# Innovating Narratives Or Stifling Creativity? Assessing The Impact Of Generative Pre-Trained Transformer (GPT) On Science Fiction Writing Skills Among Master Students In Algeria

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| ARTICLE INFO | ABSTRACT |
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| | After its release on November 2022, Generative Pre-Trained Transformer (GPT) technology (henceforth ChatGPT) as the first rising AI tool, has profoundly invaded our classrooms becoming the unavoidable reality for both students and teachers. Beyond its disruptive impact that led to divided attitudes about embracing or denying it, this study explores its integration into the creative writing process of Algerian Master students, specifically within the genre of science fiction (SF), to understand its impacts on fostering the imaginative capabilities of Algerian Master students. This research juxtaposes the narrative outputs of students utilizing GPT (Experimental Group) against those relying only on traditional writing methods (Control Group) by employing a mixed-methods approach that combines quantitative statistical analysis with an exploratory rubric-based evaluation. The findings indicate that GPT integration significantly enhances imaginative writing skills, thematic exploration, scientific integration, and plot development participants, as affirmed by higher performance scores in the Experimental Group across all evaluated criteria. These results suggest that GPT can act as a catalyst for creative and scientific thought, challenging concerns about the potential stifling of creativity or over-reliance on technology. Thus, the paper contributes to the discourse on AI in higher education by providing empirical evidence that approves the positive impact of GPT on creative writing, offering insights into its pedagogical potential, and highlighting the importance of a balanced approach to implicating AI technologies in educational settings in Algerian higher education. The research advocates for further exploration into effectively integrating such technologies across various educational contexts. On further notice, the chapter finally reflects on the ethical ramifications resulting from generative AI implementation that our dedicated teachers have to consider for the sake of their appropriateness and support as well.

**Keywords:** Algerian Higher Education, Creative Writing, Generative Pre-Trained Transformer, Imaginative Writing Skills, Master Students, Science Fiction, Technology Integration |

## 1. Introduction

As artificial intelligence (AI) technologies, especially Generative Pre-Trained Transformer (GPT), continue to evolve, their adoption within educational settings offers unprecedented opportunities for enhancing teaching and learning processes (Boudouaia et al., 2024), necessitating a critical examination of their implications for pedagogy, student engagement, and ethical considerations (Bahroun et al., 2023; Baskara,

2023). GPT has a significant potential to revolutionize the creative writing process (Tsao & Nogues, 2024). As a cutting-edge language model developed by OpenAI, the capabilities of GPT expand beyond mere text generation (Yenduri et al. (2023); it has the mechanism to serve as a dynamic tool for advancing creativity, imagination, and critical thinking among students (Ratnam et al., 2023). This is particularly relevant in the context of science fiction (SF) writing. This genre demands a high level of imaginative prowess and innovative thought to weave narratives that explore beyond the scope of the possible to the speculative future.

In the Algerian higher education context, the application of digital technologies is a reflection of a broader commitment to modernizing educational practices (Nouari et al, 2024). Studies point out the increasing technological shift within global infrastructures of higher education, emphasizing the importance of merging GPT to enhance creativity and critical thinking (Monisha & Valanteena, 2022; Ogrizek Biškupić et al., 2022; AL-Qadri et al., 2024), and Algeria is not an exception of this transformation. The unique linguistic and cultural diversity of the Algerian higher educational system offers a well-fitting platform for investigating the impact of technologies like GPT on creative writing pedagogy (Khanova et al., 2023; Kurnaz & Nafoussi, 2022; Thiermann, 2023). These recommendations underscore the timely necessity and essential exploration of AI technologies in education, offering a valuable perception of the challenges and opportunities of digital transformation (Nouari, 2023). However, the challenges in implementing an online learning system and limited internet access resources that Algerian universities (Mouas & Ghaskil, 2023) are facing might challenge the facile adoption of AI advanced technologies (Arabeche & Soudani, 2021).

This study aims to bridge this research gap by empirically investigating the effects of GPT integration on the imaginative writing skills of Algerian Master students, thus contributing to the global discourse on AI pedagogical applications and enhancing a discerning understanding of its implications for creative writing within the SF genre.

This study was grounded on the central research question:

-How does the integration of GPT impact the imaginative capabilities of Algerian Master students in the writing process of SF stories?

To address this question, five hypotheses were formulated:

**Hypothesis 1** Despite the promising applications of GPT in advancing educational outcomes, the introduction of this AI tool within the context of SF narratives still needs to be explored. This gap is pronounced in the context of Algerian higher education, where the intersection of AI technology and creative writing pedagogy remains largely uncharted territory. Concerns regarding the potential of GPT to stifle creativity, imagination, and thoughtful novelty or lead to over-reliance on technology and diminish critical thinking skills among students are perplexing. These apprehensions highlighted the urge for a comprehensive examination of the impact of GPT on the imaginative capabilities of students in crafting SF stories, balancing technological innovation with the authenticity of original thought and literary skill. **(H1):** The adoption of GPT leads to statistically significant positive differences between the pretest and posttest submissions of the Experimental Group (EG).

**Hypothesis 2 (H2):** The integration of GPT has no significant effect on the Experimental Group (EG), potentially stifling creativity due to over-reliance on technological assistance.

**Hypothesis 3 (H3)**: The use of GPT significantly enhances theme originality and creativity in the Experimental Group (EG), aiding in the exploration of complex science fiction (SF) narratives.

**Hypothesis 4 (H4):** Collaborative work with GPT significantly enhances the integration of technology and scientifically accurate concepts in the Experimental Group (EG), aiding students in delving into the science fiction (SF) world.

This study adopts a quasi-experimental research design to compare the narrative outputs of Master students collaborating with GPT (Experimental Group) against those relying solely on their imaginative capacities (Control Group). The study employs quantitative statistics with rubric analysis to provide a comprehensive understanding of the impact of GPT on SF storytelling among Algerian Master students.

The paper is designed as follows: Following this introduction, Section Two provides an insightful literature review, situating the study within the key studies of AI in education and its implications for the SF course, setting the research gap, and demonstrating perceptive insights on the theoretical framework of the paper. Section Three structures the research methodology, detailing the study design, participant selection, procedures, data collection tools, and analysis procedures. Section Four highlights the findings, offering statistical evidence and thematic comprehension of the impact of GPT on the SF writing capabilities of Algerian Master students. Section Five discusses these findings within the existing corpus, exploring the pedagogical, ethical, and practical implications of GPT integration. The paper concludes with a summary of the research contributions, Pedagogical Implications, Ethical Considerations, research limitations, and further research recommendations.

## 2. Literature Review

This section charts key studies that explore the profound impact of AI, with a particular focus on GPT, across various educational landscapes. Through a comprehensive review of seminal works in the field, this section aims to provide a perceptive understanding of how AI reshapes educational experiences, fosters creativity, and influences future educational strategies' development.

### 2.1 Key Studies of AI in Education

The introduction of GPT into the field of education has brought about opportunities for improving outcomes and addressing challenges in areas of study. Shaw et al. (2023) explored the nature of GPT in education, pointing out its ability to enhance writing while also raising concerns about ethical issues and the potential stifling of original ideas. Their study, which relied on analysis and a review of existing literature, investigates the broader discourse of the integration of AI technologies in educational environments with a specific focus on promoting ethical practices and fostering creativity.

In a parallel paper, Голубенко & Підмогильний (2022) investigated the abilities of GPT 3 in storytelling and imaginative writing, portraying it as a tool for advancing storytelling in the science fiction genre. Through descriptive analysis and case studies, their work illustrated GPT3's potential to revolutionize narrative creation, suggesting a promising horizon for literature.

You et al. (2023) further expanded the application of AI in education, exploring the broader impacts of AI, including GPT, on pedagogical strategies and learning outcomes. Through employing evolutionary game theory and analysis, their study situated AI as a transformative force in future education, advocating for its role in enhancing and evolving educational methodologies.

Wu et al. (2023) and Sun et al. (2023) studied the adaptability of GPT in education through an interdisciplinary dimension. Their comparative study suggested the potential of AI to enrich a wide array of disciplines beyond its initial programming and literary applications.

Aydın & Erdem's (2022) review sought the possibilities of educational implications, highlighting the strides made in GPT technology. They advocated for its integration within educational technology frameworks to foster AI in learning environments to respond to the theme of technological advancement.

In addition to these insights, Teo and Tan (2023) and Boscardin et al. (2023) examined the impact of ChatGPT on medical education, positing its utility in advancing writing skills and student engagement. This is further supported by Savelka et al. (2023), who assessed the potential of GPTs in passing programming assessments within higher education, hinting at the broader implications for assessment methodologies and AI literacy.

### 2.2 The Research Gap

Despite these studies underscoring the multifaceted impact of GPT on the educational setting, highlighting its potential to enhance student engagement and revolutionize teaching methodologies, a prominent research void emerges in understanding the impact of AI, specifically GPT, on the science fiction writing process among Master students in Algeria. While the referenced research provides valuable insights into the potential of AI to foster educational outcomes and innovations, the predominant reliance on rubric analysis methods and case studies reveals a methodological gap. These approaches, while insightful, often need a more comprehensive understanding that could be achieved through a mixed methods approach, combining quantitative evidence with rubric analysis method depth.

This paper seeks to bridge this gap by employing a mixed methods approach to explore the adoption of GPT in the science fiction writing process, assessing its influence on the imaginative abilities of Algerian Master students. The absence of studies addressing the contextual and cultural factors influencing the integration of AI in Algerian education highlights a critical area of inquiry. By focusing on the Algerian context, this study not only contributes to the global discourse on the pedagogical applications of AI but also offers localized insights essential for the effective integration of AI in science fiction pedagogy in Algerian higher education. This endeavor enriches the existing body of knowledge with empirical data and contextual analysis, providing a richer, more detailed exploration of AI's advancements in pedagogy.

### 2.3 Theoretical Framework

**2.3.1   Science Fiction**: It is a literary genre of speculative fiction that explores imaginative and futuristic concepts, often employing advanced scientific and technological ideas and ideologies, untreated space exploration, undetermined time travel, parallel universe plots, and extraterrestrial life (Stableford, 2006). It serves as a mediator for exploring novel ideas and ethical dilemmas within a speculative context, challenging writers and readers to portray the possibilities beyond the known and the now (So et al., 2022; Tverdynin, 2022).

**2.3.2   Imagination Writing Skill in Science Fiction:** The ability to illustrate creative and novel ideas and scenarios as envisions that are not immediately derived from the current reality (Kieran & Lopes, 2003). In the context of SF writing, these skills enable the creation of detailed, immersive worlds and narratives that

push the boundaries of imagination and provoke thought about future possibilities (Blomkvist, 2022; Kind, 2020).

**2.3.3   AI in Algerian Higher Education:** The Algerian higher education system is progressively adopting digital technologies (Bedaida, 2022) and AI (Meyer & Benguerna, 2019), marking a significant shift towards enhancing educational quality and accessibility. This transition is facilitated by the strategic implementation of blended learning environments and the integration of digital media (Saidia, 2023), reflecting a commitment to modernizing academic practices. Research by Laifa et al. (2023) on blended learning in Algeria underscores the positive reception and future preference of students towards such innovative learning methodologies, signifying a transformative shift in educational delivery.

## 3.   Methodology

### 3.1 Study Design
This study aims to assess the impact of (GPT) on the imaginative writing capabilities of Master's students in literature and civilization, focusing specifically on the creation of science fiction stories. Adopting a quasi-experimental design, the research juxtaposes the narrative outputs of students utilizing GPT (Experimental Group) against those relying solely on their imaginative capacities (Control Group). The methodology of this study encompasses detailed assignment instructions and evaluation criteria, outlined in appendices, to facilitate a structured comparison between the two groups. Detailed assignment instructions and evaluation criteria are provided in Appendix A for the offline task and Appendix C for the online task with GPT. The corresponding evaluation checklists are detailed in Appendix B for the offline task and Appendix D for the online task.

### 3.2 Participants
The research sample comprises 42 Master students from the Department of English Language and Literature at Mohamed Kheider University in Algeria, specializing in Literature and Civilization. The participants were divided into two groups: 21 students in the CG, which was tasked with writing science fiction stories without technological assistance, and 21 students in the EG, which received instructions on leveraging GPT for the same task. The selection was based on the motivation, willingness, and interests of voluntary participants towards the integration of GPT, with the division designed to investigate the differential impact of GPT assistance on imagination capabilities in SF writing outcomes.

### 3.3 Procedures
Throughout one semester, students in both groups were assigned to write science fiction stories, with the EG integrating GPT into their writing process. Before the assignment, the EG received several tutorial sessions on how to effectively use GPT to enhance their SF storytelling skills, ensuring all members could proficiently incorporate this digital literacy in the assignments. The CG, meanwhile, was encouraged to draw upon their personal scientific imagination and literary skills. This structured approach allows for a controlled examination of the influence of GPT on skills of fictional imagination in crafting SF writings.

To avoid bias, the researchers conducting this study were not the instructors of the SF course under investigation, and the evaluation of student outcomes was independently conducted by two other instructors not involved in teaching the course. This distribution of tasks ensured objective analysis and interpretation of the findings, as the researchers and evaluators were independent of the course educational process. All submissions were collected electronically at the end of the semester, facilitating a consistent and fair evaluation process.

The narratives were read and coded by two independent researchers to ensure inter-rater reliability, with discrepancies resolved through discussion. The coding process involved identifying excerpts that exemplified the innovative use of scientific concepts, thematic originality, and the imaginative interplay between student creativity and GPT-generated content. This phase aimed to uncover nuanced insights into how GPT could serve as a tool for enhancing the imaginative and narrative skills of students in crafting engaging and scientifically coherent science fiction stories.

### 3.4 Data Collection Tools
In this study, data collection was conducted through the analysis of student submissions, which were crafted in response to the assignment *Crafting the Future A Science Fiction Story*. The assignments were designed to evaluate key areas: thematic exploration and originality, scientific and technological integration, imagination skills, and plot development. These elements were critical in assessing the integration of scientific and imaginative concepts in creating engaging science fiction narratives.

For the CG, the focus was on the inherent ability to explore themes and develop narratives without the aid of GPT, emphasizing thematic originality, scientific integration, and imaginative creation. EG, on the other hand, was assessed on the same criteria with an additional focus on the interplay with GPT-generated

content, examining how this technology influenced the creative process and the depth of scientific and imaginative exploration.

The evaluation went through structured checklists aligned with the predefined rubrics, which were detailed in the assignment instructions. Each submission was scored across the following scale to ensure a standardized assessment:

Excellent (5): Outstanding integration of scientific concepts and imaginative narrative elements, demonstrating profound thematic exploration and originality.

Good (4): Strong display of thematic and scientific coherence with imaginative narrative development, albeit with minor areas for enhancement.

Satisfactory (3): Adequate thematic exploration and narrative construction, with clear room for deeper scientific integration and imaginative detail.

Needs Improvement (1-2): Limited in thematic depth, scientific accuracy, or imaginative narrative, indicating significant areas for development.

Not Evident (0): Fails to demonstrate thematic relevance, scientific integration, or any imaginative narrative elements.

These evaluations were directly linked to the assignment objectives and focus elements, ensuring a comprehensive assessment of each participant's ability to craft an SF story that reflects a deep engagement with scientific principles and imaginative extrapolation (Carey et al., 2022).

### 3.4.1   Validation and Reliability of Quantitative Tool

Ensuring the validity and reliability of the data collected through the quantitative method was essential for the integrity of this study. Therefore, a validation and reliability assessment of the quantitative tool employed for data collection was conducted to address these concerns and enhance the overall foundation of this research. Validation of the tool was achieved through a Delphi method, engaging a panel of experts consisting of four academicians and practitioners in the fields of creative writing, artificial intelligence in education, and SF literature. This iterative process involved several rounds of feedback to refine the criteria of the tool, affirming that the measures were accurately aligned with the objectives of assessing thematic originality, scientific integration, and the imaginative quality of narratives. The reliability of the tool was tested through a pilot study, wherein a subset of narratives from a preliminary group of students was evaluated independently by two raters. The inter-rater reliability (IRR) was calculated using Cohen's kappa coefficient, yielding a kappa value of 0.81, indicating an 'almost perfect agreement' according to Landis and Koch's benchmark scale. This high level of consistency affirmed the reliability of the evaluation criteria and the robustness of the tool in distinguishing varying degrees of creativity, scientific accuracy, and integration of GPT-generated content in student submissions. This validation and reliability process affirms that this study stands on a stable methodological foundation, enabling the researchers to interpret the data collected and draw meaningful conclusions about the effect of GPT on developing the imaginative writing skills of students in SF.

### 3.5 Data Analysis Procedures

The data analysis for this study was structured to evaluate the impact of GPT technology on the imaginative writing capabilities of Master's students in literature and civilization, with a particular focus on science fiction storytelling. The analysis was divided into two main phases, quantitative analysis, and rubric thematic analysis, to comprehensively assess the integration of GPT in the writing process and its influence on creative outcomes.

### 3.6 Quantitative Analysis

The quantitative component of the analysis of this study involved the statistical evaluation of scores assigned to student submissions based on the structured checklists and rubrics detailed in Appendices B and D. Each submission was scored across a 5-point scale, ranging from "Not Evident (0)" to "Excellent (5)", across several dimensions including thematic exploration and originality, scientific and technological integration, imagination skills, and plot development.

Using SPSS (Statistical Package for the Social Sciences, version 27), researchers performed a series of Independent Samples t-tests to compare the mean scores between the (CG) and the experimental group (EG) across each of the evaluation criteria. This approach aimed to identify statistically significant differences in performance, indicating the effect of GPT usage on the quality of science fiction narratives produced by the students.

### 3.7 Rubric Analysis Method

Following the quantitative analysis, a rubric analysis was conducted to examine the content of the narratives, focusing on the influence of GPT integration on thematic originality, scientific accuracy, innovation, imagination ability, and plot development. This analysis was informed by Vaezi and Rezaei (2019), who discussed the creation of a rubric for assessing creative writing, emphasizing originality and the imaginative quality of narratives. Additionally, the rubric construction drew upon the work of Osborn et al. (2023), who

investigated the integration of scientific concepts into creative writing through collaborative AI tools, which aligns with the evaluation of scientific and technological accuracy in narratives. Insights into structuring a narrative with coherence and effectiveness, particularly within SF stories, were inspired by Roberts et al. (2023). Furthermore, a reflection rubric, utilized exclusively with the EG, was designed based on Carey et al. (2022), discussing the reimagination of narrative writing and assessment to include reflections on the use of tools like GPT in the creative process.

### 3.7.1 Rubric Validation

The validation process for the rubrics began with a critical evaluation aimed at assessing imaginative writing capabilities and the integration of GPT in crafting SF narratives. Two literature professors from the Department of English Language and Literature at Mohamed Kheider University, with extensive experience in SF and creative writing pedagogy, were engaged to review the rubric content. Their assessment focused on the clarity, relevance, and comprehensiveness of the evaluation criteria, as well as the suitability of the language used. Their feedback highlighted the need for minor adjustments to ensure the rubrics effectively captured the requisite essence of imaginative and technological integration. Recommendations included

- shortening the assessments to maintain focus and clarity of instructions,
- emphasizing the creative use of GPT,
- setting clear expectations for plot development and
- providing detailed guidelines for exploring complex themes, such as ethical dilemmas in SF narratives.

Additionally, the incorporation of innovative technology and artificial context was suggested to foster a more immersive storytelling experience. In response, the rubrics were revised to clarify their objectives and facilitate a balanced assessment of both the technological and creative aspects of the submissions, aiming to augment the imaginative writing skills of Master students in Algeria.

## 4. Findings

This section examines the statistical significance of the differences between the CG and the EG across the predefined evaluation criteria pertinent to science fiction writing capabilities. Using both independent and paired samples T-tests, this paper aimed to delineate the differential impacts between the EG and the CG. The analysis demonstrates significant enhancements in originality, scientific integration, writing skills, plot development, and overall performance scores post-intervention in the EG, emphasizing the efficacy of GPT as a pedagogical tool. Moreover, comparisons within the EG, from pre-test to post-test, validate substantial improvements across all evaluated criteria, substantiating the role of GPT in enhancing creativity and augmenting science fiction narrative skills. These findings, with a robust statistical foundation, provide evidence for re-evaluating the initial conclusions of this paper and reinforce the transformative potential of integrating AI technologies like GPT in educational settings.

The Independent T-Test, presented in Table 1, provides a statistical examination of the post-test performances across both groups, focusing on key aspects of science fiction writing such as originality, scientific integration, writing skills, plot development, and overall scores. The table highlights significant mean differences, underscoring the strong effect of GPT adoption on fostering the creative and analytical faculties of the participants. These differences are quantified through measures including the t-statistic, degrees of freedom (df), p-values, mean differences, standard error (SE) of the differences, Cohen's d for effect size, and SE of Cohen's d, offering a comprehensive background of the statistical significance and magnitude of the observed impact. Such a statistical approach reinforces the foundation of the findings, illustrating the transformative potential of GPT in boosting enhanced narrative capabilities among Algerian Master students in writing science fiction.

**Independent T-Test for comparison between EG and CG according to the Post test**

| EG | CG | T | Df | P | Mean Difference | Cohen's d | | SE Cohen's d |
|---|---|---|---|---|---|---|---|---|
| **OriginalityEPOST** | OriginalityCPOST | 12.649 | 40 | < .001 | 1.333 | 0.105 | 2.760 | 0.312 |
| **IntegrationCPOST** | IntegrationEPOST | 4.264 | 40 | < .001 | 0.476 | 0.112 | 0.930 | 0.184 |
| **SkillsEPOST** | SkillsCPOST | 31.558 | 40 | < .001 | 12.429 | 0.394 | 6.887 | 0.259 |
| **PlotCPOST** | PlotEPOST | 13.645 | 40 | < .001 | 1.524 | 0.112 | 2.978 | 0.362 |
| **SumEPOST** | SumCPOST | 17.587 | 40 | < .001 | 7.762 | 0.441 | 3.838 | 0.305 |

**Fig1:** Comparative Impact of GPT Integration on Science Fiction Writing Skills: An

### Independent T-Test Analysis Between Experimental and Control Groups.

The table elucidates the findings of an Independent T-Test comparing the performance of the EG with the CG in their post-test assessments across several criteria: Originality, Scientific Integration, Writing Skills, Plot Development, and Overall Sum. This statistical analysis is significant for understanding the impact of GPT on improving various dimensions of science fiction writing skills among Master students in Algeria.

Firstly, the EG indicated a significant improvement over the CG in originality, as shown by a mean difference of 1.333 (SE = 0.105), a highly significant p-value (< .001), and a substantial effect size (Cohen's d = 2.760).

These results estimate that students who used GPT were able to produce more original work due to the multiple creative prompts provided by GPT, which inspired unique ideas and approaches to writing science fiction stories.

Furthermore, the analysis found a statistically significant difference in the ability to integrate scientific concepts into their narratives, with the EG surpassing the CG. The mean difference was 0.476 (SE = 0.112), with a p-value < .001 and a moderate effect size (Cohen's d = 0.930). This result reveals that the usage of GPT has a positive impact on students' capacity to merge scientific elements into their fiction, possibly due to the extensive database of GPT and scientific information that students can exploit.

Moreover, a dramatic difference was observed in writing skills, with the EG significantly outperforming the CG (mean difference = 12.429, SE = 0.394). The p-value was < .001, and the effect size was very large (Cohen's d = 6.887), suggesting that the interplay with GPT noticeably boosted the overall writing quality of the students. These results could be attributed to the feedback of GPT, which enabled students to refine their narrative techniques and story coherence.

Next, Plot development also witnessed a significant enhancement in the EG compared to the CG, as evidenced by a mean difference of 1.524 (SE = 0.112), a p-value < .001, and a large effect size (Cohen's d = 2.978). This result suggests that GPT not only aids in generating ideas but also supports structuring these ideas into well-developed plots, enhancing the narrative arc and storytelling depth.

In addition, reflecting on the increasing impact across all criteria, the EG revealed a marked advantage over the CG, with a mean difference of 7.762 (SE = 0.441), a p-value < .001, and a very large effect size (Cohen's d = 3.838). This comprehensive improvement underlines the considerable benefits of collaborating with GPT in the writing process, significantly strengthening the writing skills across all measured dimensions in SF.

Overall, the Independent T-Test results firmly launch the efficacy of GPT technology in enhancing the imaginative writing skills of Master students in the SF narratives. The significant mean differences, exceptionally low p-values, and large effect sizes across all evaluated criteria underscore the transformative potential of GPT as a pedagogical tool, enriching the students' originality, scientific integration, writing skills, plot development, and overall narrative construction.

The coming table shows the results of a Paired Samples T-Test, specifically employing the Wilcoxon signed-rank test, to study the development in SF writing skills within the EG by comparing their performance before and after incorporating with GPT. The analysis spans several key dimensions of writing competency: Originality, Scientific Integration, Writing Skills, Plot Development, and the Overall Sum of scores. Through the Hodges-Lehmann Estimate and the Rank-Biserial Correlation, this table illuminates the magnitude of improvement attributable to GPT usage, providing a quantifiable measure of the pedagogical impact of this technology on enhancing creative writing faculties among Master students in Algeria. The significant p-values observed across all criteria emphasize the significant development in students' writing abilities post-GPT integration, sustaining the transformative potential of this AI tool in educational contexts.

**Paired Samples T-Test for comparison between pre and post test of EG**

| Post test | | Pre test | W | z | | Df | p | Hodges-Lehmann Estimate | Rank-Biserial Correlation | | SE Rank-Biserial Correlation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **OriginalityEPOST** | - | OriginalityEPRE | 120.000 | 3.408 | | | < .001 | 1.500 | 1.000 | | 0.285 |
| **IntegrationEPOST** | - | IntegrationEPRE | 36.000 | 2.521 | | | 0.006 | 1.000 | 1.000 | | 0.377 |
| **SkillsEPOST** | - | SkillsEPRE | 120.000 | 3.408 | | | < .001 | 1.000 | 1.000 | | 0.285 |
| **PlotEPOST** | - | PlotEPRE | 231.000 | 4.015 | | | < .001 | 2.000 | 1.000 | | 0.244 |
| **SumEPOST** | - | SumEPRE | 231.000 | 4.015 | | | < .001 | 4.000 | 1.000 | | 0.244 |

*Note.* **Wilcoxon signed-rank test.**

**Fig 2: Enhancements in Science Fiction Writing Skills Post GPT Integration: A Paired Samples**

## T-Test Analysis within the Experimental Group.

The Paired Samples T-Test (noted as Wilcoxon signed-rank test in the note, which indicates a non-parametric test used here due to the nature of the data) analysis illustrates a comprehensive valuation of the effects of GPT integration on various facets of SF writing skills within the EG by comparing pre-test and post-test scores. This deep dive into the data reveals the extent to which GPT has influenced the creative writing process of Master students in Algeria.

To begin with, the comparison shows a significant enhancement in originality from pre-test to post-test within the EG, with a Hodges-Lehmann Estimate of 1.500. This statistically significant increase (p < .001) underlines a marked enhancement in the ability of students to generate novel ideas and viewpoints in their SF stories. The Rank-Biserial Correlation of 1.000 designates a positive relationship between GPT usage and the improvement in originality, suggesting that the broad knowledge of GPT base and creative prompts significantly contribute to fostering original thinking and innovation in writing.

Additionally, a notable advancement is observed in the capacity of students to integrate scientific concepts into their narratives, with an improvement estimate of 1.000. Although this criterion shows a lesser Z score (2.521) and a slightly higher p-value (0.006) compared to originality and skills, it still represents a statistically significant development. This improvement might reflect the role of GPT in providing students with access to scientific information and inspiring their narratives with accurate and imaginative scientific elements.

Likewise, the skills category exhibits significant progress, reflecting the findings in originality, with a Hodges-Lehmann Estimate of 1.000 and a p-value < .001. This result indicates that engagement with GPT has not only boosted students' creativity but also their overall writing proficiency, including grammar, coherence, and narrative structure. The perfect Rank-Biserial Correlation again highlights the effectiveness of GPT in enhancing writing skills through iterative learning and exposure to different writing styles.

Plot development experienced the most considerable leap, with a Hodges-Lehmann Estimate of 2.000. This remarkable improvement (p < .001) reveals that students were better able to structure their narratives, develop complex storylines, and create engaging plots post-GPT adoption. The high Rank-Biserial Correlation implies that the influence of GPT was fundamental in helping students organize their thoughts and ideas into coherent and appealing stories.

Looking at the overall sum of advancements across all categories, the Hodges-Lehmann Estimate jumps to 4.000, with a Rank-Biserial Correlation of 1.000 and a p-value < .001. This measure further solidifies the deep and comprehensive effect of GPT on enhancing students' writing abilities in SF. It summarizes the collective improvements in originality, scientific integration, writing skills, and plot development, demonstrating the potential role of GPT as a transformative tool in the creative writing process.

To sum up, the Paired Samples T-Test analysis provides strong empirical evidence of the significant positive impact that GPT integration has on enhancing various dimensions of SF writing skills. The improvements observed from pre-test to post-test within the EG demonstrate the potential of GPT as a valuable educational resource, capable of developing creativity, enhancing scientific literacy, fostering writing proficiency, and facilitating sophisticated plot development among Master students in the field of creative writing.

The following table shows descriptive statistics to offer a detailed comparison of the EG performance on various SF writing skills before (Pre) and after (Post) the integration of GPT. With a focus on Originality, Scientific Integration, Writing Skills, Plot Development, and overall performance (Sum), the analysis encapsulates mean scores, standard deviations (SD), standard errors (SE), and coefficients of variation for both pre-test and post-test assessments. This comprehensive summary serves to quantify the tangible impact of GPT on boosting the creative writing capacities of Master students, providing an in-depth examination of the specific areas of improvement enhanced by adopting this technology.

**Descriptives**

| | N | Mean | SD | SE | Coefficient of variation | |
|---|---|---|---|---|---|---|
| **OriginalityEPOST** | 21 | 4.095 | 0.768 | 0.168 | 0.188 | |
| **OriginalityEPRE** | 21 | 2.952 | 0.590 | 0.129 | 0.200 | |
| **IntegrationEPOST** | 21 | 2.762 | 0.700 | 0.153 | 0.254 | |
| **IntegrationEPRE** | 21 | 2.381 | 0.498 | 0.109 | 0.209 | |
| **SkillsEPOST** | 21 | 4.095 | 0.768 | 0.168 | 0.188 | |
| **SkillsEPRE** | 21 | 3.286 | 0.463 | 0.101 | 0.141 | |
| **PlotEPOST** | 21 | 4.571 | 0.507 | 0.111 | 0.111 | |
| **PlotEPRE** | 21 | 2.810 | 0.680 | 0.148 | 0.242 | |
| **SumEPOST** | 21 | 15.524 | 2.542 | 0.555 | 0.164 | |
| **SumEPRE** | 21 | 11.429 | 1.399 | 0.305 | 0.122 | |

**Fig 3: Quantitative Enhancements in GPT-Assisted Science Fiction Writing: Descriptive**

## Statistics of Pre-Test vs. Post-Test Performance

The descriptive statistics table delineates the pre-and post-test performance across the previously underlined key domains involved in the study. An in-depth analysis of the data reveals significant observations regarding the pedagogical impact of GPT on creative writing.

A noteworthy advancement is evident in the domain of Originality, where the mean score increased from 2.952 in the pre-test to 4.095 in the post-test. This enhancement reflects a substantial leap in students' ability to generate novel and original ideas, likely prompted by the diverse and expansive content accessible through GPT. The slight increase in the coefficient of variation (from 0.200 to 0.188) post-intervention reveals a relatively consistent improvement among students, underlining the role of GPT in developing inventive thoughts.

Scientific Integration scores upgraded from a mean of 2.381 to 2.762, highlighting a strengthened capacity for embedding scientific concepts into narratives. The slight rise in the coefficient of variation post-GPT integration (from 0.209 to 0.254) might show variability in how students leveraged GPT for scientific content, possibly reflecting individual differences in using the tool for improving scientific accuracy and creativity in their narratives.

The scores for Writing Skills resonated with the pattern of significant improvement, with mean scores escalating from 3.286 to 4.095. This increase not only validates enhanced writing proficiency but also recommends the efficacy of GPT in refining language, grammar, and storytelling structure. The consistent coefficient of variation pre- and post-test (0.188) indicates uniform advancement across the group, pointing towards the effective role of GPT in honing overall writing skills.

Plot Development witnessed the most substantial progress, with mean scores rising from 2.810 to 4.571. This remarkable improvement is indicative of GPT's potential to assist students in crafting more complex and coherent narrative arcs. The decrease in the coefficient of variation from 0.242 to 0.111 post-intervention signifies a homogenization effect of GPT on the ability of students to develop well-structured plots, likely due to this model's capabilities in suggesting narrative pathways and plot twists.

The overall performance, as captured by the Sum score, surged from 11.429 to 15.524, attesting to the comprehensive enhancement across all writing dimensions. The relatively low coefficient of variation post-test (0.164) compared to the pre-test (0.122) accentuates not only the significant improvement but also the uniformity in how GPT benefitted the creative writing endeavors.

The descriptive analysis elucidates the profound and positive impact of GPT integration on the SF writing skills of Master students. It reflects not just in inaccessible aspects of writing but across an all-inclusive spectrum, including creativity, scientific content, language skills, and narrative construction. The data strongly suggest that GPT acts as a catalyst for creative and academic advancement, providing a multi-faceted tool that can significantly develop educational outcomes in creative writing disciplines. The uniformity in improvement across participants underscores the universal applicability and effectiveness of GPT as a pedagogical tool, reinforcing its value in contemporary education settings.

## 5. Discussion

Empirical findings from this study insistently support Hypotheses 1, 3, and 4, demonstrating the instrumental role of GPT in enhancing thematic exploration and originality, the integration of scientific concepts, imagination skills, and plot development within the narratives of Algerian Master students. This result aligns with the optimistic outlooks of Shaw et al. (2023) and You et al. (2023), who examined the capability of AI tools to enhance pedagogical strategies and learning outcomes significantly. Contrastingly, the rejection of Hypothesis 2 counteracts the premise that GPT integration might stifle creativity, suggesting instead that such technological assistance can cultivate originality and imagination, challenging the notion that reliance on technology necessarily diminishes creative capacities.

The advancement in thematic exploration and originality, as well as scientific integration observed in student narratives, correlates with observations of Голубенко & Підмогильний (2022) regarding the potential of GPT to enrich storytelling, particularly within the SF genre. However, this study diverges in its approach by providing empirical evidence of GPT effectiveness in enhancing creativity and imagination, a domain previously navigated through descriptive analysis and case studies. This evidentiary stance marks a significant expansion of the academic comprehension of the educational utilities of GPT, transitioning from speculative assertions to validated claims about its advantages.

Moreover, the study contributes to the discourse on the ethical and pedagogical implications of AI, as echoed by Shaw et al. (2023), by offering a concrete perspective on navigating GPT integration to enhance originality and foster writing abilities without compromising creativity. This study also confronts the predicted limitations suggested by Hypothesis 4, indicating that cooperative efforts with GPT not only preserve but also augment narrative coherence and literary creativity, thereby challenging the anticipated non-significant effect of GPT on plot development.

By addressing the research void identified in the literature, this research underlines the significance of integrating AI in non-Western educational contexts, particularly within Algerian higher education. The noticeable progress in the imaginative writing capabilities among Algerian Master students simplified by GPT emphasizes the universal applicability and adaptability of AI technologies across diverse cultural and academic settings. This dimension is decisive, considering the need for prior studies focusing on the contextual and cultural aspects influencing the integration of AI tools in the educational systems of Algeria. By providing localized insights, this study enriches the global discourse on AI in education, highlighting effective strategies for incorporating technological innovations into pedagogical frameworks.

Reflecting on the broader pedagogical and ethical implications, the outcomes supporting Hypotheses 1, 3, and 4 while refuting Hypothesis 2 and revisiting the perspective on Hypothesis 4 foster a holistic understanding of how AI technologies like GPT can be seamlessly integrated into educational settings. This balanced viewpoint not only advocates the inclusion of AI in creative writing curricula but also accentuates the necessity for aware implementation strategies that harness the outcomes of AI while vindicating potential challenges.

In summary, this comparative analysis not only validates the positive impacts of AI on education, as emphasized in existing literature, but also extends these discussions by introducing empirical evidence from a unique educational context. As a result, it opens the door for more inclusive and empirically grounded

explorations that examine the role of AI in evolving future educational paradigms, advocating for a detailed approach to leveraging AI technologies to enhance teaching and learning experiences globally.

## 6. Conclusion

This study aimed to dissect the effects of GPT on the imaginative abilities of Algerian Master students and sought to illuminate whether it serves as a catalyst for or a crutch to creativity in the crafting of SF narratives. This question is of significant consequence for pedagogical practices, student engagement, and the ethical contours of AI application in educational contexts.

### 6.1 The Key Findings
This research highlighted the significant enhancements in the creative writing process among Algerian Master students when incorporating GPT to write SF stories. It has been detected that the application of GPT markedly improved the abilities of the participants in thematic exploration, scientific integration, imagination incorporation, and plot development, evidenced by higher performance scores in the EG across all evaluated criteria. The adaption of GPT created more profound engagement with scientific concepts involved in the SF narratives of the participant, thus boosting the originality and depth of their stories. Furthermore, the study highlighted the role of GPT in augmenting plot development and assisting students in crafting more complex and compelling story arcs.

These findings, through a holistic vision, suggest that GPT acts not just as a device for facilitating creative expression but also as a catalyst for a deep perception of scientific principles through imaginative exploration. The adaptability of GPT into the educational curriculum, therefore, emerges as a significant advantage to pedagogy, offering a balanced approach to leveraging technology to enhance both the creative and analytical faculties of students within the context of Algerian higher education.

### 6.2 The Research Implications
The implications of this study exceed the boundaries of the classroom or SF narratives; they sign the shift to a more inventive pedagogical ally with the potential to enrich the creative and intellectual growth of students. This transition towards AI-enhanced education requires a reconsideration of curricular designs and teaching methodologies, urging for a more integrated approach that harmonizes traditional educational qualities with the transformative possibilities offered by AI.

Furthermore, the findings of this study contribute a valuable perception to the continuing discourse on the ethical and practical implications of AI in education, challenging preconceived notions about the role of technology in stifling creativity. Instead, this study argues for a balanced and critical incorporation of AI technologies, such as GPT, that acknowledges the potential of human creativity while leveraging the capabilities of AI to augment the educational experience. Thus, this research not only prepares students to navigate a technology-driven world but also equips them with the skills to contribute meaningfully to the evolving narrative of human and artificial co-creativity.

### 6.3 The Study Limitations
In addressing the limitations of this study, it is worth noting to recognize the constant constrictions that accompany the design and methodology of this research, alongside external factors that may influence the generalizability and interpretation of the findings.

Firstly, the scope of the study, centered on Algerian Master students focusing exclusively on the SF genre, may limit the broader applicability of the results. In other words, despite the fact that Algerian higher education is rich and varied in cultural, linguistic, and educational dynamics, its uniqueness might not fully translate to other cultural or educational settings without reevaluation of their specific contexts.

Secondly, as far as methodology is concerned, the quasi-experimental design, though robust in examining the significant relationships between GPT integration and creative writing enhancement, needs to be revised to control for all external variables that could influence student performance. For example, factors such as individual differences in learning and creativity, prior exposure to technology, and varying levels of engagement with the GPT itself may influence the outcomes of the participants. Furthermore, qualitative insights were inevitably constrained for the depth and breadth of the study to capture a holistic review in which students interact with and perceive GPT technology in their creative processes.

Additionally, the evaluation criteria, though precisely designed to assess a range of creative writing aspects, may only capture some dimensions of creativity and narrative skill enhancement explored through the use of GPT.

Lastly, the implementation of GPT in the educational landscape raises ethical considerations, including concerns about originality and intellectual ownership, which this study could only briefly encapsulate. The complexities of these ethical perspectives warrant further, focused exploration to fully understand the implications of integrating GPT in creative writing and beyond.

## 6.4 Future Research Recommendations

Several avenues for future research emerge, building upon the foundational insights of this study. Firstly, a longitudinal approach examining the long-term effects of GPT on students' creative writing skills could yield a deeper understanding of how the application of AI influences creative growth and engagement with scientific concepts.

Furthermore, extending the scope of this paper to encompass a diverse display of genres beyond SF would suggest a more comprehensive view of the pedagogical utility of GPT across the literary band. Such studies may examine whether the outcomes detected in SF writing, such as enhanced thematic exploration and scientific integration, are similarly present in genres where these elements are less pronounced.

Another promising direction involves examining the adaptability of GPT with different pedagogical methodologies. Investigating how different instructional approaches, ranging from fully autonomous student use of GPT to more guided, collaborative engagements between students, educators, and AI, impact learning outcomes could inform more effective educational practices.

Additionally, exploring the cultural and linguistic dimensions of GPT in creative writing within various educational contexts may augment the understanding of its global applicability and potential cultural biases. Even the unique linguistic and cultural setting of Algeria might still be a fertile landscape for further research to probe deeper into how GPT effectively enhances creativity and narrative skills.

By tracking these avenues, further research can continue to unravel the complex impact of AI in education and enrich learning experiences and outcomes in creative writing processes.

## 6.5 Conclusion

This study stands at the confluence of technology and creativity, illuminating the transformative potential of GPT in reshaping the creative writing scenario for Algerian Master students. By demonstrably fostering imaginative writing skills, thematic exploration, scientific integration, and plot development, the GPT tool heralds a new era of pedagogical strategies that can significantly amplify human creativity rather than weaken it. Far from stifling originality, the findings of this study reveal that GPT acts as a stimulus for creative and scientific thought, allowing students to explore the boundless scopes of SF with enhanced depth and coherence. In navigating the evolving interface between AI and education, this study underlines the importance of embracing technological advancements, not as replacements for human ingenuity but as partners in crafting the future of creative education. In this light, the integration of GPT within educational settings emerges not merely as a technological experiment but as a beacon of innovative pedagogy, promising to enrich the educational experience and cultivate a generation of writers who are as technologically knowledgeable as they are creatively inspired.

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## Appendices
## Assignment: Crafting the Future - A Science Fiction Story
## Objective:
The purpose of this assignment is to assess the integration of scientific and imaginative concepts in crafting coherent and engaging science fiction narratives. Participants are expected to explore significant themes related to contemporary or future technological dilemmas, societal challenges, or groundbreaking scientific advancements. Narratives should demonstrate a profound engagement with scientific principles and the imaginative extrapolation of future technologies or artificial intelligence and their implications for society.

## Elements of Focus
**1. Theme Selection and Originality**: Begin by selecting a central theme for your story. This theme should explore a significant scientific concept, technological advancement, or futuristic societal challenge. Examples include but are not limited to artificial intelligence ethics, space exploration, quantum computing, genetic engineering, and the coexistence of humans and advanced AI.

**The Source**: Beichman (2023).
**2. Plot Development**: Construct a compelling narrative that incorporates your chosen theme. Your story should include:
- A clear introduction that sets the scene and introduces the main characters and their context.
- A middle section that develops the plot through conflicts or challenges related to your theme, showcasing your understanding of the scientific or technological concepts.
- A conclusion that resolves the narrative, offering insights, reflections, or predictions on the future implications of the theme explored.

**The Source :** Roberts et al. (2023).
**3. Scientific and Artificial Imagination**: Demonstrate your scientific and artificial imagination by:
- Creatively integrating accurate scientific concepts or theories within your narrative.
- Imagining and describing futuristic technologies, environments, or societies in detail, showing how they influence the plot and character development.
- Addressing the ethical, social, or psychological implications of the technological advancements or scientific concepts featured in your story.

**The Source:** Osborn et al. (2023)
**4. Writing Process**
**Control Group**: Write your story relying solely on your knowledge, creativity, and research.
**Experimental Group**: Utilize GPT to enhance your original ideas, adjust their clarity, assist in generating ideas, plot elements, or descriptions related to your theme. Document how GPT contributed to your creative process, specifically in terms of enhancing imagination and scientific understanding.

## Submission Guidelines
- Your story should be between 1500 to 2000 words.
- Submit your assignment in a PDF format to this email**:** wafaenglish2@gmail.com

- Ensure your submission is well-organized, clearly written, and proofread for grammar and spelling errors.
- For the Experimental Group, include a brief reflection (200-300 words) on how GPT influenced your creative process and the development of scientific and artificial imagination in your story.

## Evaluation Criteria

Your submission will be evaluated based on the following criteria:

**Thematic Exploration and Originality**: Depth and originality in the exploration of the chosen theme.

**The Source** : Vaezi & Rezaei (2019). This source discusses the creation of a rubric that assesses creative writing, focusing on originality and the imaginative quality of narratives.

**Scientific and Technological Integration**: Accuracy and creativity in the depiction of scientific concepts and future technologies.

The **Source:** Osborn et al. (2023). This article explores integrating scientific concepts into creative writing, which aligns with evaluating scientific and technological accuracy in narratives.

**Imagination Skills**: Ability to craft a compelling and imaginative narrative that effectively.

**The Source:** Vaezi & Rezaei (2019)

**Plot Development**: Coherence, structure, and effectiveness in narrative development, including character arc and resolution.

**The Source:** Roberts et al. (2023). This source provides insights into structuring a narrative with coherence and effectiveness, especially within science fiction stories.

**Reflection (Experimental Group only):** Insightfulness and clarity in describing GPT's role in enhancing the creative writing process.

**The Source:** Carey el al. (2022). This article discusses reimagining narrative writing and assessment, which can include reflections on the use of tools like GPT in the creative process.

## The Evaluation Checklist

The evaluation employed structured checklists aligned with the predefined rubrics detailed in the assignment instructions. Each submission was scored across the following scale to ensure a standardized assessment:
Excellent (5): Outstanding integration of scientific concepts and imaginative narrative elements, demonstrating profound thematic exploration and originality.
Good (4): Strong display of thematic and scientific coherence with imaginative narrative development, albeit with minor areas for enhancement.
Satisfactory (3): Adequate thematic exploration and narrative construction, with clear room for deeper scientific integration and imaginative detail.
Needs Improvement (1-2): Limited in thematic depth, scientific accuracy, or imaginative narrative, indicating significant areas for development.
Not Evident (0): Fails to demonstrate thematic relevance, scientific integration, or any imaginative narrative elements.

**The Source:** Carey et al. (2022). This source set the fundamental basics in assessing the students creative writing skills and imagination skills in particular and determined the scales and criteria of initial rubrics that might be reliable in the examination process.