Impact of ChatGPT on Student Learning Outcomes: A Systematic Review

Fajar Aziz, Abdul Bari khan
Institute of Southern Punjab, Multan, Pakistan

Abstract: To design a sustainable education system is a challenge. Enhancing the efficacy and sustainability of blended learning systems is a promising area for artificial intelligence (AI). This study focuses on the integration of Generative Pre-trained Trans-former (ChatGPT) on student learning outcomes with a blended learning system. The objective of the study is to investigate academic performance and enhance the sustainability of the education system. A qualitative research design was used to collect data from 120 students and teachers of BS level Multan. The initial thematic quantitative work has suggested satisfactory progress with ChatGPT, however, no qualitative exploration has been carried out to evaluate the process. For this purpose, in-depth qualitative interviews were conducted with the participants. The data were analyzed by using a thematic analysis approach which shows a combination of positive and negative effects of the program. Furthermore, the findings include an improvement in the ChatGPT skills of students on the one hand while lacking creativity and thinking abilities on the other hand. Despite its drawbacks, ChatGPT is thought to be useful for increasing learning efficiency and productivity by respondents. As a result, using ChatGPT might be seen as an attractive learning tool as long as one uses it critically and makes sure the information it provides.

Keywords: Chatgpt, Higher Education System, Productivity, Student Learning Outcomes

Email: fajarfatimaaziz@gmail.com

1. Introduction:

The field of education has seen significant changes as a result of the advancement of information and communication technology in recent years. Online learning is now more flexible and accessible because of technological advancements. Many educational institutions now primarily use e-learning to give students a more engaging and productive learning environment. Artificial intelligence (AI) is expanding quickly in tandem with technological advancements. Chatbots are one component of AI that has drawn interest from the education sector. They have been utilized to support and help users in a variety of scenarios. Computer software created to have interactions with users is called a chatbot Sandu & Gide, (2019). Generative Pre-trained Trans-former (ChatGpt) is one of the increasingly common types of chatbots. Human language can be understood and processed by Chat GPT, an artificial intelligence model based on natural language. With this paradigm, the chatbot can converse with people naturally and respond in a way that is pertinent and

appropriate for the context. Chat GPT has the potential to enhance student engagement and learning outcomes in technology-based learning in an educational setting. Students can use Chat GPT to interact with the chatbot as they would with a classmate, and receive immediate feedback, assistance, and explanations regarding the course materials Shoufan, (2023). This study is new since it examines the application of Chat GPT in technological learning, compares its effects through experimentation, and investigates the potential applications of chatbots in the classroom. The primary goal of this study is to determine whether using Chat GPT improves student learning outcomes. This research may have useful ramifications for the advancement of education in the digital age. Furthermore, this study demonstrates a dedication to gaining a deeper comprehension of chatbots' function in educational settings, while candidly recognizing its limitations and suggesting avenues for future research Lee et al., (2022). It is anticipated that this study's findings will contribute to a better understanding of the impact of Chat GPT on technology-based learning Nasim et al., (2022). The results have the potential to significantly impact the evolution of education in the digital age and offer educators useful guidance on how to best leverage AI chatbots' ability to enhance student learning outcomes. However, given the limits of this study, more research in the future might examine the use of AI chatbots in a variety of educational settings and topic areas to gain a deeper understanding of their effects.

1.1 Background of the Study

Artificial Intelligence (AI) has expanded rapidly, bringing about new forms and changes in manyaspects of modern life. One of its more recent inventions that has an impact on teaching and studying English is ChatGPT. It came about as a result of the extensive body of AI research that technology-based language instruction has been using for many years.

The early research on integrating technology into EFL and ESL programs concentrated on learning methodologies, motivation, attitudes, and integration. The introduction of ChatGPT, dubbed "a giant auto-complete machine," has opened up new research avenues for the study of technological integration in teaching second and foreign languages, including English Ali et al., (2023a). Some voices claim that AI-language bots are "incapable of generating insights or deep analysis," despite efforts to integrate AI into language programs as a solution to current issues Esra & Sevilen,

(2021). This study shows, a group of 44 authors who contended that "the AI model's output cannot be taken at face value. They recommended that all AI-based outputs be thoroughly examined to avoid mistakes, omissions of important details, or the making of unrelated assertions. One of the more recent AI innovations, ChatGPT, may provide false results if the existing data needs to be updated or completed. Perhaps authors would be able to reconsider before going so far as to name ChatGPT as a co-author if such assertions were made. Before ChatGPT, which emerged from a lengthy history of AI research, technology was employed in language learning and teaching settings for a variety of reasons. A preliminary investigation of the use of technology in English language programs examined language school students' access to real-world communication channels. The use of computers and other contemporary technology by students is very beneficial. The study demonstrated how using technology could increase students' motivation, involvement, and level of engagement in language learning Ali et al., (2023)b.

1.2 Emergence of ChatGPT

Open AI launched ChatGPT, a general-purpose conversation chatbot, on November 30, 2022, with the expectation that it will have a substantial impact on all facets of our society. The potential educational implications of this natural language processing method remain unclear though. An argument from a different study suggests that ChatGPT's potential may have a major impact on educational learning objectives, assessment and evaluation procedures, learning activities, and evaluation procedures. The rapid rise of ChatGPT, which looked at artificial intelligence (AI) in teaching and learning in higher education, demonstrates that how AI is accelerating the pace at which higher education services are made available outside of the classroom. The study covered the potential integration of AI into higher education, as well as the immediate and long-term effects on several fields within higher education Zhai et al., (2021). Similarly, the study looked at whether artificial intelligence could be used to summarize literature review articles. The authors claim that AI has the potential to transform academic publication by relieving human laborers of some of their workload and allowing academics to focus on their research Lockey et al., (2021). They also used ChatGPT to create an academic paper and used plagiarism detection software to make sure that ChatGPT's content was

original. Researchers can use ChatGPT to help them write articles that are accurate, methodical, logical, and enlightening, according to the findings of another study that used ChatGPT. The study suggested rewriting the learning objectives to emphasize creativity and critical thinking above generic skill development and to let students use AI technologies to complete subject-domain tasks. Students can outsource their assessment work with ChatGPT.

It's crucial to move from general to specific and from global to local in these investigations.

1.3 Objectives

1. To investigate the impact of ChatGPT on the academic performance of students and teachers.
2. To investigate the impact of ChatGPT on content improvement of student learning outcomes (SLOs).

1.4 Research Questions

1. What is the impact of ChatGPT on the academic performance of students and teachers?
2. What is the impact of ChatGPT on content improvement of student learning outcomes?

3. Research Method and Technique:

Investigating the effects of ChatGPT on English language learners and then determining whether there are differences in the views of teachers and students is a logical first step. This study situates constructivist paradigm was used to explore the perception of BS level students and teachers of Multan. The researcher converses with the subjects for this aim and gathers information by using logic.

The researcher conducts several contacts with the participants to carry out these conversations, extracting meaning and integrating it to create information. Therefore, in-depth qualitative interviews with the important stakeholders were conducted to investigate the influence of Chat GPT. Data was continuously tracked and evaluated throughout the process to create context for the study participants' responses.

2.1 Hypothesis development

Students who use Chat GPT may benefit in

Figure 1 shows the conceptual framework for the investigation. The study put out the following hypothesis, which regression

analysis will be used to test: a few ways, most notably in terms of their drive to learn, as was discussed in the previous section.

H0: The use of ChatGPT has an impact on the Academic improvement of students. Ho: The use of ChatGPT has an impact on Content improvement for student`s

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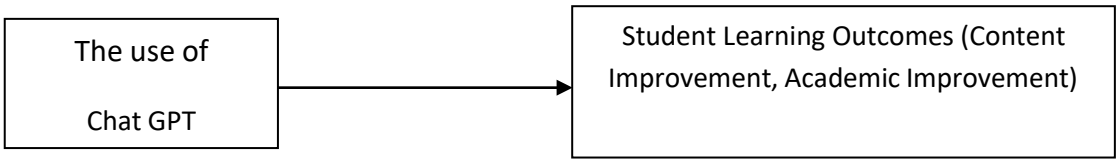

Figure 1: Research Framework

2.2 Data Analysis:

The management and interpretation of data comprised the analysis of data. Transcribing the audio recordings and sorting the handwritten field notes was the first stage Siregar et al., (2023). After that, every transcript was read aloud several times to ensure that the data was well understood before analysis. Data analysis is done using a thematic analysis approach Creswell, (2009).

The data analysis procedure employed in this study is depicted in the image below;

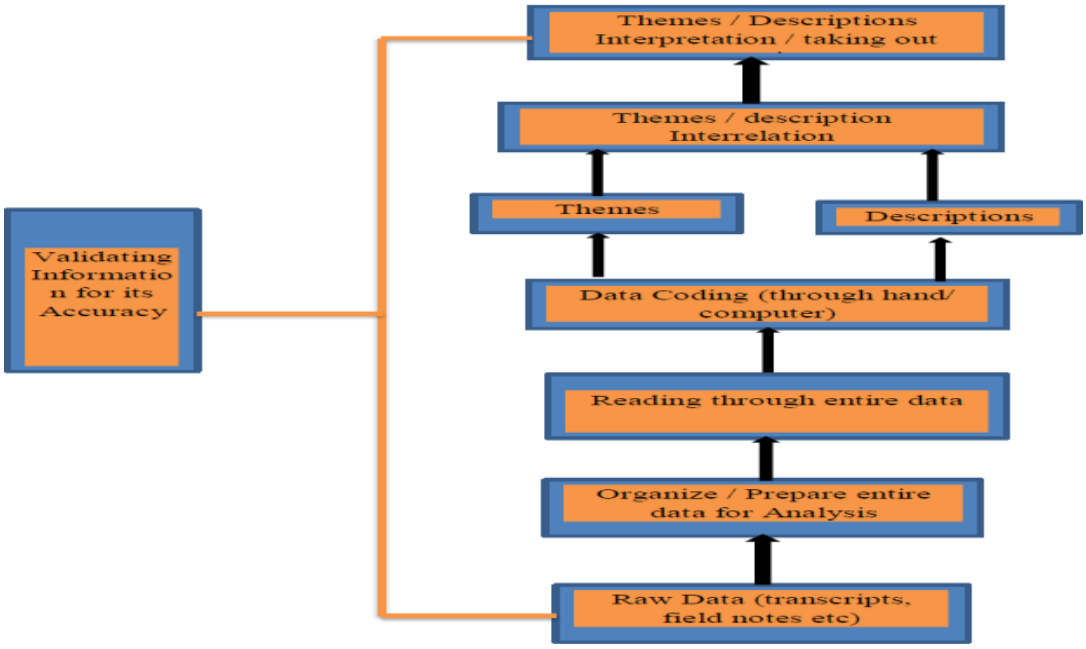

Figure 2. Source (Creswell, 2009)

Population and Sample:

The population of the study is entire students from BS level District Multan. However we selected 120 students as a sample, they were from different higher education sectors including, institutions, universities, colleges, and affiliated campuses. The respondent's demographic are shown in Table 1, 2.

Table 1: A Demographic Table of Academic Improvement

Category	Variable	n(Frequency)
Academic Improvement	male	55(87%)
	female	40(73%)
	teachers	25(90%)

Table 2: A demographic table of Content Improvement

Category	Variable	n(Frequency)
Content Improvement	male	60(82%)
	female	50(72%)
	teachers	10(84s%)

2.3 Findings:

The interview has been analyzed by using thematic analysis. After reviewing each interview, in cases where many participants submitted identical information using different words, the best wordings were chosen, and the codes of each participant who contributed that information were listed in front of the literal text.

The analysis of the interview revealed the following responses from the participants:

1. Relevance
2. Acceptability
3. Challenges
4. Suggestions
5. Improving learning Outcomes
6. Making a sound education base
7. Use of technology for learning

4. Conclusion:

The field of artificial intelligence (AI) has advanced significantly in recent years and is now applied in many different fields. AI has the power to completely change the education industry by enhancing the quality of teaching and learning, personalizing instruction, simplifying administrative tasks, and creating new research opportunities. Artificial intelligence (AI) technologies, such as Chat GPT, and intelligent tutoring systems, can help students with writing assignments, offer comments and revision recommendations, and improve their learning experience. This paper discusses the impact of ChatGPT on student learning outcomes with a moderating effect of about 67%. According to the study, younger students used Chat GPT more frequently than older students

and male students used it more frequently than female students.

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