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EXPLORING THE INFLUENCE OF ACCESS TO TEXTBOOK PDFS, GOOGLE SEARCH ENGINE, AND CHATGPT ON STUDENTS' INFORMATION RETRIEVAL AND PLAGIARISM

THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
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MARYAM DULAIMI

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Approval of the Graduate School of Natural and Applied Sciences, Atilim University.

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I certify that this thesis satisfies all the requirements as a thesis for the degree of **Master of Science in Computer Engineering, Atilim University.**

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This is to certify that we have read the thesis titled "Exploring the Influence of Access to Textbook PDFs, Google Search Engine, and ChatGPT on Students' Information Retrieval and Plagiarism" by MARYAM DULAIMI and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

EXPLORING THE INFLUENCE OF ACCESS TO TEXTBOOK PDFS, GOOGLE SEARCH ENGINE, AND CHATGPT ON STUDENTS' INFORMATION RETRIEVAL AND PLAGIARISM

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This study explores the impact of ChatGPT, an advanced AI conversational agent, on various aspects of student learning outcomes, when compared to traditional educational resources such as Google Search and PDF documents. Focusing on six key areas—Feeling of Findability, Feeling of Knowing, Willing to Complete the Task, Cognitive Self-Esteem, Submission Similarity, and Submission AI Similarity—this research involved university students completing assignments using both ChatGPT and traditional technologies. Employing a true-experimental pre- and post-test design, participants were randomly assigned to four groups: control, e-textbook, Google, and ChatGPT access. Results indicate that ChatGPT significantly improves the Feeling of Findability and Knowing, increases students' Willingness to Complete Tasks, and enhances Cognitive Self-Esteem, particularly in the initial stages of learning. These findings suggest that while ChatGPT can substantially enhance educational outcomes, its integration into educational settings must be carefully managed to optimize benefits and mitigate potential drawbacks.

Keywords: ChatGPT**,** Google Search engine, Cognitive self-esteem, Submission Al similarity, Information Retrieval, Academic Plagiarism, Academic Integrity

ÖZ

DERS KİTAPLARI PDF'LERİNE, GOOGLE ARAMA MOTORUNA VE CHATGPT'E ERİŞİMİN ÖĞRENCİLERİN BİLGİ ALINMASI VE İNTİHAL ÜZERİNDEKİ ETKİSİNİN ARAŞTIRILMASI

Maryam Dulaimi

Yüksek Lisans, Bilgisayar Mühendisliği
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Bu çalışma, gelişmiş bir yapay zekâ konuşma aracısı olan ChatGPT'nin, Google Arama ve PDF belgeleri gibi geleneksel eğitim kaynaklarıyla karşılaştırıldığında öğrenci öğrenme sonuçlarının çeşitli yönleri üzerindeki etkisini araştırıyor. Altı temel alana odaklanan (Bulunabilirlik Hissi, Bilme Duygusu, Görevi Tamamlama İsteği, Bilişsel Öz Saygı, Gönderim Benzerliği ve Gönderim Yapay Zekâsı Benzerliği) bu araştırma, hem ChatGPT'yi hem de geleneksel teknolojileri kullanarak ödevleri tamamlayan üniversite öğrencilerini içeriyordu. Gerçek deneysel bir ön ve son test tasarımı kullanılarak katılımcılar rastgele dört gruba atandı: kontrol, e-ders kitabı, Google ve ChatGPT erişimi. Sonuçlar, ChatGPT'nin Bulunabilirlik ve Bilme Duygusunu önemli ölçüde iyileştirdiğini, öğrencilerin Görevleri Tamamlama İsteklerini artırdığını ve özellikle öğrenmenin ilk aşamalarında Bilişsel Benlik Saygısını geliştirdiğini göstermektedir. Bu bulgular, ChatGPT'nin eğitim sonuçlarını önemli ölçüde geliştirebilmesine rağmen, eğitim ortamlarına entegrasyonunun, faydaları optimize etmek ve olası dezavantajları azaltmak için dikkatli bir şekilde yönetilmesi gerektiğini göstermektedir.

Anahtar Kelimeler: ChatGPT, Google Arama motoru, Bilişsel özgüven, Gönderim Al benzerliği, Bilgi Erişimi, Akademik İntihal, Akademik Dürüstlük

I would like to dedicate this thesis to the memory of my beloved father, [FADHIL ABBAS Abd], his wisdom and encouragement continue to inspire me every day. I owe my achievements to the values and principles he instilled in me. This work is a tribute to his lasting impact on my life and education, I would like to extend my deepest gratitude to my mother, [Khawla Jabbar Neama]. Her constant encouragement and support have guided me through the most challenging times of my academic. Thank you, Mom, for being my biggest supporter. would like to express my heartfelt gratitude to my husband, [HAYDER ABDULRAZZAQ]. His encouragement and belief in me have given me the confidence to persevere and achieve my goals. Thank you for your endless love and for always being by my side.

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CHAPTER 1

INTRODUCTION

1.1 Background

Artificial intelligence (AI) is a multidisciplinary approach to computer science and linguistics that tries to create computers capable of accomplishing tasks that would otherwise require human intelligence. These responsibilities include the ability to learn, adapt, analyze, and comprehend abstract concepts, as well as the reactivity to complex human characteristics such as attention, emotion and creativity The use of artificial intelligence (AI) in education has received a lot of attention in recent years, with an increasing number of educational institutions and organizations looking into the potential benefits of AI-powered technologies [1].

Despite Google's years of AI research and skill, OpenAI shifted the game with the introduction of ChatGPT in November 2022 ChatGPT is a language model designed for dialogue that allows users to converse naturally. Its capacity to respond to follow-up queries, admit mistakes, disprove faulty assumptions, and deny unsuitable requests sets it apart from other language models. ChatGPT was improved from a model in the GPT-3.5 series and soon became popular, with over 100 million users within two months of its release. This spurred extensive discussion regarding the application of AI in a variety of settings, including homes, schools, and companies. Unlike other language models such as Google's BERT, Facebook's Large Language Model Meta AI or Mixtral by Mistra AI was available, but it did not obtain the same level of satisfaction as the GPT series and ChatGPT. As a result, major commercial search engines like Google, Bing, and Baidu rapidly announced intentions to incorporate AI conversation into their search results and began implementing it [2].

ChatGPT may be used as a tool to assist students with their studies by providing relevant knowledge and references on a given topic. It may also be used to provide students feedback that helps them enhance their knowledge. This may assist guarantee

that students are given the appropriate level of difficulty and information that they find engaging and relevant. The ChatGPT paradigm might be used to create summaries, flashcards, or quizzes about a certain topic or subject area. ChatGPT has the ability to improve students' educational experiences by delivering individually tailored, flexible, and entertaining learning possibilities. The education industry has embraced this technology as a game changer. Personalized learning experiences and information gathered via Research and automation of testing [3].

Although some recommend banning and prohibiting the use of AI tools in schools and colleges , such regulations will not go back in time. We must confront the reality that the quality of AI tools is fast improving, and this is a major changer in our daily life. As a result, we must begin the discussion immediately, before the usage of these technologies becomes out of control, and educate our students the required skills for integrating ChatGPT into their academics, job, and personal lives [4].

AI technologies, such as ChatGPT powered by GPT-4, have shown great promise for transforming how students learn and interact with information. As these AI-powered technologies become more advanced and accessible, it is critical to investigate their influence on students and educationalin stitutions, notably universities.AI technologies in education have the ability to transform old methods, tailor learning, and build soft skills [5].

The release of this strong technology has brought with it numerous obstacles. Some regard it as wiser than humans, others as harmful technology, and yet others as an excellent aid in the preparation of scientific and research papers. The most intriguing aspect is that researchers have used this technology as coauthors In general, the world of artificial intelligence demonstrates that it is highly interesting and that this technology may assist people at a high level in any sector (research, literature, programming, or health knowledge), a subject that was deemed science fiction in previous decades. It may be; it is now part of reality. But the major issue that is highlighted is the topic of ChatGPT plagiarism. According to a study"ChatGPT is basically high-tech plagiarism."This is a concerning issue because, in actuality, a student can write about most topics without thinking and write essays or do homework whenever he or she wants ,This issue also drives most students to use this tool to

complete assignments and create articles or portions of articles. Although many positive factors can be included for chatbots such as ChatGPT. For example, ChatGPT can be a valuable instructional tool. According to a study may have value for some things, but it is not clear what Something!" Anyway, ChatGPT supporters can be divided into two groups: those who believe the technology is harmful to creativity and unethical, and others who believe it is a smart and valuable tool. Currently, two methods can assist schools, colleges, and research centers in preventing academic plagiarism: first, banning ChatGPT and modifying teaching approaches, and second, recognizing AI-produced work [6].

This means that students can use these systems to cheat in their assignments by submitting writings that are not their own work This changes the whole goal of higher education, which is to educate students, and may lead to reduce the liability am importance of degrees. Another concern is that GPT-3 could be used to provide advantage for some students over others. For example, if a student has access to GPT-3 and uses it to create high-quality written assignments, they may have an unfair advantage over students who do not have access to the model. This could lead to disparities in the assessment process. It can be difficult to tell the difference between a student's own work and the work created by a chatbot application. When a student uses a chatbot application to respond to their questions, academic staff may struggle to assess the overall content appropriately. This is because the responses generated by the chatbot program may not represent the student's genuine level. Given the difficulties connected with marking student assignments created using chatAPI, academic staff may use a variety of techniques to address these obstacles. Firstly, academic staff can give students clear and precise guidance on how to format their work. This can help to ensure that the assignments are well-structured. Secondly, academic staff may use a rubric to assess the quality of student assignments. This can help ensure that the student's effort understanding of the content are appropriately evaluated. Finally, academic staff may use both automatic and manual assessment tools to check students' understanding of the topic. This can help ensure the student's genuine level of understanding is appropriately assessed [7].

1.2 Chatgpt And Ethical Considerations In Academics And Research

ChatGPT is a game changer that could raise severe ethical concerns in research and academia. It quickly became a cultural sensation This chatbot has created ethical concerns within the research community. Noam Chomsky, a well-known US-based scholar, expressed his thoughts on ChatGPT to the media described ChatGPT as "hi-tech plagiarism" and "a way to avoid learning". He went on to say that the usage of this technology by pupils today is a sign of the "failure of the education system". ChatGPT has emerged as a game changer for researchers who have previously struggled with how to avoid plagiarism. However, the researchers are unable to discern between the original and the AI-generated sentences [8].

1.3 Problem Statement

The growing demand for efficient explanatory resources, such as user manuals and textbooks, necessitates novel ways that can meet users' different backgrounds and information needs. Traditional materials frequently include static, preset content, which may be insufficient for consumers to adequately absorb complicated information . The issue is to create user- centered strategies for converting static content into interactive explanations tailored to specific needs. Recent improvements in natural language processing, particularly in large-scale language models such as ChatGPT, have showed potential for improving explanatory capacities [9].

ChatGPT, with its complex language model, has the potential to fundamentally change the way we work and learn. Providing information within seconds instead of It is a useful tool for professionals, educators, and students since it can generate text that seems and sounds like human speech. Given the continuous research and discoveries in natural language processing, ChatGPT has endless potential. ChatGPT allows users to engage in genuinely human-like discussions to address a wide range of concerns, including compiling vocabulary lists, writing essays, creating computer programs, creating pop quizzes, and much more. It is useful, rapid, and yields extremely high-quality results. ChatGPT responses are quick, free, and frequently a good starting point for people to generate their own [3].

1.3.1 Research Questions

1.How do various tools such as Google Search, ChatGPT, and PDF documents influence students' cognitive self-esteem as they progress from comprehension and understanding through to analysis, evaluation, and creation of tasks?

2.How do the use of different tools (Google Search Engine, ChatGPT, and PDF documents) influence students' Feeling of Findability while completing the tasks progressing from knowing and understanding to analyzing evaluating, and creating?

3.How do the use of various tools such as(Google search engine, ChatGPT, and PDF documents) influence students' Feeling of Knowing the tasks as they progress through stages from comprehension and understanding to analyzing, evaluating, and creating?

4.How do different tools like (Google search engine, ChatGPT, and PDF documents) influence students' Willing to Complete the Task as they move from stages of comprehension and understanding to analyzing, evaluating, and creating?

5.How do use of different tools such as (Google search engine, ChatGPT, and PDF documents) influence students' Submissions AI Similarity as they progress through stages from understanding and comprehension to analysis, evaluation, and creation?

6.How do use of various tools such as (Google search engine, ChatGPT, and PDF documents) influence students' Submissions Similarity as they progress from understanding and comprehension to analyzing, evaluating, and creating?

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The use of Artificial Intelligence (AI) into educational environments is a fundamental change in how teaching and learning are conducted in the current days. AI technologies, particularly complex language models such as ChatGPT, have proven critical to this shift, providing ablilites that go well beyond traditional techniques. These technologies are not only transforming the connection between students and information, but also strengthening instructors' responsibilities, giving both groups with strong new methods to engage with knowledge [10].

2.2 Overview of AI in Educational Environments

AI technologies, particularly language models like ChatGPT, are continuously being integrated into educational contexts, reducing the gap between large volumes of instructional information and proper learning experiences. These models provides adaptable platforms that can mimic human-like interactions, making them useful for a wide range of applications, including customized instruction and scalable evaluation systems [11], [12]. AI solutions such as ChatGPT help to create a more dynamic and engaging learning environment by assessing and responding to student input with high relevance. They can modify difficulty and provide feedback in real-time, supporting different learning demands and paces a study discovering that AI-supported classrooms resulted in higher levels of engagement and student outcomes rather than traditional classrooms. As a result, research into the integration of AI technologies in education has to be accelerated as the potential benefits of AI In education are better understood.[11], [12].

2.2.1 Objectives of The Review

The purpose of this literature review is to investigate the effects of ChatGPT on educational outcomes, with emphasising on cognitive self-esteem, student engagement, the outcome of tasks and information, and AI similarity. Each of these key areas reflects an important aspect of the learning process that AI has the ability to improve. The evaluation will look at how ChatGPT affects these characteristics, with respect to its performance and value to educational resources like search engines and e-textbooks. This evaluation is important to understand the larger application of AI into education and the ability to modify them in ways that fulfils the educational goals and standards.This introduction provides the begining for a more in-depth investigation of AI's role in education, highlighting both its benfites and the obstacles it offers in today's academic context [13].

2.3 Evolution of AI in Educational Contexts

The growth of Artificial Intelligence (AI) in education has been increasing rapidly, from basic algorithms to complex, complex and large language models such as ChatGPT. This advancement is more than just a series of improvements; it is a significant change that has redefined the power of educational technology [10].

2.3.1 Development from Simple Algorithms to Advanced Language Models

Initially, AI in education was largely into only basic algorithms meant to do small, particular tasks like grading and basic teaching. These early implementations were restricted in expanding and flexibility, largely growing as automated systems that followed a pre-determined rules and had little capacity to learn or adjust based on interactions over time, as computer power and machine learning techniques improved, there was a larger move toward more complex systems. These complex models, represented by language models such as ChatGPT, use deep learning to understand and comprehend massive volumes of data, allowing them to participate in human-like conversations and deliver individual learning experiences. Such ability represent a huge development from the early days of AI in education, when the functionality was more confined [5], [14].

2.4 Technological Advancements Enabling the Integration of AI in Education

Several significant technologies advances have accelerated the uses of AI into educational cases. The increased computer power and data processing abilities have enabled the development and deployment of complex AI models such as ChatGPT. These models requires a significant computational resources to efficiently evaluate and learn from large datasets, which have only recently been possible because of the advances in hardware and cloud computing. Furthermore, the development in the neural network topologies has been critical. These technologies have increased AI's ability to understand and mimic human languages, making them ideal for educational applications. Such developments have not only increased the benefits of AI tools in performing educational tasks, but also made them more available to a wider range of users. Cloud technology advancment have allowed institutions to launch complex AI-driven apps without the requirement for costly on-site infrastructure. [15], [16] These advancments highlight the ongoing nature of AI's progress in educational contexts. From simple programmed instructions to interactive learning , artificial intelligence has evolved into an important tool in modern education, changing how educational content is given, consumed, and understood.

2.5 Advantages of ChatGPT and Related Generative AI for Improving Teaching and Learning

ChatGPT, OpenAI's huge language model and has the possiblility to be an effective educational tool and may be used to increase learning, along with the references that support them

Personalized instruction: ChatGPT can be used to provide students with detailed instruction and feedback based on their specific learning needs and progress. A study made by Chen et. al (2020) found that a conversational agent based on a generative model (ChatGPT) could give detailed math tutoring to students, leading to better learning outcomes. The finding of the study showed that the conversational agent can provide explanations that were fitted with the students' assumptions and adapt to their level of understanding.

Language Translation: ChatGPT can be used to convert information into multiple languages, making them more accessible to a larger groups of users. A study made by

Johnson et. al (2016) found that a generative model (ChatGPT) trained on a dataset of bilingual sentence pairs could accurately translate between languages, providing a large scores on various translation standers. The study have shown that the model could understand the meaning of sentences in one language and generate almost accurate translations in another.

ChatGPT can also be used to create interactive learning experiences in which students interact with a virtual tutor through a conversation. A study made by Peng et. al (2019) showed that a generative model-based conversational agent could give support to students learning English as a second language, which increases the language learning efficiency. The study also showed that the bot could understand students' questions and offer relevant responses. ChatGPT has can be a strong tool for improving teaching and learning through tutoring, language translation, and interaction [17].

2.6 Impact of ChatGPT on Student Learning Outcomes

2.6.1 Cognitive Self-Esteem

The introduction of AI, specifically ChatGPT, into education presents a huge impact on cognitive self-esteem, which changes how students see their own academic ability. This effect is supported by individual interactions, which improve the learning and also increase the confidence of students [18].

2.6.2 Enhancing Cognitive Self-Esteem

ChatGPT enhances students' confidence by giving them feedback based on the needs of student learners. This level of customisation implies that feedback is both relevant and helpful, allowing students to understand complicated concepts at their own. while receiving postive feedback to keep up with their learning paths. Such interactions help to reinforce positive self-image and self-efficacy, which are important components of cognitive self-esteem. Personalized feedback techniques have been found to increase students' confidence and motivation, and hence it influence their engagement with the academic assignments. This shows how ChatGPT, through individualized engagement, not only helps in information gathering but also boosts students' confidence in their capacity to study and perform academically [11], [19].

2.6.3 Studies on Student Confidence

Studies has been performed to determine how AI technologies such as ChatGPT help student to improve thier confidence in different educational majors. These studies use approaches that measure the changes in student self-esteem before and after using the AI-powered learning tools. When these techniques are employed as part of the learning process, it helps to boost student confidence. This study describes the benefits of AI in increasing cognitive self-esteem, showing how students who interact with AI feel better prepared to face academic problems and more confident in their academic study [20].

2.7 Willing to Do The Tasks

AI's integeration in education extends beyond cognitive gains, including large increases in student engagement and willingness to participate in learning activities. ChatGPT, in particular, has proven alot of promises for creating dynamic and relevant learning experiences that supports and increases student engagements [10].

2.7.1 Role of ChatGPT in Student Willing to Do Tasks

ChatGPT plays an important role in increasing student willingness to do the task by giving interactive and appropriate solutions to their questions. This willingness makes the student learning more dynamic and interesting, allowing them to be more in depth with thier subjects and keep up with their studies. The responses generated by ChatGPT provides the students with the exact knowledge they want, shaping it to their individual needs, and therefore it keeps their interest and motivation. Studies have shown that this form of connection is critical for increasing the student willingness over time. [1] Illustrates how interactive AI systems, such as ChatGPT, can interact with students by addressing their specific learning needs, resulting in an interesting learning experience. Similarly [7] shows thae use of ChatGPT's function ensurs academic integrity while increasing student willingness in learning tasks.

2.7.2 Comparative Analysis with Other Tools

When compared to traditional educational resources like e-textbooks, ChatGPT's role of keeping students willingness to complete tasks is higher since Traditional tools

frequently offer information in a static style, which can result in disengagement and decreasing thier willingness over time. Wherease ChatGPT, is a much more willing tool due to its capacity to interact with students, answer questions in real time, and provide answers that meets up to thier context of the inquiry. [21] The study shows that when students learn using interactive AI rather than static e-textbooks, they are more likely to be willing to perform the assignment and motivated Furthermore, the study insights into how AI-powered dynamic content can dramatically improve learning experiences by making them more willing and similarity to the learner's needs.

2.8 Efficiency in Task Findability and Information Retrieval

AI solutions such as ChatGPT have transformed how students can access and get knowledge which increases the efficiency and accessibility of educational content. This section will assess the function of these AI technologies in increasing the information gathering and compares their effiecny to traditional search engines and e-textbooks [18].

2.8.1 Improving Information Accessibility

ChatGPT provides a great information gathering responses through out using advanced natural language processing to give the exact and most relevant responses to user questions. Which is unlike traditional search methods, where students spends alot of time searching through large data, the ChatGPT can provides short answers that are directly linked with the user's requirements. This not only saves time but it also reduces students' burden, allowing them to focus on the understanding of the materials rather than simply just finding it. For example, [14] the study has found that ChatGPT's advanced language model can speed the information gathering procedures, making academic research more easier for students. Similarly [13] have analyzed ChatGPT's ability to simplify complex requests by giving direct and relevant information, hence improving the entire learning experience.

2.8.2 Comparison with Traditional Tools

When ChatGPT is compared to standard tools like search engines and e-textbooks, it overcomes them in terms of information gathering efficiency and effectiveness.

Traditional search engines sometimes return an large quantity of links, forcing the users to surfe throw the sites and many sources to locate useful information. While ChatGPT, provides quick replies and explanations, which reduces the time and effort required to get the required information [22] A study looks at the advantages of using ChatGPT for academic writing, it has highlighed the ablility of ChatGPT to help with obtaining and sorting the material more effectively compared to the traditional methods. Furthermore [15] have compared ChatGPT's output quality with other AI and traditional tools, showing its effectiveness in providing relevant academic information.

2.9 Feeling of Knowing About the Tasks

2.9.1 Definition and Importance

The term "feeling of knowing" relates to a learner's subjective judgment of their understanding and ability to obtain facts about the tasks they preforms. This metacognitive judgment is important in educational situations because it effects the learners' confidence in their knowledge, guiding their study habits, and determining whether they feel ready to move on to new task or keep working on the same task. The feeling of knowing is important in self-regulated learning because it allows students to evaluate their understanding and select what steps they need to take to improve it. Educational technologies can also help learners become more effective in managing their study habits and enhancing their learning outcomes by increasing the sense of certainty [1].

2.9.2 The Impact of AI on Feeling of Knowing About the Tasks

AI solutions such as ChatGPT have a huge impact on students' feeling of knowing about the tasks by providing a fast and tailored feedback that allows learners to measure their level of the content. Also ,these interactions allow students to detect gaps in their knowledge and receive support to solve them, increasing their general confidence in their learning abilities. For example, ChatGPT's adaptive feedback mechanism provides comments to the student's present level of knowledge, ensuring that the help provided is both relevant and can be understood. Furthermore, This

dynamic engagement helps students build a more accurate experience of knowing by providing constant, real-time evaluations of their knowledge and development [11].

researches have found that the using of AI tools in education improves students' sense of knowing about tasks by providing dynamic and helpful feedback. For example, a study detailed in demonstrates how AI-powered platforms provide learners with insights into their understanding and progress, allowing them to shape their study tactics and improve their metacognitive skills. This higher feeling of understanding leads to make student be better prepared and increased thier confidence which eventually leading to improve thier academic achievements [19].

Furthermore, ethical problems regarding the use of AI in education, such as academic integrity, influence the students' feeling of knowing about thier tasks. Since theseTools such as ChatGPT can help to maintaining medium to high academic standards by providing assistance while avoiding dishonest behavior. This ethical use of AI produces a learning environment where students feel secure in their understanding and confident in the integrity of their work, thus it increases their feelings of knowing [7].

2.10 AI Similarity and Learning Adaptation

The use of AI technologies, such as ChatGPT, to varity of learning styles has changed educational settings. ChatGPT shapes its responses based on student interactions, resulting in a personalized learning experience. ChatGPT changes the complexity and depth of content presented based on patterns from the student questions and responses, while keeping it with the learner's current level of knowledge. This mechanism presents differentiated instruction and a special educational environment which allows the students to develop at their own speed [11].

The impact of AI similarity on the educational settings is huge. The personalized learning experiences provided by AI tools such as ChatGPT aids in meeting the specific demands of individual learners.Therefore, this guarantees that the students receive the most relevant and understandable type of information, which increases their engagement and feeling of knowledge. In addition, ChatGPT's ability to mimic a human-like interactions helps the students to practice and enhance their communication skills in a secure and supportive virtual setting. These interactions are

intended to be natural and intuitive that makes the learning experience more engaging and successful [19].

Furthermore, AI tools like ChatGPT makes contributions to the cognitive growth through providing fast, specific feedback. This feedback loop is important for reinforcing learning and increasing the students confidence level. For example, when students use ChatGPT to investigate at complex concepts, they will receive explanations that matches their present understanding, which will help them to increase their information and boosts their cognitive self-esteem . The employment of AI in this manner means that learners can grow without the fear of being judged, creating an interseting learning environment [18]. The individualized aspect of AI-powered learning tools also applies to academic writing. ChatGPT helps students improve their writing skills throught offering real-time corrections and suggestions. This assistance helps the students to imporve their ideas and also improve the clarity and understanding of their writing, which is an adnavtage in academic contexts where good communication is important [13].

2.11 Comparison of ChatGPT with Google Search Engines and Electronic Textbooks

AI tools, such as ChatGPT, can provide a variety of features and benefits that set them on top of traditional educational resources like Google Search and e-textbooks. ChatGPT's ability to provide a natural language conversations and modify responses based on user input results in a more engaged and personalized learning experience. This ability enables the students to receive quick and relevant feedback, therefore it improves their learning and Information gathering. For example, while Google Search provides alot of information, students must filter and surfe through multiple links and sources, which can be time consuming and stressful while ChatGPT fouces the materials into short replies which make it easier to learn [14] Furthermore, ChatGPT's adaptability to different learning styles and ability to generate content that is appropriate for the student's current level of knowledge are cosidered to be an important advantages. Even though e-textbooks are comprehencive but it lacks to this interactive element and deliver material in a static form and it does not adjust to the learner's speed or provide tailorated feedback, which may restrict their benefits in meeting varied learning demands [23].

There are several limitations and flaws to be consider when comparing ChatGPT to traditional educational materials. One of the big problems is the possibility of misrepresentation, as AI models like ChatGPT are only as reliable as the data they are trained on. Which raises the possibility that the information provided by ChatGPT is out of date or erroneous, which could mislead the students. This is less of a concern for traditional textbooks, which go through peer reviewing and editorial processes to assure thier relaibility [5].

Furthermore, while ChatGPT suceeds at producing human-like language and offering instant responses, it may lack the depth and breadth of material found in e-textbooks and research publications. Traditional resources are frequently more comprehensive and informative, providing in-depth explanations and copious references required for higher-level academic work. This level of content is something that ChatGPT, with its emphasis on brevity and clarity, may not always provide [22].

2.12 Challenges and Ethical Considerations

The use of AI in educational contexts introduces several problems and ethical consernce that must be carefully addressed. One of the main concerns is data privacy. To work properly, AI systems such as ChatGPT require access to large volumes of data, which frequently include sensitive information about students' academic achievement and personal details. This creates serious privacy concerns, thus it is critical to guarantee that data is managed securely and protected from breaches in order to preserve confidence and comply with privacy laws [12]. Another major issue is bias in artificial intelligence systems. AI models are trained on varaity of datasets that may contain inherent biases, which can be seen in their results. This can result in biased treatment of specific groups of students, thereby resulting in incerasing of the existing inequities. Addressing these biases involves continual work to improve the diversity and variety of training the data, as well as the development of bias-mitigation algorithms [7].

Furthermore, it would be difficult to classify the output of AI-based software as original content created by ChatGPT and submitted for publication is at high risk of plagiarism since the references on which such output is based may not be available

until it is requested from the AI tool. If the usage of AI-generated content in scientific journals becomes more extensive, it is unavoidable that some degree of similarity would slip into such content, which might be highlighted by similarity-checking software [14].

Another ethical issue arises from the over relining on AI in education. While AI can provide essential support and improve learning experiences, students and educators may become overly reliant on these technologies. This dependence may risk the development of critical thinking and problem-solving skills, as students may rely on AI for answers rather than interacting thoroughly with the content themselves [12] In addition to these challenges, the employment of AI tools in education presents issues of academic integrity. AI's advanced ability to write human-like language and solve complicated issues might be exploited for cheating and plagiarism. This challenge involves the creation of effective detection methods and instructional programs that prohibit academic dishonesty while encouraging ethical usage of AI technologies [7].

Educators and students have different viewpoints on the obstacles of using AI for academic purposes. While some believe AI has the ability to improve learning and reduce effort, others are concerned about the privacy, equity, and the validity of student work. These perspectives highlights the importance of taking a balanced approach to AI that capitalizes on its benefits while considering its ethical and practical problems [7].

2.13 Recommendations for Future Integration of AI Technologies in Learning Environments

2.13.1 The Future: Fast Forward

It has been claimed for decades that introducing tools into educational environments is critical to educational progress , since students' knowledge and skills change during their schooling. Additionally, the student's past knowledge is extremely diverse.People who use Artificial Intelligence tools, such as ChatGPT, will soon be able to complete their tasks considerably faster than those who do not use these tools, because ChatGPT is an assistive technology . Higher education institutions must include Artificial Intelligence capabilities into their course offerings to ensure fair educational chances. If educators disregard the tools and advancements of artificial intelligence, students

will miss out on the potential to obtain a deeper knowledge. Changes in the higher education experience would be limited. Although there has been talk of prohibiting artificial intelligence tools in educational institutions , certain higher education institutions have made their use illegal . These precautions will not be able to reverse the passage of time. Educators and policymakers in the higher education arena must recognize that the quality of artificial intelligence technologies is rapidly rising, signaling a substantial paradigm shift in our daily activities. As a result, we must begin Conversation should begin as soon as possible to avoid the misuse of these technologies. Furthermore, we must teach our students the necessary abilities to incorporate ChatGPT into their academic, professional, and personal life [4].

CHAPTER 3

METHODOLOGY

This chapter outlines the research methodology, detailing the participants involved, methods of data collection, and procedures for analysis. It explains the execution of the study, including the experimental framework used to compare ChatGPT with traditional educational resources, the metrics selected for evaluating learning outcomes, and the statistical methods employed for data analysis.

3.1 Participants

One hundred fifty-two students from an information systems department at a private university in Turkey consented to participate in the study. However, 24 students who did not complete all needed activities were excluded from the analysis. Five of the students who completed all tasks did not accurately follow the instructions. Because of this, they were omitted from the study. Finally, 123 students' data were included in the study.

Participants were requested to take two pretests and two self-efficacy questionnaires that assessed their understanding of data privacy, ChatGPT, search self-efficacy, and search experiences. The average score in the data privacy test was 54.81 (SD = 27.10) out of 100, while the ChatGPT test was 71.29 (SD = 9.32) out of 100. The average score on the search self-efficacy exam was 49.52 (SD = 9.22) out of 70.

3.2 Research Design

We employed a random assignment true-experimental pre- and post-test design. According to Field and Hole (2002) [24], this necessitates the use of a control group, at least one experimental group, and a variable that the researcher may alter. The control, e-textbook, Google, and ChatGPT access groups were the first four randomly

distributed groups. In the course where data privacy was discussed, the e-textbook group's primary resource was a PDF version of the textbook; students in this group were not allowed to utilize any other resources.

Similarly, students in the Google group were not permitted to use any other tools during the trial; they were only permitted to utilize the Google search engine. The ChatGPT group did not utilize Google or e-textbooks; they just used ChatGPT. Throughout the trial, the control group was not given access to any of these technologies. The teacher and teaching assistants, together with the rest of the course team, oversaw the experiment's execution in a lab setting. We recognize that in real-world situations, students frequently have simultaneous access to several resources, such ChatGPT and Google.

Participants were closely watched to make sure they followed the research protocol, and there were very few instances of their not using the prescribed instruments. There were just five pupils who initially did not follow the guidelines; they quickly went back to utilizing the assigned tool after being reminded. Ultimately, these five pupils were not included in the research. Our findings' internal validity is preserved in part by our rigorous adherence to the experimental setup.

Using Bloom's Revised Taxonomy of Educational Objectives, we developed three data privacy tasks with varying degrees of complexity for the current study (Krathwohl, 2002) [25]. Students did a task in Task 1 on lower-order thinking abilities, such as remembering and comprehending (see Table 3.1); in Task 2, they worked on a task meant to promote medium-order thinking abilities, such as applying (see Table 3.2). Using higher-order thinking abilities, such as analyzing, evaluating, and producing, students were asked to offer a solution to the problem they had discovered in Task 3 (see Table3.3). Task 1, Task 2, and Task 3 were finished in the following sequence by participants in each task.

Table 3.1 Task 1- remembering and understanding

Please answer the following questions and submit them as a Word file to the Moodle Course site.

1. What is the European Union (EU) General Data Protection Regulation (GDPR)? List the GDPR requirements that must be met by EU organizations when processing personal information, including but not limited to collection, recording, organization, structuring, storing, adaptation, retrieval, use, dissemination, combination, and destruction of personal data.
2. What types of information are protected by the GDPR?
3. What are the main differences and similarities between privacy, security, and ethics?
4. What do cookies mean? And why are they important for privacy?

Table 3.2 Task 2 – applying

Suppose that you work for a company as a privacy and security expert with proficiency on legal and technical aspects of GDRP. The company's management wants to make sure it has policies and procedures in place to protect the privacy of visitors to its website. You have been asked to provide advice to the company about what needs to be included in the policies to ensure that they comply with the EU GDPR. Your advice should address issues, including but not limited to:

1. How much data should the company collect on visitors to its website, and why that data? What information could it discover by tracking visitors' activities on its website?
2. What value would this information provide the company? What are the privacy problems raised by collecting such data?
3. Should the company use cookies? What are the advantages of using cookies for both the company and its website visitors? What privacy issues do they create for the company?
4. Should the company adopt an opt-in or opt-out model of informed consent?

Table 3.3 Task 3 - analyzing, evaluating, and creating

Examine the Optimum Customer Privacy Notice and evaluate whether it complies with the EU GDPR. Base your evaluation on the GDPR requirements, including but not limited to

1. requiring organizations to protect PII (personally identifiable information),
2. requiring organizations to allow users to access all their personal information without charge within one month,
3. requiring organizations to delete personal data (right to be forgotten),
4. requiring organizations to ensure data portability so consumers are not locked into a particular service,
5. requiring organizations to guarantee the right to sue providers for damages or abuse of PII, including class action lawsuits,
6. requiring organizations to have a data protection officer that reports to senior management;
7. requiring explicit consent before collecting data (positive opt-in),
8. requiring organizations to eliminate default opt-in processes,
9. requiring organizations to publish the rationale for data collection and the length of retention
10. requiring organizations to report breaches and hacks within 72 hours,
11. requiring organizations to assume liability for data they share with partners or other firms,
12. requiring organizations to build privacy protections into all new systems (privacy by design),
13. requiring organizations to anonymize data rather than targeting based on intimate, personal profiles;
14. requiring organizations to limit the collection of personal data to only that which is needed to support a task or a transaction and then deleting it shortly thereafter.

improving the privacy policy (PR)? Please prepare a list of suggestions to improve the PR document.

3.3 Group Formation

Based on a variety of criteria, such as the participants' search history, their confidence in their own search abilities, their understanding of data privacy, and their familiarity with ChatGPT, we divided the participants into four major groups. Two steps of cluster analysis went into this classification. Very low composite scores for the previously described criteria were seen in the first cluster, which had 24 patients. With thirty-two individuals, the second cluster's results were somewhat better but remained poor. The fourth cluster, which consisted of 35 individuals, had the highest scores in these categories, whereas the third cluster had 62 people with medium values.

We evenly divided participants from each cluster among the four experimental groups to provide a balanced representation in the study. This strategy was used to preserve a consistent participant mix that reflected the various degrees of expertise and experience within each group in accordance with the clustering criteria. We also took gender parity into consideration while distributing information. Throughout this procedure, consideration was given to the distribution of genders. Figure 1 shows this distribution procedure as well as the specifics of participant clustering.

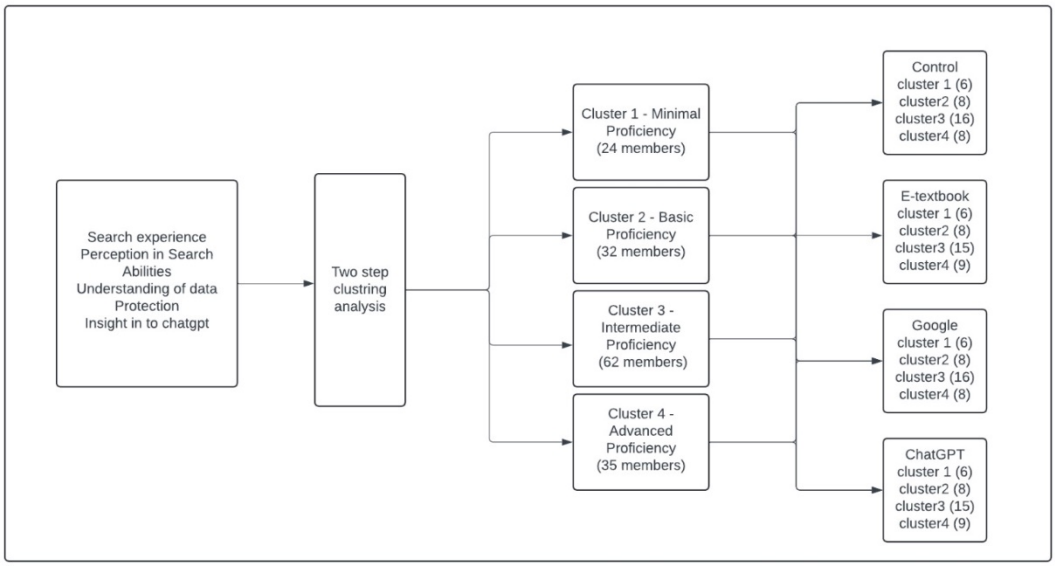

Figure 3.1 The process of random assignment to the study groups

The frequency of students by gender and group is displayed in Table 4. There were 83 male students (67.48%) and 40 female students (32.52%). Of the pupils, 31 (25.20%)

were in the control group. There were 25(20.33%), 29(23.58%), and 38(30.89%) students in the treatment groups for e-textbooks, Google, and ChatGPT, respectively.

Table 3.4 The frequency distribution of the participants by groups and gender

Groups	Gender					
	Female		Male		Total	
	f	%	f	%	f	%
Control	11	8.94	20	16.26	31	25.20
E-textbook	10	8.13	15	12.20	25	20.33
Google	9	7.32	20	16.26	29	23.58
ChatGPT	10	8.13	28	22.76	38	30.89
Total	40	32.52	83	67.48	123	100.00

3.4 Procedure

The following material was included in the instructions for each assignment; prior to students being asked to complete activities, the teaching team discussed the concept of plagiarism in the context of the course and provided some examples of plagiarism.

Plagiarism is described in our academic world as the use of another person's concepts, ideas, or words without giving due credit. This is considered academic dishonesty, particularly when it comes to turning in homework. Plagiarism examples include outright stealing content from books or websites; using a phrase or term from another source without giving credit; resources; closely copying or translating text from another source; using data, figures, graphs, pictures, or diagrams without giving credit to where they came from; and using other people's remarks or notes, such as those from lectures or tutorials that include direct quotes. Plagiarism includes even using information from other resources like assignment writing services or other sources without properly citing them. Using the appropriate academic reference style is crucial if you want to be able to properly credit any outside sources you use in your work.

The course schedule included one lecture/demonstration (50 minutes) and one lab session (100 minutes) for each task. The lab session was preceded by a lecture and demonstration.

Lessons that combined lecture and demonstration were utilized to go over key concepts and course material and show how they may be applied to comparable problems. Students were expected to do the tasks given to them in the laboratories. Using a learning management system, assignments were finished and then submitted to Turnitin for a plagiarism check.

Together with its standard similarity ratings, which indicate the proportion of text that was most likely created by an AI writing tool, Turnitin also unveiled a new AI writing detection tool lately. Turnitin's percentages were used as the foundation for compiling the statistics, and each submission was subjected to a plagiarism check. The study's methodology and overall research design are depicted in Figure 2.

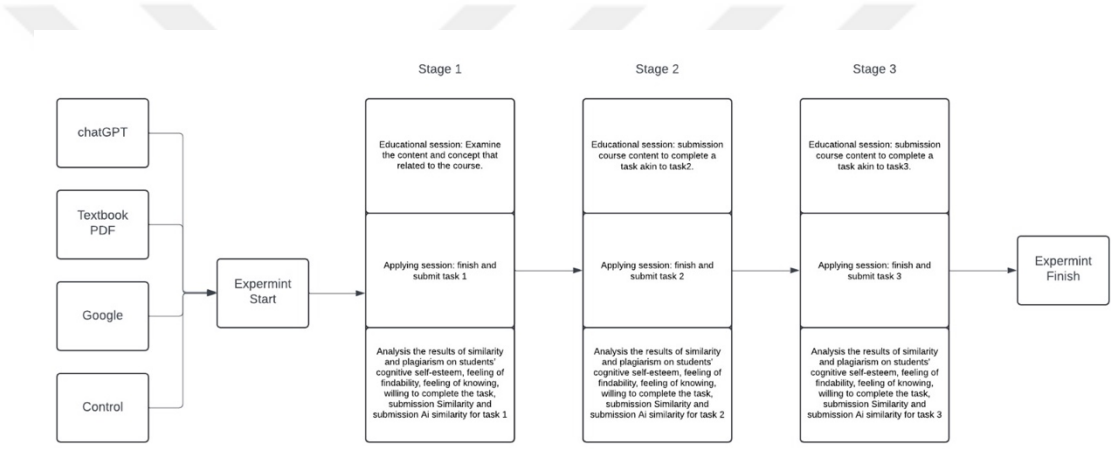

Figure 3.2 Overall research design and data collectionData Analysis and Measures

3.5 Data Analysis and Measures

After each activity was finished, the Turnitin plagiarism detection tool was used to generate AI plagiarism scores and similarity scores for each participant's submission, as recommended by Cotton, Cotton, and Shipway (2023) [7] for preventing plagiarism using ChatGPT and other artificial intelligence language models in addition to traditional plagiarism. The Similarity Score displays the portion of a piece of writing that is exactly the same as something that may be discovered online, in a Turnitin database, or in another person's paper (Turnitin, 2024) [32].

A work's similarity does not indicate that it was copied. When examining the score, instructors must to consider relevant commonalities such citations, quotes, and

bibliographic data. Because of this, the teacher went over the Turnitin similarity findings and revised the scores by removing any acceptable similarities—like citations, quotations, or bibliographic data—from the reports. In the research, these revised ratings were applied.

Due to significant false-positive rates, a recent study (Elkhatat et al., 2023) [26] demonstrates that AI plagiarism detection algorithms are not very successful. The nature of machine learning itself may cause this problem for all detectors, even though Turnitin is not one of the ones mentioned in the paper. The same set of students are evaluated on three tasks with different levels of difficulty as part of our repeated measure design, which aims to address concerns regarding the possible high false positive rates of AI plagiarism detectors (Field, 2017)[27] . According to Bramwell, Bittner, and Morrissey (1992)[28], this design is important because it enables internal comparison within the same cohort, which reduces measurement error variation and unreliability and lessens the effect of false positives.

Although it is accepted that artificial intelligence (AI) plagiarism detectors are not perfect and may mistakenly identify content as AI-generated, our emphasis is not on the precision of these tools when used alone. Rather, we focus on the relative changes in AI plagiarism scores as students advance through increasingly challenging tasks within the same student group. We want to show a pattern or trend in the students' responses to AI-assisted plagiarism by comparing their results from Task 1, Task 2, and Task 3.

Therefore, although a significant factor in the wider application of AI plagiarism detectors, the possibility of false positives has less bearing on the design of our study.

The basis of our study is the variation in task scores for the same subjects,which This lowers the possibility of false positive rates distorting the results as a whole. As a result, the worry about false positives has a far less impact on the results made from our research, which are based on relative rather than absolute evaluations of AI plagiarism at various task difficulty levels.

After examining the normality of AI plagiarism scores and similarity scores, it was discovered that the data collected under each circumstance was normally distributed. The sphericity of the AI plagiarism and similarity scores were examined as part of the investigation (Field, 2017). Mauchly's W =.973, 2(2) = 3.178, p =.204, and Mauchly's

W =.972, 2(2) = 3.305, p =.192, for the two variables, respectively, did not defy the assumption.

To assess ChatGPT's impact on different learning aspects, several metrics and data collection methods were employed. These includedFeeling of findability,Feeling of knowing ,Willing to complete the task Cognitive self esteem ,Submission similarity,Submission Al similarity , Each of these indicators is thoroughly explained below, along with their respective data collection methodologies.

3.5.1 Cognitive Self Esteem

Perceptions of cognitive self esteem were evaluated using survey questions designed to gauge participants for the assignments. The survey included Questions like "The task is a difficult task" help assess how challenging the respondent found the task. If individuals feel that they can handle difficult tasks, it may boost their self-esteem regarding their cognitive abilities. Also "I am capable of solving most problems without outside help" and "I am smarter than the average person" target self-efficacy and perceived intelligence. Positive responses to these questions could enhance an individual's self-esteem by affirming their belief in their own intelligence and problem-solving skills. Participants filled out a perception of cognitive self esteem survey after each task, allowing us to track variations in perception of cognitive self esteem across activities and learning tools (e.g., ChatGPT, Google, e-textbook). To validate the dependability of the perception, the Mauchly's Test of Sphericity used to evaluate the assumption of equal variances in phase differences for the Cognitive Self Esteem of the task. The test yielded the following results of (Mauchly's W: 0.654 , χ^2(2)= 52.251 , p-= 0.000) given the p-value of 0.000, which is less than the standard alpha level of 0.05, the assumption of sphericity has been violated.

3.5.2 Feeling of Findability

The study analyze the effect of a structured task on students' ability to find relevant information. The task in question involves multiple stages, after which students were asked to complete a survey assessing their experiences and perceptions related to the task. Responses were measured on a Likert scale from "Strongly Disagree" to "Strongly Agree," allowing for a quantitative analysis of students' confidence and perceived challenges during the task. A significant number of students agreed that they

knew how to complete the task and could easily find the required information across the tools (e.g., ChatGPT, Google, e-textbook). The perceived findability measurements were tested for reliability using Mauchly's sphericity test. The results confirmed that the data matched the sphericity assumptions, hence validating the statistical analysis. Mauchly's sphericity test for perceived findability revealed the following: Mauchly's W = 0.987, χ^2 (2) = 1.662, and a p-value = 0.436. This p-value the results showsthat the assumption of sphericity for the findability of the task data has not been violated.

3.5.3 Willing to Complete The Tasks

The study analyzed data collected from a survey administered to participants after completing the tasks, where their willing to completethe tasks was measured. This perceived was assessed through an initial survey question which asked participants if they were willing to complete the task after being informed about what it entailed and the tools they would use. (e.g., ChatGPT, Google, e-textbooks).this measurements were tested for reliability using Mauchly's sphericity test. The results confirmed that the data matched the sphericity assumptions, hence validating the statistical analysis. The Mauchly's Test of Sphericity used to evaluate the assumption of equal variances in phase Willing to Complete the Task. The test yielded the following results: Mauchly's W = 0.861, $\chi^2(2) = 18.35$, and a p-value = 0. This p-value, being less than the standard alpha criterion of 0.05, indicates that the assumption of sphericity for the Willing to Complete the Task has been violated.

3.5.4 Feeling of Knowing

The study explores the effect of participants' Feeling Knowing about the tasks , using survey data collected after completing tasks. The survey assessed participants' confidence in how to complete the tasks, and their ability to find necessary information. participant who felt well-informed experienced higher satisfaction, perceived less difficulty, and showed greater competence and self-efficacy. The study suggests that a clear understanding of the tasks boosts participants' confidence and reduces anxiety, which significantly enhances task performance across different tools (e.g., ChatGPT, Google, e-textbooks) the Mauchly's Test of Sphericity used to evaluate the assumption of equal variances in phase of the Feeling of Knowing. The

test yielded the following results: Mauchly's W = 0.936, $\chi^2(2) = 8.148$, and a p-value = 0.017. Since this p-value is less than the standard alpha criterion of 0.05, it indicates that the assumption of sphericity for the Feeling of Knowing has been violated.

3.5.5 Submissions AI Similarity

investigates the implications of AI similarity on the assessment of tasks, particularly focusing on the consistency and fairness of evaluations. The analysis is based on data collected from a structured survey conducted among students after they completed tasks with the assistance of AI tools. The survey assessed their perceptions of task difficulty, their own abilities, and the utility of AI assistance. AI similarity was gauged by comparing student submissions to ideal responses generated by AI, with a focus on the similarity in content, structure, and problem-solving approaches. We used Mauchly's Test of Sphericity to assess the assumption of equal variances in phase differences for the submissions AI similarity The results indicated a Mauchly's (W = 0.968) χ^2(2) = 3.924, p-value = 0.141). Because this p-value exceeds the conventional alpha threshold of 0.05, it suggests that the assumption of sphericity has not been violated for the submissions AI similarity data.

3.5.6 Submissions Similarity

The study involved administering a detailed survey to students post-task completion. The survey included questions about their perceptions of the task difficulty, their engagement with the task, and their opinions on the necessity of additional tools. Submission similarity was analyzed by comparing the content and structure of student responses, identifying patterns of resemblance, and assessing the dependency on shared resources or external aids, We used Mauchly's Test of Sphericity to assess the assumption of equal variances in phase differences for the submissions similarity. The results showed a Mauchly's (W = 0.964, χ^2(2) = of 4.542), and a p-value (p=0.103). Because this p-value is greater than the standard alpha threshold of 0.05, it indicates that the assumption of sphericity for the Submissions Similarity has not been violated.

CHAPTER 4

RESULTS

The results section provides an in-depth analysis of the data collected during the study, along with conclusions drawn from the findings. This section includes detailed statistical analyses that explore the impact of ChatGPT on student' Cognitive self-esteem, feeling of findability while completing the task, feeling of knowing the task, Willing to complete the task, Submission similarity and Submission Al similarity.

4.1 Cognitive Self Esteem

How do the use of different tools (Google Search Engine, ChatGPT, and PDF documents) affect students' Cognitive Self Esteem while completing the tasks progressing from knowing and understanding to analyzing evaluating, and creating?

In our study, we employed four different tools, including Control group, PDF documents, Google Search Engine, and ChatGPT. on students' cognitive self-esteem to understand their effectiveness in enhancing academic preformance, We used Mauchly's Test of Sphericity to evaluate the assumption of equal variances in phase differences for the Cognitive Self Esteem of the task. The test yielded the following results of **(**Mauchly's W: 0.654 , χ^2(2)= 52.251 **,** p-= 0.000) Given the p-value of 0.000, which is less than the standard alpha level of 0.05, the assumption of sphericity has been violated.

Table 4.1 Descriptive Statistics for Cognitive Self Esteem

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
CSE_STAGE 2	My memory	50.55	6.239	31
	E-textbook	52.56	5.886	27
	Google	46.59	16.341	32
	ChatGPT	51.79	12.030	38
	Total	50.35	11.351	128
CSE_STAGE 3	My memory	49.58	9.266	31
	E-textbook	52.15	5.289	27
	Google	52.47	7.211	32
	ChatGPT	51.89	9.700	38
	Total	51.53	8.209	128
CSE_STAGE 4	My memory	48.97	8.890	31
	E-textbook	51.81	7.317	27
	Google	51.78	8.672	32
	ChatGPT	51.45	8.592	38
	Total	51.01	8.418	128

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.1) shows the varying impacts of different tools on students' cognitive self-esteem:

In CSE Stage 2, The participants using different tools exhibited a wide range of mean scores. Memory-based performance averaged (M=50.55), E-textbook users scored higher with a mean of (M=52.56), outperforming the other groups. Google users had the lowest average score at (M=46.59), showing the highest variability. ChatGPT users had a near-average performance with a score of (M=51.79) and the the total average score for this stage was 50,35

In CSE Stage 3, Scores generally declined or showed minimal improvement. Memory-based scores dropped slightly to (M=49.58). E-textbook performance remained relatively stable at (M=52.15), while Google users improved, achieving the highest stage score of (M=52.47). ChatGPT users also improved to (M=51.89). total average score for this stage was (M=51.53).

In CSE Stage 4,This stage saw a general decline in scores across all tools, with memory-based scores dropping further to (M=48.97). Both e-textbook and Google users had nearly identical scores of (M=51.81) and (M=51.78) respectively, indicating consistent performance compared to the previous stage. ChatGPT users had a slight decrease to (M=51.45). The total average for this stage slightly decreased to (M=51.01)

Table 4.2 Within-Subjects Effects Analysis for Cognitive Self Esteem

Tests of Within-Subjects Effects							
Measure:	Cognitive Self Esteem						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task	Sphericity Assumed	83.842	2	41.921	0.835	0.435	0.007
	Greenhouse-Geisser	83.842	1.486	56.430	0.835	0.405	0.007

Table 4.2 (Continued)

Task	Huynh-Feldt	83.842	1.536	54.585	0.835	0.408	0.007
	Lower-bound	83.842	1.000	83.842	0.835	0.363	0.007
Task* Study Group	Sphericity Assumed	621.774	6	103.629	2.064	0.058	0.048
	Greenhouse-Geisser	621.774	4.457	139.495	2.064	0.080	0.048
	Huynh-Feldt	621.774	4.608	134.936	2.064	0.077	0.048
	Lower-bound	621.774	3.000	207.258	2.064	0.108	0.048
Error Factor	Sphericity Assumed	12452.784	248	50.213			
	Greenhouse-Geisser	12452.784	184.235	67.592			
	Huynh-Feldt	12452.784	190.460	65.383			
	Lower-bound	12452.784	124.000	100.426			

our study analysis of how cognitive self-esteem (CSE) outcomes varied across different stages.

The findings from the within-subjects' effects (Table 4.2) analysis the impact of the task on cognitive self-esteem was not statistically significant, with an F-value of (F (2, 248) = 0.835) and a p-value of (0.435) The effect size was very small, with a partial

eta squared value of 0.007, accounting for less than 1% of the variance in cognitive self-esteem scores. These results clearly indicate that the variations in tasks did not significantly influence the cognitive self-esteem scores.

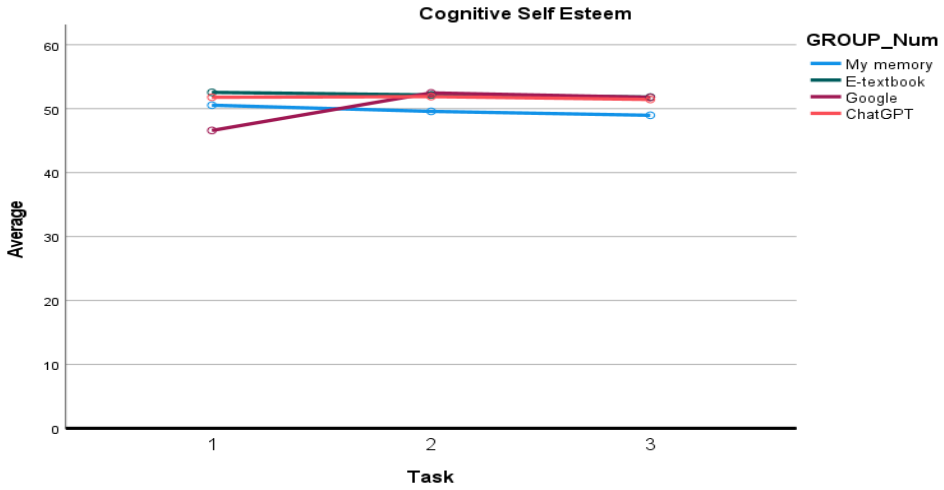

Figure 4.1 cognitive self-esteem Trends by Group and Task

The graph (Figure 4.1) shows the Average means of cognitive self-esteem results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT.

Stage 1, The "ChatGPT" and "Google" groups begin slightly higher compared to the "E-textbook" and "My memory" groups, indicating a marginal lead in cognitive self-esteem scores, Stage 2, As the tasks progress to the second stage, all groups exhibit a slight increase or stability in their scores. "ChatGPT" and "Google" maintain the highest scores among the groups"E-textbook" shows a slight improvement, aligning closely with the scores from "My memory. Stage 3 By the third task, all group scores converge closer together, "ChatGPT" continuing as the highest throughout all three tasks. The tools “Google," "E-textbook," and "My memory" show very little variation from each other by the final task.

4.2 Feeling of Findability

How do the use of different tools (Google Search Engine, ChatGPT, and PDF documents) affect students' Feeling of Findability while completing the tasks progressing from knowing and understanding to analyzing evaluating, and creating?

In our research, we evaluated student perceptions of Feeling of Findability using four different tools: Control group, E-textbooks, Google, and ChatGPT. We analyzed these perceptions across three different stages from knowing and understanding to analyzing evaluating and creating.

To determine whether the tools influenced the perceived ease or difficulty of the tasks, and to explore if this perception changed at different stages of the task. We run Mauchly's Test of Sphericity to evaluate the assumption of equal variances in phase differences for the findability of the task. The test yielded the following results (Mauchly's W = 0.987, χ^2 (2) = 1.662, p- = 0.436) This p-value greater than the standard alpha criterion of 0.05, indicates that the assumption of sphericity for the findability of the task has not been violated.

Table 4.3 Descriptive Statistics for Feeling of Fndability

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
Task_ Findability_STAGE 2	My memory	0.77	0.425	31
	E-textbook	0.89	0.320	27
	Google	0.84	0.369	32
	ChatGPT	0.92	0.273	38
	Total	0.86	0.349	128
Task_ Findability_STAGE 3	My memory	0.68	0.475	31
	E-textbook	0.74	0.447	27
	Google	0.84	0.369	32

Table 4.3 (Continued)

Task_ Findability_STAGE 3	ChatGPT	0.92	0.273	38
	Total	0.80	0.398	128
Task_ Findability_STAGE 4	My memory	0.68	0.475	31
	E-textbook	0.78	0.424	27
	Google	0.69	0.471	32
	ChatGPT	0.95	0.226	38
	Total	0.78	0.415	128

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.3)shows the varying impacts of different tools on students' Feelings of findability

In findability stage 2 : ChatGPT users achieved the highest mean findability score (M=0.92), E-textbook (M=0.89), followed by Google users (M=0.84), and memory (M=0.77). The total average findability for this stage was 0.86 (M=0.86).

In findability stage 3: Scores generally decreased or showed slight improvements. Memory- scores dropped to (M=0.68), while E-textbook scores decreased (M=0.74). Google users maintained a consistent score of (M=0.84), ChatGPT users continued to lead with a high score of (M=0.92). The stage average was (M=0.80).

In findability stage 3: This final stage observed a further decline or slight increase in findability scores across tools. Memory scores remained at (M=0.68), E-textbook scores decreased to (M=0.78), and Google users saw a drop to (M=0.69). ChatGPT users, however, improved their performance, achieving the highest stage score of (M=0.95). The overall average for this stage was 0.78 (M=0.78).

Table 4.4 Within-Subjects Effects Analysis for Feeling of findability

Tests of Within-Subjects Effects							
Measure:	Feeling of findability						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task	Sphericity Assumed	480	2	240	2.936	0.055	0.023
	Greenhouse-Geisser	480	1.974	243	2.936	0.056	0.023
	Huynh-Feldt	480	2	240	2.936	0.055	0.023
	Lower-bound	480	1	480	2.936	0.089	0.023
Task*Study Group	Sphericity Assumed	0.641	6	107	1.307	0.254	0.031
	Greenhouse-Geisser	0.641	5.921	108	1.307	0.255	0.031
	Huynh-Feldt	0.641	6	107	1.307	0.254	31
	Lower-bound	0.641	3	214	1.307	0.275	0.031
Error (Factor)	Sphericity Assumed	20.28	248	82			
	Greenhouse-Geisser	20.28	244.716	83			
	Huynh-Feldt	20.28	248	0.082			
	Lower-bound	20.28	124	8164			

Our study analysis of how Feeling of Findability outcomes varied across different stages. The analysis of within-subject effects (Table 4.4) for the task Findability under the assumption of sphericity did not yield statistically significant results. Specifically, with an F-value of (F= 2.936 ,p-value= 0.055),The partial eta squared value was 0.023, indicating a very small effect size, which explains approximately 2.3% of the variance

in the dependent variable. This suggests that changes in task conditions did not significantly impact the Task findability.

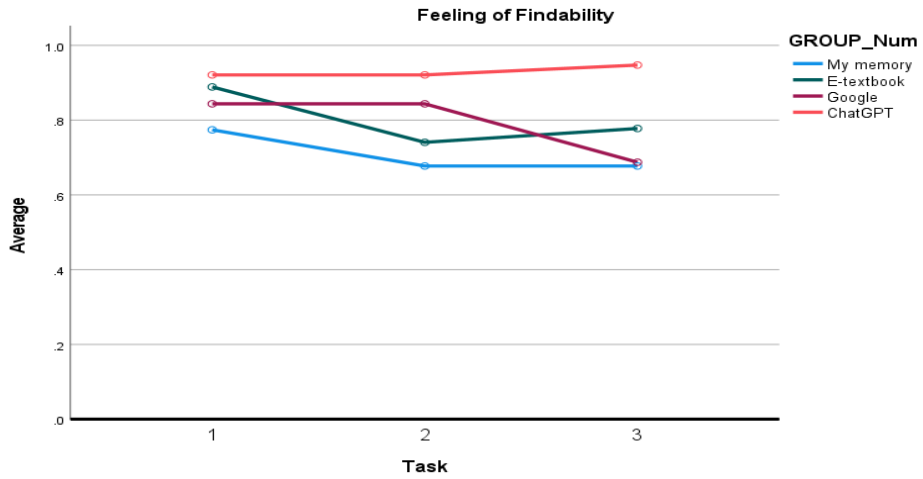

Figure 4.2 Perceived Feeling of Findability Trends by Groups and Task

The graph (Figure 4.2) shows the Average means of Feeling of Findability results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT Stage 1, the "ChatGPT" group begins with the highest findability rating, closely followed by the "Google" group, while the "E-textbook" and "My memory" groups start at lower values. This indicates that users initially feel more confident in finding information using ChatGPT and Google,Stage 2, there is a noticeable decline in the "My memory, the "E-textbook" and "Google" groups exhibit a slight decrease, whereas the "ChatGPT" group remaining the highest among all groups,Stage 3, the "ChatGPT" group's rating slightly decreases but still remains the highest. The "Google" group shows a small decline, aligning more closely with the "E-textbook" group, which slightly improves. The "My memory" group also improves, with "ChatGPT" maintaining a marginal lead throughout the tasks.

4.3 Feeling of Knowing

How do the use of various tools such as(Google search engine, ChatGPT, and PDF documents) impact students' Feeling of Knowing the tasks as they progress through stages from comprehension and understanding to analyzing, evaluating, and creating?

This study explores the impact of different informational and technological tools including the Google Search Engine, ChatGPT, and PDF documents influence students' perceived Feeling of Knowing, We uesd Mauchly's Test of Sphericity to evaluate the assumption of equal variances in phase of the Feeling of Knowing. The test yielded the following results: Mauchly's W = 0.936, $\chi^2(2) = 8.148$, and a p-value = 0.017. Since this p-value is less than the standard alpha criterion of 0.05, it indicates that the assumption of sphericity for the Feeling of Knowing has been violated.

Table 4.5 Descriptive Statistics for Feeling Knowing

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
FEELING OF KNOWING_STAGE 2	My memory	0.84	0.374	31
	E-textbook	0.96	0.192	27
	Google	0.94	0.246	32
	ChatGPT	0.87	0.343	28
	Total	0.9	0.303	128
FEELING OF KNOWING_STAGE 3	My memory	0.68	0.475	31
	E-textbook	0.93	0.267	27
	Google	0.97	0.177	32
	ChatGPT	0.97	0.162	38
	Total	0.89	0.313	128
FEELING OF KNOWING_STAGE 4	My memory	0.74	0.445	31
	E-textbook	0.85	0.362	27
	Google	0.91	0.296	32
	ChatGPT	0.95	0.226	38
	Total	0.87	0.341	128

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.5) shows the varying impacts of different tools on students' Feelings of Knowing Stage 2, Google users (M=0.94), E-textbook users (M=0.96), ChatGPT users achieved mean score (M=0.87) and memory (M=0.84). The total average for this stage was M=0.9.

Stage 3, Memory scores dropped to(M=0.68), while E-textbook scores improved to (M=0.93), Google users also increased their score to (M=0.97), and ChatGPT users continued to lead with a high score of (M=0.97). The stage average was M=0.89.

Stage 4, In the final stage, scores observed further improvement or slight decline across tools. Memory scores increased to (M=0.74), E-textbook scores improved to (M=0.85), and Google (M=0.91). ChatGPT users, however, continued to improve their performance, achieving the highest stage score of (M=0.95). The overall average for this stage was M=0.87.

Table 4.6 Within-Subjects Effects Analysis for Feeling of Knowing

Tests of Within-Subjects Effects							
Measure:	Feeling of Knowing						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task	Sphericity Assumed	0.103	2	0.051	0.691	0.502	0.06
	Greenhouse-Geisser	0.103	1.88	0.055	0.691	0.493	0.006
	Huynh-Feldt	0.103	1.954	0.053	0.691	0.499	0.006
	Lower-bound	0.103	1	0.103	0.691	0.407	0.006

Table 4.6 (Continued)

Task * Study Groups	Sphericity Assumed	0.804	6	0.134	1.801	0.099	0.042
	Greenhouse-Geisser	0.804	5.639	0.143	1.801	0.104	0.042
	Huynh-Feldt	0.804	5.861	0.137	1.801	0.101	0.042
	Lower-bound	0.804	3	0.268	1.801	0.151	0.042
Error (Stages)	Sphericity Assumed	18.461	248	0.074			
	Greenhouse-Geisser	18.461	233.062	0.079			
	Huynh-Feldt	18.461	242.252	0.076			
	Lower-bound	18.461	124,000	0.149			

Our study analysis of how Feeling of Knowing outcomes varied across different stages. The analysis of within-subject effects (Table 4.6) for the Feeling of Knowing the F-value is(F= 0.69) ,p-value(P = 0.502) and The partial eta squared value is 0.06, indicating a very small effect size which explains about 6% of the variance in the dependent variable "Feeling of Knowing". suggests that changes in task conditions did not significantly impact the perception Feeling of Knowing.

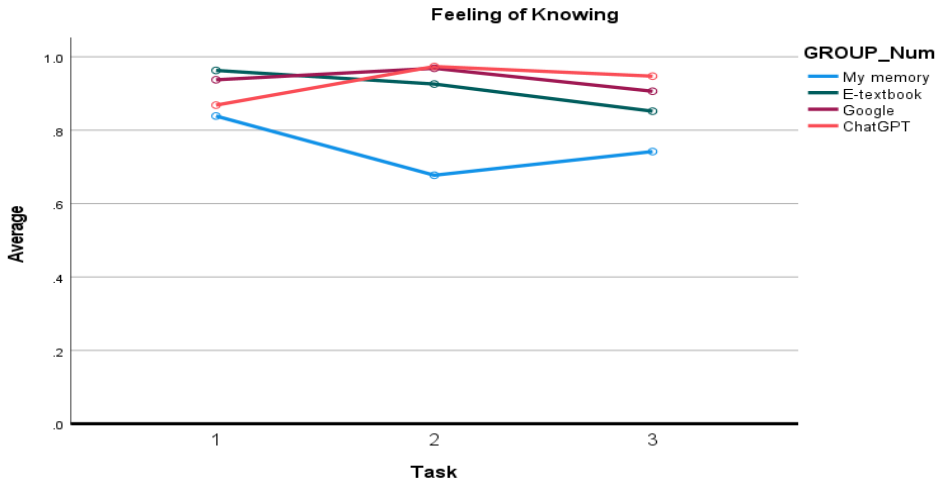

Figure 4.3 Feeling of Knowing Trends by Group and Task

The graph (Figure 4.3) shows the Average means of Feeling of Knowing results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT Stage1, ChatGPT starts with the highest average, , Google closely follows, suggesting a slightly lesser but still high, Both the E-textbook and My memory groups begin with lower averages,Stage 2,The ChatGPT, Google experiences a slight decrease, E-textbook also decreases slightly,My memory shows a notable decline, pointing to decreased,Stage 3,ChatGPT sees a slight decline in average but still holds the highest position, Google continues its small decline, aligning more closely with the E-textbook, which slightly improves, My memory improves possibly reflecting a better recall.

4.4 Willing to Complete the Task

How do different tools like (Google search engine, ChatGPT, and PDF documents) influence students' Willing to Complete the Task as they move from stages of comprehension and understanding to analyzing, evaluating, and creating?

This study examines how different information and technology tools, including the Google Search Engine, ChatGPT, and PDF documents, influence students' Willing to Complete the Task.We used Mauchly's Test of Sphericity to evaluate the assumption of equal variances in phase Willing to Complete the Task. The test yielded the following results: Mauchly's $W = 0.861$, $\chi^2(2) = 18.35$, and a p-value = 0. This p-value, being less than the standard alpha criterion of 0.05, indicates that the assumption of sphericity for Willing to Complete the Task data has been violated.

Table 4.7 Descriptive Statistics for Willing to Complete the Task

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
WILLING TO DO THE TASK_STAGE 2	My memory	0.94	0.25	31
	E-textbook	0.96	0.192	27
	Google	0.97	0.177	32
	ChatGPT	0.84	0.37	38
	Total	0.92	0.269	128
WILLING TO DO THE TASK_STAGE 3	My memory	0.84	0.374	31
	E-textbook	0.89	0.32	27
	Google	1	0	32
	ChatGPT	0.87	0.343	38
	Total	0.9	0.303	128
WILLING TO DO THE TASK_STAGE 4	My memory	0.65	0.486	31
	E-textbook	0.74	0.447	27
	Google	0.88	0.336	32
	ChatGPT	0.87	0.343	38
	Total	0.79	0.41	128

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.5) shows the varying impacts of different tools on students' Willing to do the Task In Stage 2, my memory reported (M= 0.94) ,e-textbooks showed a slightly higher score at (M=0.96), while those using Google shown

the highest score at (M=0.97). In contrast, ChatGPT users exhibited a lower score with a mean score of (M=0.84) Overall, the average for this stage was (M=0.92) across all tools.

Stage 3, My Memory decreased slightly to (M=0.84). E-textbook users showed an improvement (M=0.89) and Google users reached a peak willingness of (M=1.00),ChatGPT users also improved, recording (M=0.87). The combined average for this stage slightly improved to 0.9.

Stage 4, My Memory reliance continued to decline, with a score of (M=0.65), E-textbook users showed some recovery at (M= 0.74), and Google users maintained high at (M=0.88). ChatGPT users similarly displayed high with a score of (M=0.87). However, the overall average for this stage decreased to 0.79.

Table 4.8 Within-Subjects Effects Analysis for Willing to do The Task

Tests of Within-Subjects Effects							
Measure:	Willing to do The Task						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task	Sphericity Assumed	1.49	2	0.745	11.312	0	0.084
	Greenhouse-Geisser	1.49	1.757	0.848	11.312	0	0.084
	Huynh-Feldt	1.49	1.823	0.817	11.312	0	0.084
	Lower-bound	1.49	1	1.49	11.312	0.001	0.084

Table 4.8 (Continued)

Task * Study Groups	Sphericity Assumed	1.048	6	0.175	2.653	0.016	0.06
	Greenhouse-Geisser	1.048	5.27	0.199	2.653	0.022	0.06
	Huynh-Feldt	1.048	5.469	0.192	2.653	0.02	0.06
	Lower-bound	1.048	3	0.349	2.653	0.052	0.06
Error(Stage)	Sphericity Assumed	16.332	248	0.066			
	Greenhouse-Geisser	16.332	217.813	0.075			
	Huynh-Feldt	16.332	226.041	0.072			
	Lower-bound	16.332	124	0.132			

In our study, we looked at how the Willing to do Task results differed among stages The examination of within-subjects effects (Table 4.8) indicated a significant main effect of stage

With an (F-value =11.312, p-value = 0.000). This suggests that there were significant differences in the perceived to perform the task across the different stages. The partial eta squared value is 0.084, indicating that approximately 8.4% of the variance willing to do the task These results clearly indicate that the stage of the task has a significant impact on willing to do the task results.

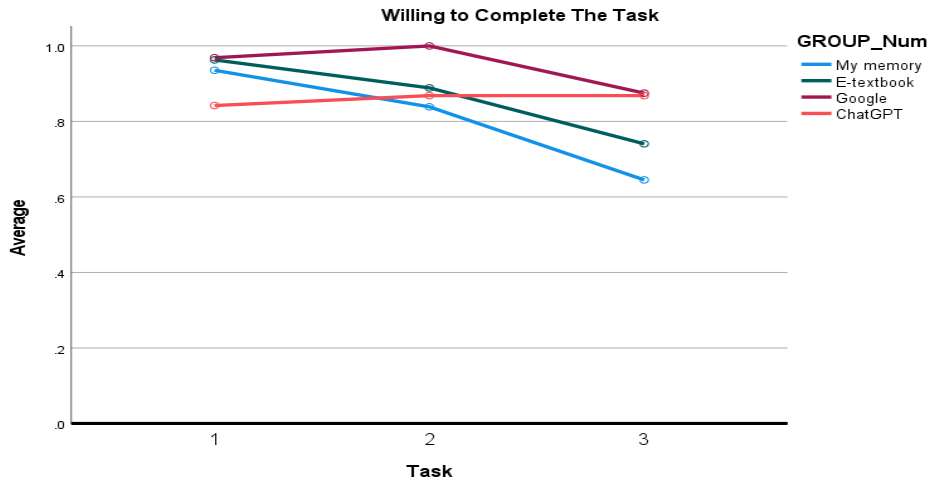

Figure 4.4 Wiling to complete The Task Trends by Group and Task

The graph (Figure 4.3) shows the Average means of Wiling to complete The Task results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT

Stage 1, ChatGPT showing the highest average, indicating a strong initial confidence among users in its effectiveness. Google is closely following ChatGPT,. The E-textbook and My memory start with lower averages

Stage 2, both ChatGPT and Google experience a slight decrease in their average, The E-textbook also sees a slight decrease, my memory group shows a notable decline, the most among all groups.

Stage 3 ChatGPT continues to hold the highest position despite a slight decline in average, Google's average also declines, now aligning more closely with the E-textbook, which shows a slight improvement. My memory group improves, which might reflect better recall.

4.5 Submissions AI Similarity

How do use of different tools such as (Google search engine, ChatGPT, and PDF documents) affect students' Submissions AI Similarity as they progress through stages from understanding and comprehension to analysis, evaluation, and creation?

This research explores the impact of informational and technological resources, including Google Search Engine, ChatGPT, and PDF documents, on students'

Submissions AI Similarity as they undertake tasks aligned with Bloom's Taxonomy, We used Mauchly's Test of Sphericity to assess the assumption of equal variances in phase differences for the submissions AI similarity The results indicated a Mauchly's (W = 0.968) $\chi^2(2) = 3.924$, p-value = 0.141). Because this p-value exceeds the conventional alpha threshold of 0.05, it suggests that the assumption of sphericity has not been violated for the submissions AI similarity data.

Table 4.9 Descriptive Statistics for Submissions AI Similarity about the tool

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
SUBMISSION Al SIMILARITY_STAGE2	My memory	4.68	19.015	31
	E-textbook	6.42	20.14	26
	Google	13.41	31.782	32
	ChatGPT	71.89	32.893	38
	Total	27.35	39.968	127
SUBMISSION_AI_SIMILARITY_STAGE3	My memory	0	0	31
	E-textbook	9.69	27.495	26
	Google	22.69	37.841	32
	ChatGPT	64.92	37.685	38
	Total	27.13	39.986	127
SUBMISSION_AI_SIMILARITY_STAGE4	My memory	0	0	31
	E-textbook	5.73	12.382	26
	Google	3.88	12.788	32
	ChatGPT	26.74	36.74	38
	Total	10.15	24.277	127

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.9) shows the varying impacts of different tools on students' Submissions AI Similarity

Stage 2, memory reported a low mean score (M=4.68). e-textbooks scored slightly higher with a mean of (M=6.42). Google users shown a considerably higher mean score at (M=13.41), while ChatGPT users had the highest mean score among all tools at (M=71.89). The overall average score for this stage was (M=27.35).

Stage 3, My Memory users reported a significant drop, scoring a mean of (M=0). E-textbook users showed an improvement with a mean score of (M=9.69). Google users reached a peak score of (M=22.69). ChatGPT users also exhibited a high score, though slightly lower than Google, with a mean of (M=64.92). The overall average for this stage slightly decreased to (M=27.13).

Stage 4, My Memory reliance led to the lowest scores again with a mean of (M=0). E-textbook users saw some recovery, scoring a mean of (M=5.73). Google users, however, experienced a drop, recording a mean score of (M=3.88). ChatGPT users maintained a relatively higher score with a mean of (M=26.74),The total average score for this stage declined to (M=10.15).

Table 4.10 Within-Subjects Effects Submissions AI Similarity about the tool

Tests of Within-Subjects Effects							
Measure:	Submissions AI Similarity						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared

Table 4.10 (Continued)

Task	Sphericity Assumed	19029.927	2	9514.964	13.639	0	0.1
	Greenhouse-Geisser	19029.927	1.939	9816.097	13.639	0	0.1
	Huynh-Feldt	19029.927	2	9514.964	13.639	0	0.1
	Lower-bound	19029.927	1	19029.927	13.639	0	0.1
Task * Study Groups	Sphericity Assumed	26540.874	6	4423.479	6.341	0	0.134
	Greenhouse-Geisser	26540.874	5.816	4563.475	6.341	0	0.134
	Huynh-Feldt	26540.874	6	4423.479	6.341	0	0.134
	Lower-bound	26540.874	3	8846.958	6.341	0	0.134
Error(Stages)	Sphericity Assumed	171616.071	246	697.626			
	Greenhouse-Geisser	171616.071	238.453	719.705			
	Huynh-Feldt	171616.071	246	697.626			
	Lower-bound	171616.071	123	1395.253			

Our study analysis of how Submissions AI Similarity outcomes varied across different stages. The analysis of within-subject effects (Table 4.10) for the Submissions AI Similarity The (F-value is F=13.639**)**, and the significance (p-value,P=0.000**)** (less than 0.05), suggesting that there are statistically significant differences within the tasks regarding AI similarity.

The partial eta squared value is 0.1, indicating a small to moderate effect size. accounting for about 10% of the variance in Submissions AI similarity scores. These results clearly indicate that the stage of the task has a significant impact on Submissions AI similarity

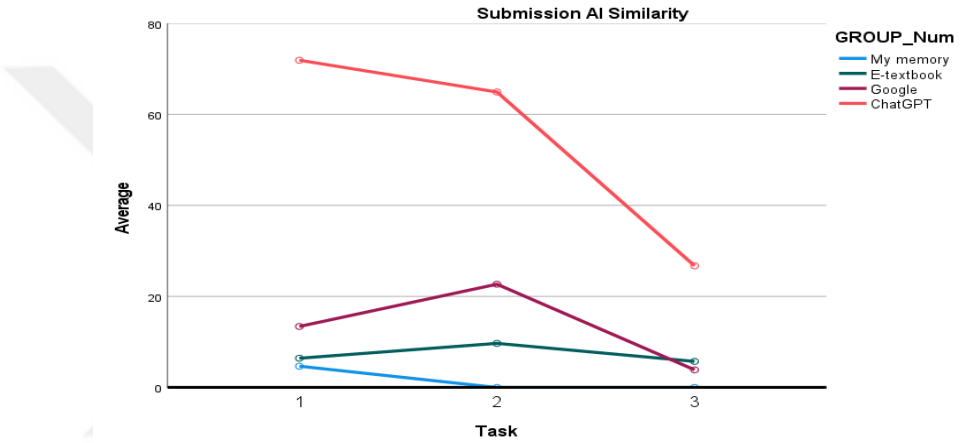

Figure 4.5 Submissions AI Similarity Trends by Group and Task

The graph (Figure 4.5) shows the Average means of Submissions AI Similarity results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT

Stage 1, Initially, ChatGPT leads with the highest average score,. Google also begins with a high score, slightly below ChatGPT,. The E-textbook has a moderate starting average, indicating it is less favored than Google and ChatGPT My Memory scors the lowest average

Stage 2, all tools except My Memory show a slight decrease in their average scores. ChatGPT maintains a lead but with a reduced margin. Google's decline mirrors that of ChatGPT, maintaining its position below ChatGPT but above the E-textbook. The E-textbook also declines slightly, My Memory sees the most significant drop.

Stage 3, ChatGPT still holds the highest position despite another slight decline in its average score, Google's score decreases further, bringing it closer in performance to the E-textbook, which, in contrast, shows a slight improvement, My Memory records an improvement, possibly indicating that users are adapting to using their memory more effectively after the initial challenges.

4.6 Submissions Similarity

How do use of various tools such as (Google search engine, ChatGPT, and PDF documents) affect students' Submissions Similarity as they progress from understanding and comprehension to analyzing, evaluating, and creating?

This study investigates how various informational and technological tools, such as Google Search Engine, ChatGPT, and PDF documents, affect students submissions similarity when engaging with tasks that correspond to different levels of Bloom's Taxonomy. We used Mauchly's Test of Sphericity to assess the assumption of equal variances in phase differences for the submissions similarity. The results showed a Mauchly's (W = 0.964, $\chi^2(2) =$ of 4.542), and a p-value (p=0.103). Because this p-value is greater than the standard alpha threshold of 0.05, it indicates that the assumption of sphericity for the Submissions Similarity has not been violated.

Table 4.11 Descriptive Statistics for Submissions Similarity about the tool

Descriptive Statistics				
Study Groups		Mean	Std. Deviation	N
SUBMISSION SIMILARITY_STAGE2	My memory	31.45	25.642	31
	E-textbook	63.11	27.929	27
	Google	59.44	28.155	32
	ChatGPT	47.08	13.958	38
	Total	49.77	26.66	128

Table 4.11 (Continued)

SUBMISSION SIMILARITY_STAGE3	My memory	33.84	33.354	31
	E-textbook	34.81	28.466	27
	Google	42.56	33.479	32
	ChatGPT	34.53	20.895	38
	Total	36.43	29.021	128
SUBMISSION SIMILARITY_STAGE4	My memory	31.06	30.873	31
	E-textbook	40.59	31.777	27
	Google	54.91	33.715	32
	ChatGPT	20.79	14.592	38
	Total	35.98	30.677	128

The descriptive statistics across three stages from knowing and understanding to analyzing evaluating, creating (Table 4.11) shows the varying impacts of different tools on students' Submissions Similarity.

Stage 2 ,My memory results show the lowest mean score of (M=31.45), e-textbooks significantly improve performance with a mean score (M=63.11), Google users also score high, with a (M=59.44), ChatGPT's mean score (M=47.08) though lower than both e-textbooks and Google.

Stage 3,my memory users show a slight improvement (M=33.84),E-textbooks and ChatGPT yield similar scores (M=34.81 , 34.53, respectively),Google remains a strong aid with a score of (M=42.56).

Table 4.12 Within-Subjects Effects Submissions Similarity about the tool

Tests of Within-Subjects Effects							
Measure:	Submissions Similarity						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Task	Sphericity Assumed	15637.281	2	7818.64	17.635	0	0.125
	Greenhouse-Geisser	15637.281	1.93	8102.084	17.635	0	0.125
	Huynh-Feldt	15637.281	2	7818.64	17.635	0	0.125
	Lower-bound	15637.281	1	15637.281	17.635	0	0.125
Task * Study Groups	Sphericity Assumed	14532.538	6	2422.09	5.463	0	0.117
	Greenhouse-Geisser	14532.538	5.79	2509.896	5.463	0	0.117
	Huynh-Feldt	14532.538	6	2422.09	5.463	0	0.117
	Lower-bound	14532.538	3	4844.179	5.463	0.001	0.117

Table 4.12 (Continued)

Error(Stages)	Sphericity Assumed	109955.478	248	443.369			
	Greenhouse-Geisser	109955.478	239.324	459.442			
	Huynh-Feldt	109955.478	248	443.369			
	Lower-bound	109955.478	124	886.738			

our study analysis of how Submissions Similarity outcomes varied across different stages. The analysis of within-subject effects (Table 4.12) for the Submissions Similarity The results show that there are statistically significant differences within the Submissions AI similarity. The F-value (F=17.635) with a significance (p-value) of(F= 0.000), which is less than 0.05, indicating that these differences are statistically significant. The partial eta squared value is 0.125, accounting for about 12.5% of the variance in Submissions AI similarity scores These results clearly indicate that the stage of the task has a significant impact on Submissions Similarity

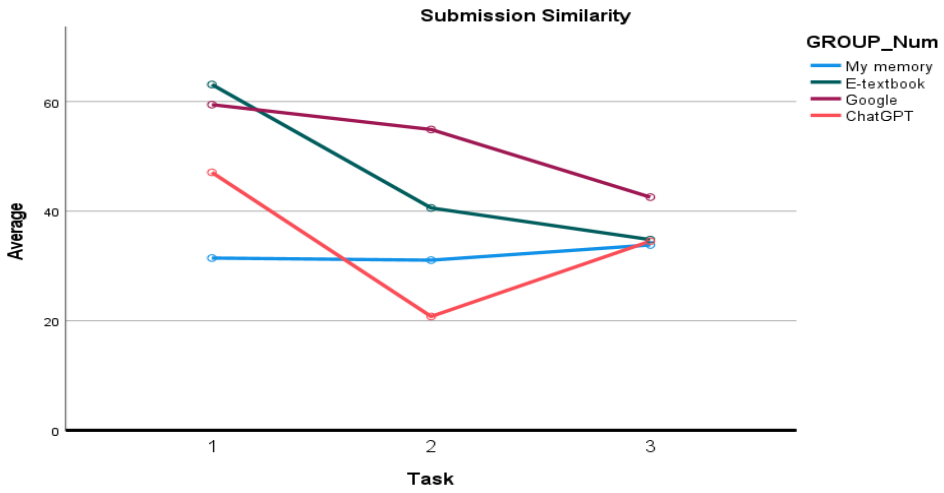

Figure 4.5 Submissions Similarity Trends by Group and Task

The graph (Figure 4.5) shows the Average means of Submissions Similarity results over three phases for various study tools: control group, 'E-textbook,' 'Google,' and 'ChatGPT

Stage 1, ChatGPT emerges as the leading tool with the highest average score. Google follows closely, also starting strong but with a slightly lower score than ChatGPT, The E-textbook holds a moderate average, My Memory, scoring the lowest

Stage 2, there is a general decline in average scores for all tools except My Memory, ChatGPT, although still leading, sees its margin reduced, Google's score decreases similarly, maintaining its rank below ChatGPT but still above the E-textbook, which also shows a slight decline. Interestingly, My Memory experiences the most significant drop.

Stage 3, ChatGPT maintains the highest position despite a further slight decline in its average score,Google's score decreases more significantly, bringing it closer in performance to the E-textbook, which, in contrast, shows a slight improvement,My Memory also records an improvement in this stage.

CHAPTER 5

DISCUSSION AND CONCLUSİON

5.1 Interpretation of Results

This study's findings offer vital insights into the function of AI, notably ChatGPT, in educational contexts. The findings confirm previous research demonstrating that AI tools can dramatically improve learning experiences. For example, the adoption of ChatGPT has been found to increase student motivation and information retrieval efficiency. Wich is also the same with the findings of other researches[11], [12]. These studies have shown AI's transformative ability to make learning more accessible and interactive. However, the findings of this work raises the question several widely held beliefs about AI's limitations in tailored learning through highlighting the different abilites of ChatGPT, this study offer more details about the role for AI tools in education, foucsing on the adaptability and the possiblity to provide a more individualized learning expierence [14]

5.2 Effectiveness of ChatGPT in Enhancing Learning

The study have shown that the most of students have used ChatGPT for a different kind of tasks, such as researching also ChatGPT helped students produce ideas, gain information, and enhance their writing skills. Furhtermore, These findings shows that ChatGPT has the potential to be a useful tool for postgraduate students in their further studies. This work also found that students who used ChatGPT spent much less time on tasks than those who used Google Search. This means that ChatGPT can enhance the learning expiernce by making the search and information gathering more efficient. The use of ChatGPT has shown alot of improvements in work efficiency, allowing users to complete activities in less time.

The use of ChatGPT in the learning processes improves the students' creative problem-solving skills and self-efficacy levels. According to study , student co-creation with ChatGPT led to improved performance in creative problem-solving activities, requiring less mental effort. The study underlines that while ChatGPT improves divergent thinking skills, students should be given clear guidelines on how to use ChatGPT for academic purposes,, and how to use it more effectively, emphasizing the importance of avoiding plagiarism and other ethical concerns when using this tool [29].

5.2.1 Impact on Cognitive Self-Esteem

One of the most notable effects of ChatGPT is on students' cognitive self-esteem. ChatGPT's tailored feedback and coaching have helped students feel more confident in their learning abilities. This is especially significant in educational environments, as students frequently experience self-doubt and lack of confidence. ChatGPT improves students' cognitive self-esteem by providing instant, constructive feedback on their strengths and problems. This finding supports previous research and shows the positive benefits of AI on student self-perception and academic achievements. For example, research has shown that AI-driven feedback mechanisms can increase students' self-esteem and academic achievements [11], [19], [30].

5.2.2 Impact on Willing to do the Tasks

This work have shown that ChatGPT has been greatly increasing the student willingness when it is compared to traditional instructional tools and methods. The interactive part of ChatGPT have increased the long-term engagement with learning materials, which makes it very important for academic success. This preformance have become possible by the tool's capacity to give meaningful and good responses that keep the students interested and motivated. Furthremore, Previous researches has shown that use of AI-based educational tools increased the student engaiment and willingness to do thier tasks which highlighs the tool's possiblity to change learning experiences. In addition, ChatGPT also keeps a high level of interaction and personalization, which helps students stay focused and invested in their studies [1], [7], [21]

5.2.3 Efficiency in Task Findability and Information Retrieval

ChatGPT improves the accessibility and findability of academic content, allowing students to easily identify relevant resources. This efficiency provides a great benefit over traditional search approaches, which can be time-consuming and frustrating. Also ChatGPT can decreas the cognitive load on students by offering brief and relevant answers which allows them to focus on learning and applying the material rather than simply finding it. This finding increases the turst into ChatGPT's effectiveness in improving information retrieval processes, as mentioned in previous studies. For example, AI's ability to shorten the research process and offer fast and accurate replies has been well-documented, underlining its importance in enhancing the educational methods. [13], [14], [22].

5.2.4 Feeling of Knowing About the Task

ChatGPT has a huge impact on students' metacognitive evaluations, specially their feeling of knowing thier tasks. The term "feeling of knowing" relates to a learner's ability to judge their own knowledge and understanding of a subject. ChatGPT delivers continuous, real-time feedback to aid students evaluation of their understanding and confidence in task performance. This instant feedback is important for students to establish accurate self-assessments and make sound judgments about their learning strategies. Studies have shown that AI tools can improve students' skills, resulting in improved self-regulation and academic achievement. ChatGPT helps students become more aware and active in their learnings. Therefore it encourages them to be more effective and autonomous in thier learning experience [1], [11], [19].

5.2.5 AI Similarity and Learning Adaptation

ChatGPT's ability to provide various learning styles and give an individualized learning experiences provides a huge advantage through its preofrmance which improves the learning experience by responding to each student's needs and choices. Also this approach guarantees that each student receives the right amount of challenge and support, making learning more successful. Researches have shown that individualized learning experiences preformed by AI tools can improve student performance and ChatGPT contributes to the educational environment is supportive

through shaping it to each learner's needs. Moreover, This finding is supported by different researches highlighting the benefits of adaptive learning tools in current education [1], [11], [19]. Furhtremore, the personal development and guidance of ChatGPT can serve as virtual mentors, providing advice on personal growth and life skills. Students can seek help with time management, goal setting, stress management, and decision making. AI tools offers knowlage, tools, and practical information to help students to grow and thrive. Another use case of these tools is as homework assistance where students can use ChatGPT as virtual study assisstance to get help with homeworks. While these AI systems can provide explanations, examples, and step-by-step advice on complex concepts in a different majors and subjects it also let students ask questions and receive immediate responses, allowing them to clarify thier miss-understanding and expand their knowlage of the content. In terms of research and information gathering, ChatGPT can help students conduct thier research and gather information for thier assignments and projects. AI tools can also help students gain fast and efficient access to a different kinds of resources by presenting facts, figures, and explanations for thier needs which they can also create topic-specific ideas, references, and recommendations to enhance thier work.

Aditionally , ChatGPT can functions as virtual tutors and mentors, offering students extra support outside of the classroom. AI tools can help students review topics, prepare for tests, and obtain study recommendations which enhances teacher-student interactions and offers ongoing learning support.

Finally, ChatGPT can also help teachers create effective lesson plans and detailed instructional content. Also it can help teachers develop ideas, generate creative writing prompts, and test new teaching methods. Using ChatGPT ablility, educators can gain access to the growth of educational resources and inspiration to improve their teaching materials [29].

5.3 Comparative Analysis with Other Educational Tools

When AI tools are compared to standard educational tools like Google Search and e-textbooks, it has many advantages. Since it offers more immediate and contextually relevant responses, which can improve the learning experience alot. For example, while Google Search forces students to surfe through several links and sources, ChatGPT provides clear, focused responses that save the student time and effort.

However, it is important to recognize ChatGPT's limitations, such as the potential biases in its responses and the necessity for constant human monitoring to assure accuracy and ethical use. Furthermore, these findings foucs on both the strengths and opportunities for improvement for AI tools in education, showing that while AI can greatly boosts the learning expierence, it should be used along with traditional approaches to guarantee a well-rounded educational experience [5], [14], [31] . In conclusion, the discussion of these findings foucses on the transformating power of ChatGPT and other AI tools in educational settings. AI solutions are helping to modernize educational procedures and improve student outcomes by increasing cognitive self-esteem, engagement in learning tasks, and information gathering efficiently. However, it is important to address the ethical and practical problems connected with AI integration in order to ensure that these tools are used successfully and ethically in educational settings [10].

5.4 Implications for Practice

The use of AI tools such as ChatGPT into educational curricula creates several chances to improve teaching and learning outcomes with practical advice for educators including the AI for individualized learning, which allows ChatGPT to give tailored experiences based on individual student needs which makes this strategy meets a variety of learning styles and speeds, ensuring that each student receives the proper level of challenge and support. Furhtermore, using AI-driven tools into lesson planning and assignments, teachers may provide more flexible and effective education [11].

In addition to that, using the AI for formative assessments is very advantageous. ChatGPT may conduct formative evaluations that give students quick feedback which allows them to understand their learning progress and highlight which areas they need to improve. Also, educators can use these findings to adapt their teaching methods and provide targeted techniuqes as needed [11]. Furthermore, artificial intelligence tool can improve student engagement by making learning more dynamic and engaging. ChatGPT's ability to react to student questions in a conversational way can contribute to a more engaging and encouraging learning experinece while Educators are encouraged to implement AI-driven activities that promote active learning and critical thinking [14].

However, the use of AI in education presents policy and ethical concerns that must be addressed to ensure the appropriate and suitable application of these tools.Since one of the key issues is data privacy and security. AI systems requires access to large volumes of data, which raises worries about privacy and security. Therefore, to protect student information, strong data security procedures must be used. Data should be gathered, kept, and used in accordance with privacy laws and ethical laws[12].

Using AI in academic writing and promoting academic honesty. It is vital to prioritize the production of original ideas, critical thinking, and in-depth analysis above depending only on algorithmically generated content in order to maintain the quality and rigor of academic work. We believe that in the future, the qualifying of ChatGPT-generated writing will be called into question as the distinction between plagiarism and automated creation blurs. As a result, it is vital to acknowledge that plagiarism may play a minor part in the future of academic writing, being replaced by the issue of unthinking exploitation of ideas and existing work via algorithmic rewriting. Academic institutions must establish explicit standards and rules for the usage of AI tools like ChatGPT in academic activity. This includes defining what constitutes independent work, using AI-generated information appropriately, citing and acknowledging such content, and providing subject-specific training on how to use these technologies. We clearly favor rule-based integration of AI tools into legal academic training over a ban on such tools, which is inconsistent with universities' mission of preparing students for their future work and, in any case, has no chance of being effectively enforced by lecturers and universities [7].

Addressing prejudice in AI is another important topic while AI models can unintentionally provides biases found in their training data, resulting in unjust outcomes for particular student groups furhter efforts should be made to discover and reduce these biases by continuously monitoring and updating AI algorithms. Educational institutions must guarantee that AI tools are designed and implemented in ways that provide equity and honesty [7]. Policies should be developed to guide the ethical use of AI in education, including explicit standards for appropriate use. Institutions should also invest in technologies that can detect and prevent academic dishonesty [12].

By addressing these practical and ethical concerns, educators may fully realize the potential of AI technologies such as ChatGPT to build more effective, usefulness, and engaging learning environments.

5.5 Limitations of the Study

While this study gives useful insights into the effects of AI tools such as ChatGPT on several elements of education, it is important to know the limitations that may effect the findings and conclusions of these tools. One consideration is the study's scope, which is primarily concerned with certain factors such as cognitive self-esteem, engagement, task accomplishing, task knowledge, and AI similarity. While these are important topics of study, future research could benefit from investigating additional components and varied educational situations in order to expand on the conclusions.

Another consideration is reling on self-reported data. While self-reports provide detailed, personal insights into participants' experiences, they can also introduce subjective biases. However, these insights are important for understanding individual perspectives and experiences using ChatGPT, and precautions should be made to guarantee the data acquired was reliable. Other factors that may influence the results' generalizability include the study's sample size and demographic characteristics. While the sample gives a useful overview of student experiences, additional research that includes a more diverse and representative population may improve the findings' of this work across multiple educational contexts.
Additionally, In terms of study design and technique, the cross-sectional approach provides a useful snapshot in time, capturing immediate affects and views. To gain a more knowledge of long-term work, future study could use a longitudinal design that tracks changes and advancements over time.

Finally, the capabilities of ChatGPT are always evolving and this study evaluates the AI's performance based on its present iteration; as technology improves, new features and upgrades may overcome some of the current constraints. Continuous study is required to stay up with these evolution and understand their consequences for educational practice.

In conclusion, while this study gives valuable insights into the possible benefits and applications of ChatGPT in education, recognizing these factors lays the work for

future research to improve our understanding and deployment of AI in educational settings.

5.6 Recommendations for Future Research

Future research should take several important factors into account in order to expand on the findings of this study and fill existing gaps. First, increasing the scope to cover a wider range of variables and educational situations would provide a more complete picture of ChatGPT's effect. For example, investigating how ChatGPT affects various age groups, subject areas, and educational levels could provide useful information. Furthermore, longitudinal studies would be useful in capturing the long-term consequences and persistent impacts of AI use in education. By tracking changes over time, researchers can gain a greater understanding of how students' cognitive self-esteem, willingness, and learning outcomes.

In addition to that, future research could focus on developing and testing new algorithms to reduce false-positive rates in plagiarism detection, as well as looking into the ethical aspects of using AI for plagiarism detection. Future research should focus on developing more complex AI models able to differentiate between duplicated text and actual use of sources, hence increasing the benefits and fairness of plagiarism detection tools.

Future research should also attempt to improve the diversity and representative of sample populations. The addition of participants from varied demographic origins and educational contexts might improve the generalizability of the results. Another key area for future research is the ongoing evaluation of AI technology as they develop. As ChatGPT and comparable systems are updated and improved, continuous study will be cruisal in determining their enhanced capabilities and addressing any growing ethical concerns. Also, investigating the integration of AI with other educational technology and instructional methodologies may provide a more understanding of its potential. Understanding how ChatGPT interacts with various tools and approaches can assist educators in creating more effective teaching environments [11], [14].

5.7 Conclusion

This study conducts a thorough assessment of the impact of ChatGPT on several aspects of student learning, such as cognitive self-esteem, task fulfuilment, feeling of knowing about the task, willingness to complete the task, and AI similarity. The major findings foucs on the advantages of implementing ChatGPT in educational contexts. ChatGPT boosts students' cognitive self-esteem by providing individualized feedback and encouragement, resulting in more confidence in their learning ability. The application also increases student willingness by offering a dynamic and relevant responses that keep the students engaged in learning tasks. ChatGPT also improves the efficiency of information gathering, making academic research more accessible and time-saving. These findings have significant effect on changing instructional processes and boosting student performance. Future studies can improve the understanding of AI's use in education by resolving constraints and researching new study areas. The study fouces on the important of ongoing research to stay up with technology breakthroughs and guarantee that AI tools are used successfully and ethically in educational settings.

In conclusion, this study makes an important contribution to the field of educational technology by proving the power of AI tools such as ChatGPT. It offers important insights on how these tools might be used in educational settings to improve learning experiences and outcomes. As AI evolves, its role in education is likely to grow, presenting new opportunities and difficulties that must be explored and used carefully.

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