sophisticated text structures, and carefully chosen words, which they then use and attempt to emulate in their writing (Jouhar & Rupley, 2021). The connection between reading and writing is bidirectional (Graham & Hebert, 2011; Graham et al., 2018; Shanahan, 1984; Shanahan, 2016; Shanahan & Lomax, 1986); reading ChatGPT 3.5 responses influenced the gifted students' writing, and their repeated writing sessions during the intervention affected how they read and engaged with ChatGPT 3.5 responses.

The gifted students in this study demonstrated an awareness of both the advantages and disadvantages of ChatGPT 3.5. Participants expressed positive opinions about ChatGPT 3.5, highlighting its efficiency in terms of time and effort, simplicity, conciseness, and wealth of ideas generated. They also emphasized its ability to address socially sensitive issues and its role as a suitable substitute for individuals with intellectual limitations in real-life discussions. However, they acknowledged important limitations, such as the program's lack of historical context for some writing topics, the repetition of ideas, and its inability to answer current questions because it has not been updated in 2 years. Participants stressed the importance of users being aware that ChatGPT 3.5 presents viewpoints shaped by its creators, often neglecting cultural, ethnic, or regional nuances. Using ChatGPT 3.5 without having a diverse cultural and intellectual background can be detrimental, potentially leading the user to have a one-sided perspective (Michel-Villarreal et al., 2023; Ray, 2023).

The evidence presented in this study highlighting ChatGPT 3.5 as an effective brainstorming tool for improving persuasive writing does not imply that traditional brainstorming methods, such as independent reading and real-life peer discussions, should be replaced. Rather, it suggests that ChatGPT can effectively supplement these traditional methods. Engaging in 25 hours of independent reading per year has been shown to significantly improve writing quality (Graham et al., 2018; Jouhar & Rupley, 2021). Similarly, peer discussions enhance communication skills and help build a community of writers by exposing individuals to diverse thoughts and conversations, all of which are critical to writing development (Graham & Harris, 2016; Graham & Perin, 2007b; Siegle, 2020). This study advocates for and encourages writers to brainstorm using multiple resources before writing. This study also encourages literacy teachers to incorporate ChatGPT into the writing classroom with the above caveats in mind.

7. Limitations and Directions for Future Research

The idiosyncratic nature of the gifted participants in this study is both a strength and a weakness. Their prior characteristics appeared to reduce the tendency to be overly impressed by ChatGPT's readily available, instant, seemingly in-depth, diverse, and comprehensive responses. A major concern with AI-generated content is its potential to diminish motivation, engagement, and the desire to think, undermine self-worth, and hinder personal growth and confidence (Barrot, 2023; Ray, 2023). Some regular users might think, *Why should I bother researching, analyzing, critiquing, or asking further questions? AI is certainly better than me and has given me everything I need.* However, the gifted students' strong general knowledge, curiosity, and analytical mindset likely mitigated this risk. They were not passive recipients of content, as evident from focus group discussions in which they identified several weaknesses in ChatGPT and critically engaged with its responses rather than accepting them at face value. They recognized the risks of relying on a singular ChatGPT-generated narrative and the importance of verifying information. They also noted ChatGPT's lack of historical and cultural contexts that reflect narrative diversity, as well as its limitations in providing up-to-date information. These insights reflect an active, thoughtful engagement with ChatGPT rather than passive consumption. A different sample, more easily captivated by ChatGPT-generated content, might have been fascinated with ChatGPT's responses without intellectual or critical engagement, potentially leading to different outcomes in persuasive writing. It may be reasonable to assume that a passive acceptance and consumption mindset—lacking active engagement, the ability to challenge assumptions, critical evaluation, original thought, and personal insights—toward ChatGPT-generated content could lead to superficial and weakly structured arguments, lacking depth, and presented in a less compelling, shallow voice that barely resonates with the reader.

Similarly, the writing competencies of the gifted participants in this study are both a strength and a weakness. This study recruited gifted writers who possessed prior knowledge of the writing process, key writing skills, and various writing strategies before the intervention. This ensured that the study's primary objective—examining ChatGPT as a pre-writing brainstorming tool—remained clear and undistracted, without concerns about participants engaging in broader and/or different writing challenges during the time allocated for brainstorming via ChatGPT and the 60 minutes designated for writing. As a result, participants were able to focus more on the ideas generated by ChatGPT to develop their intellectual, critical, and persuasive arguments rather than on other writing-related aspects. This was evident in the results of Table 3, which showed statistically significant improvements in writing components related to idea development and presentation (argument, supporting evidence, opposing viewpoints, and voice), while demonstrating stability or only slight improvement in fundamental writing components (organization, word choice, sentence fluency, and conventions). A different sample lacking these essential writing competencies prior to the study could have yielded different results.

More research is needed to fully understand the potential and contributions of ChatGPT in writing. Future studies should assess and evaluate users' capacity to engage critically,

intellectually, and analytically during interactions with ChatGPT. Capturing and analyzing students' responses to ChatGPT-generated content could serve as a practical measurement tool, potentially more effective than self-reported measures. Additionally, future studies should investigate affective aspects such as users' motivation, self-worth, and confidence levels after consistent use of ChatGPT. Longitudinal studies are especially valuable in this context, as they allow for the observation of shifts in these affective factors over an extended period. Likewise, research should explore the extent to which ChatGPT enhances students' ideation self-efficacy—an element not directly measured in this study but inferred from its findings—when used as a brainstorming tool prior to writing.

Further studies could also examine ChatGPT's impact on different writing genres. For instance, one of our participants, Tahany, noted that ChatGPT 3.5 lacks essential elements for narrative writing, such as metaphors, suspense, and depth—concerns echoed by Thorp (2023). Another interesting topic for future investigation is assessing the writing performance of writers who rely on ChatGPT for pre-writing brainstorming, those who use traditional methods such as independent reading and peer discussions, and hybrid writers who use both. This type of comparative study allows for an in-depth examination and understanding of ChatGPT's effects. Moreover, cross-linguistic studies may be particularly insightful in determining whether ChatGPT-generated content is equally effective across different languages for bilingual and/or multilingual students. This study examined the effects of ChatGPT on writing in students' first language.

Finally, since this study employed a single-subject design with a small convenience sample—and is therefore best understood as an exploratory study—its findings cannot be generalized beyond the gifted students who participated. Future research should adopt treatment-control methodologies with larger, more diverse samples to enhance generalizability. Larger sample sizes provide a more representative distribution of various demographic groups and student profiles (including typically developed students, average students, students with dyslexia, dysgraphia, disabilities, etc.), as well as cultural, environmental, behavioral, and personal traits, along with writing competencies and proficiency. This approach would help reduce bias, examine AI effects on different student cohorts, explore a wider range of outcomes, and ultimately improve the generalizability of findings.

8. Conclusion

This study investigated the impact of ChatGPT 3.5 on gifted students' persuasive writing and found positive effects on their performance. ChatGPT 3.5 provides intellectually rich brainstorming experiences that significantly impact the rhetorical categories of persuasion in gifted students' writing while also impacting general writing elements to a lesser extent. The use of ChatGPT, an interactive AI chatbot, in writing instruction may help gifted students manage the ideation challenges they often experience before writing due to their pursuit of perfectionism and others' expectations. Further empirical research with larger samples across

different writing genres and other services offered by ChatGPT, including both gifted and non-gifted students, could help validate and extend the findings of this study.

Notes, Acknowledgements, and Data Availability

- The authors recognize that, in recent years, the term "gifted" is being reconsidered by some educators and researchers, as it may imply an extraordinarily high IQ, elitism, or genetic advantages. However, this study adopts an inclusive operational definition that avoids reinforcing assumptions of innate superiority. Instead, giftedness is defined multidimensionally, focusing on academic performance, writing skills, and personal traits that reflect intellectual engagement, such as critical thinking, a desire for knowledge and self-development, passion, curiosity, and persistence in complex thinking and problem-solving. While some may prefer terms like "high-potential students" or "high-achievers," we use "gifted" due to its widespread presence in academic literature and in the names of many literacy-focused journals (e.g., *Journal for the Education of the Gifted*, *Gifted Child Quarterly*, *Gifted Education International*, *Gifted Child Today*, and others). We emphasize that the gifted students in this study were not born with inherent advantages but distinguished themselves through passion for knowledge, discovery and experimentation, hard work, consistent training, strong academic performance, and a desire to develop their writing skills. This study is intended for educators who recognize enthusiasm, motivation, potential, giftedness, and success in their students, regardless of how their institutions classify or label them.

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- The quantitative data used in the statistical analysis of this study, the transcription of the focus group, and the ten writing prompts used to assess participants' persuasive writing throughout all phases of the study are available via https://drive.google.com/drive/folders/1UWUgx7oUT-GWQ-n6YHFYAJBtwPZvsDUC?usp=sharing

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