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DISSERTATION HELP

Investigating the Impact of ChatGPT Feedback on the Quality of Students' Writing Compared to Human Feedback

1. Introduction

1.1 Background

The field of education has been undergoing a transformative shift with the integration of cutting-edge technologies, notably Artificial Intelligence (AI), which has gained substantial traction in recent years. AI applications, particularly in educational settings, have garnered attention for their potential to revolutionise traditional teaching and learning methodologies. Within this technological evolution stands ChatGPT, an advanced language model leveraging AI to generate text that resembles human writing (Imran & Almusharraf, 2023). The incorporation of ChatGPT holds significant promise, especially in assessing and enhancing students' writing skills. Traditional methods of providing feedback on students' writing have relied heavily on human assessment by instructors or peers. However, this approach is often resource-intensive, time-consuming, and prone to subjectivity influenced by individual biases. In contrast, ChatGPT introduces an automated feedback mechanism, potentially offering a more efficient and consistent approach to evaluating and improving students' writing quality. Given the increasing reliance on technology in education and the inherent challenges associated with human-centric feedback systems, examining the impact of ChatGPT feedback compared to traditional human feedback emerges as a critical area of inquiry (Shaikh *et al.*, 2023). This study aims to investigate the effectiveness of ChatGPT in providing feedback on students' writing, seeking to uncover its potential as an alternative or complement to traditional feedback methods in educational settings.

1.2 Rationale

The selection of this topic stems from the evolving landscape within the educational sphere, particularly the ongoing transformation influenced by technological advancements. In my professional experience and observation within educational settings, there's a pressing need for more efficient and personalised feedback mechanisms for students' writing. As Artificial Intelligence (AI) integration increasingly reshapes pedagogical approaches, there's a growing interest in exploring how these technologies, particularly ChatGPT, can revolutionise feedback processes. AI's potential to redefine traditional learning methods has become increasingly evident, prompting significant interest in its application within education. Among AI innovations, ChatGPT stands out due to its remarkable ability to simulate human writing convincingly (Dai *et*

al., 2023). Recognising the challenges posed by conventional feedback systems—such as resource-intensive and subjective assessment methods—I see an opportunity to leverage ChatGPT's capabilities to streamline and enhance the feedback process. This research topic has been chosen based on the immediate need observed within educational institutions for more effective, timely, and personalised feedback mechanisms. ChatGPT's potential to provide prompt, comprehensive, and tailored feedback holds promise in addressing these needs, potentially revolutionising writing instruction and improving the quality of feedback students receive (Su *et al.*, 2023).

1.3 Statement of the Problem

The issue at hand revolves around the predominant reliance on human assessment for evaluating students' writing, a method known for its resource-intensive nature, time constraints, and susceptibility to individual biases. This reliance poses a significant challenge within educational contexts, leading to a deficiency in providing consistent and timely feedback to a diverse cohort of students. The inherent limitations of traditional human feedback methods underscore the urgency to explore alternative approaches to enhance students' writing skills more efficiently and effectively (Dai *et al.*, 2023). Personalised and timely feedback methods are becoming more important in education, highlighting the significance of this topic. There is a severe lack of research about effective feedback systems, which is becoming more apparent as educational institutions aim to create learning environments that are more inclusive and impactful. A new automatic assessment method called ChatGPT might solve these issues. Yet, despite its potential advantages, the specific efficacy and comparative impact of ChatGPT feedback against traditional human feedback methods remain relatively unexplored within the academic domain. This gap in evidence highlights the pressing need to investigate and ascertain the viability of AI-driven feedback systems like ChatGPT in addressing the deficiencies inherent in conventional feedback mechanisms (Imran & Almusharraf, 2023).

1.4 Research Purpose and Research Questions

The primary objective of this study is to conduct a comprehensive comparative analysis between ChatGPT feedback and traditional human feedback concerning students' writing. This investigation aims to assess the impact of ChatGPT on student writing performance in contrast to conventional feedback methods. Additionally, the research examines students' perceptions

regarding the effectiveness of ChatGPT feedback, thereby providing insights into its reception and utility within educational contexts. This study focuses on two pivotal research questions:

RQ1: How does the impact of ChatGPT feedback on student writing performance compare to the traditional way of feedback?

RQ2: How do students perceive the effectiveness of ChatGPT feedback compared to traditional feedback?

1.6 Significance of the Study

The significance of this research endeavour extends beyond its immediate scope, bearing profound implications for the evolving landscape of educational practices infused with technological advancements. At its core, this investigation aims to contribute substantively to the ongoing dialogue surrounding the seamless integration of Artificial Intelligence (AI) into educational frameworks, particularly within writing instruction. The exploration into the efficacy of AI-driven feedback systems, exemplified by ChatGPT, vis-a-vis conventional human feedback methods, holds the promise of catalysing a paradigm shift in pedagogical methodologies. By comprehensively understanding and evaluating the impact of ChatGPT on students' writing quality compared to traditional feedback mechanisms, this research has the potential to unlock transformative changes in educational approaches (Shaikh *et al.*, 2023). Should ChatGPT emerge as a viable and effective alternative or complement to conventional feedback practices, it could herald a new era of educational efficiency. The implications are vast, offering the prospect of delivering timely, consistent, and personalised feedback to a significantly larger cohort of students. This potential revolution in feedback mechanisms aligns with the urgent need to accommodate diverse learning styles and individualised learning paths, thus addressing the challenges posed by traditional, resource-intensive, and sometimes subjective human feedback methods. Ultimately, the study's significance lies in its capacity to pave the way for innovative instructional strategies, fostering a more inclusive, efficient, and impactful educational environment. Embracing AI-powered feedback systems like ChatGPT could mark a pivotal step forward in optimising the quality and accessibility of education for a broader spectrum of learners (Hojeij & Ayber, 2022).

2. Literature Review

2.1 The Role of Feedback in Learning

Feedback in learning plays a pivotal role in shaping and enhancing students' academic writing skills (Hojeij & Ayber, 2022). It is acknowledged that effective feedback is instrumental in fostering student engagement and improvement in writing proficiency (Leenknecht et al., 2019). Particularly in the context of English as a Foreign Language (EFL) learners, feedback holds a significant place due to the inherent challenges they face in connecting writing skills with language competencies (Vossoughi *et al.*, 2021). EFL students often struggle with academic writing, encountering difficulties organising and coherently presenting ideas in English. Studies emphasise the importance of providing timely and personalised feedback that caters to individual learner needs and encourages self-monitoring during writing. However, delivering feedback, especially in EFL settings, can be demanding and time-consuming for teachers. Therefore, integrating educational technologies into the feedback process is increasingly recognised as beneficial, enabling instantaneous feedback delivery while enhancing student engagement and learning.

Research in this domain, particularly within an Arabic EFL context, is limited. The effectiveness of digital feedback tools has gained attention as they offer opportunities for personalised and self-paced learning experiences. These tools, such as digital screen-recorded feedback used in ubiquitous learning, create active and positive learning environments that promote learner autonomy. Moreover, incorporating digital feedback mechanisms aims to place students at the centre of the learning process, enhancing their responsibility in revising and editing their academic writing (Hojeij & Ayber, 2022). Additionally, studies have highlighted the need to understand students' feedback-seeking behaviour and its relationship with their learning approaches and goals. Students' active engagement with feedback, influenced by their learning orientation, indicates variations in seeking monitoring and inquiry strategies, with a preference for monitoring. The association between feedback-seeking behaviour, goal orientation, and deep learning approaches underscores the complex interplay between students' learning goals and feedback engagement (Leenknecht *et al.*, 2019). Understanding the multifaceted role of feedback in learning, especially in the context of technological interventions like ChatGPT feedback compared to human feedback, is essential for discerning the potential impact on students' writing quality and learning experiences.

2.2 ChatGPT and Its Potential for Education

Many people, especially at the university level, have been curious about ChatGPT since it came out (Imran & Almusharraf, 2023). There has been a lot of talk and research around ChatGPT's writing assistant function, emphasising how it may help with language writing and learning classes (Shaikh *et al.*, 2023). Comprehensively evaluating ChatGPT's usefulness for academic English language acquisition, Shaikh *et al.* (2023) emphasised its success in activities such as dialogue, writing, rules of grammar, and vocabulary. The study's varied participant pool and wide range of English proficiency levels highlight ChatGPT's ability to support learners in all areas of their learning journey. Further, by reviewing many relevant publications, reviews, and opinion essays, Imran and Almusharraf's (2023) systematic literature review investigated ChatGPT's function as an academic writing assistance. They brought attention to various viewpoints and situations related to the usage of ChatGPT in the classroom and its possible advantages and disadvantages. The research emphasised the need for rethinking assessment techniques and educational practices to maintain academic honesty. It stressed understanding how ChatGPT may benefit students and educators (Imran and Almusharraf, 2023).

Collective efforts to include ChatGPT in the instruction of English as a foreign language and argumentative writing showed its potential as a supplementary tool (Su *et al.*, 2023). The benefits of ChatGPT for tasks such as creating an outline before writing, editing material, proofreading, and evaluating post-writing were emphasised by Su *et al.* (2023), who advocated for its inclusion in argumentative writing courses. Similarly, Baskara (2023) investigated the pros and cons of using ChatGPT in English as a foreign language writing class, highlighting the tool's ability to enhance language learning, captivate students, and foster better writing habits. The research generally agrees that ChatGPT might have educational uses, praising its ability to generate text that sounds human, ease learning tasks, and provide individualised help. All these studies highlight the need to continue to investigate the role of technological innovation in schools, the difficulties of using it, and any ethical concerns that may arise.

2.3 Prior Research on ChatGPT Feedback in Writing Instruction

An important step forward in using automatic feedback systems (AFS) in the classroom is shown by previous studies on using ChatGPT in giving comments on writing assignments. To improve students' learning experience, this section presents crucial research on the effectiveness, limits, and possible developments of ChatGPT in delivering feedback. Research on ChatGPT's ability to evaluate and comment on students' writing has been extensive, with many studies

concentrating on its capacity to measure essay quality, coherence, and overall effectiveness. Yoon *et al.* (2023) examined the effectiveness of ChatGPT in providing ELLs with comments on the cohesiveness and coherence of their writings. Based on their research, ChatGPT struggles to provide useful comments to English Language Learners (ELLs) on their coherence and cohesiveness as it lacks training in this area. In addition, academics have been motivated to investigate the possibility of using pre-trained language models, such as ChatGPT, to provide students with comprehensive and well-organised feedback due to their recent improvements.

Occasionally surpassing human instructors in offering thorough feedback, Dai *et al.* (2023) showed that ChatGPT may provide extensive, fluid, and cohesive feedback summarising students' performance effectively. They showed that ChatGPT might agree with teachers about students' work, which is encouraging for the dependability of its content evaluations. According to the experts, ChatGPT may also help students improve their learning abilities by providing feedback as they work on projects. Students may get insight into their learning processes and develop more effective learning methods via this feature of ChatGPT's feedback supply. Collectively, prior research underscores the potential of ChatGPT in offering feedback to students, highlighting its capability to provide comprehensive, detailed, and sometimes superior feedback compared to human instructors. However, it also acknowledges limitations, especially in providing specific, concrete suggestions, indicating a need for further advancements and refinements in ChatGPT's feedback generation mechanisms (Dai *et al.*, 2023). These investigations shape the discourse surrounding ChatGPT's role in providing feedback for writing instruction, contributing significantly to the exploration of automated feedback systems in educational contexts.

2.4 Conceptual Framework

The study's conceptual framework intertwines several key theories to comprehensively explore Research Questions 1 (RQ1) and 2 (RQ2). The study aims to delve into the impact of ChatGPT feedback on student writing performance compared to traditional feedback methods and understand students' perceptions of its effectiveness. Self-efficacy, a cornerstone of Bandura's theory, posits that individuals' beliefs in their capabilities significantly influence their actions, perseverance, and performance outcomes. In this study, self-efficacy will be pivotal in examining how students' confidence in utilising ChatGPT feedback affects their writing performance (Zhang, 2021). The study will gauge whether ChatGPT's feedback, perceived as

useful and reliable, bolsters students' confidence in their writing abilities compared to traditional feedback, thus impacting their performance positively (RQ1).

The theory of constructivism emphasises learners' active involvement in constructing knowledge and understanding. By utilising ChatGPT feedback, which provides detailed insights and corrective suggestions, this study aims to explore how students engage with this feedback to construct their knowledge and enhance their writing skills (Kumari, 2022). It will investigate how students actively use ChatGPT's feedback to refine their writing, build upon their existing knowledge, and integrate new information, influencing their writing performance compared to traditional feedback (RQ1). Social learning theory emphasises the significance of observational learning and the influence of the social environment on learning outcomes. In the context of this study, examining students' perceptions of ChatGPT feedback compared to human feedback (RQ2) aligns with the social learning theory. It explores how students observe, assess, and potentially adopt or resist ChatGPT feedback based on their perceptions, experiences, and interactions. Moreover, it assesses how peer influence or social factors affect the adoption and acceptance of ChatGPT feedback in the writing process (Marques Andres *et al.*, 2021). By integrating these theories, the study seeks to holistically understand the intricate dynamics between ChatGPT feedback, students' beliefs in their capabilities, active engagement with feedback, and the influence of social interactions, contributing to a comprehensive analysis of the research questions.

3. Methodology

3.1 Research Design

The study adopts a mixed-methods approach encompassing quantitative and qualitative techniques to explore the influence of ChatGPT feedback vis-à-vis human feedback on students' writing quality. This methodological choice stems from the need to capture diverse aspects of feedback impact comprehensively. Quantitative measures enable precise evaluation of writing metrics, while qualitative insights delve into students' perceptions and experiences with feedback. To get the whole picture, we used a mixed-methods strategy to measure the subjective value of feedback and the objective progress in writing abilities. According to Mackey and Bryfonski (2018), this research approach captures the complex nature of evaluation in improving students' writing talents via a nuanced study.

3.2 Participants

A wide variety of pupils with different educational experiences and writing abilities will participate in the research. Incorporating a range of academic fields and degrees of writing competency into a representative sample requires a systematic selection procedure. This approach seeks to include a wide range of viewpoints and experiences to improve the study's results by considering the varying reactions and possible effects of ChatGPT input compared to human feedback from various student groups (Capili, 2021).

3.3 Data Collection Instruments

We will evaluate improving writing performance, grammar, and abilities using a pre-and post-test writing evaluation. This will help us answer RQ1. The tests will be structured to measure general writing ability and features influenced by comments, such as cohesiveness, clarity, and correctness of grammar and syntax. To directly evaluate how different parts of writing affected by feedback have changed, it is necessary to administer both a pre-and post-test writing assessment. According to Parra and Calero (2019), these evaluations analyse the effect of various feedback techniques on students' writing abilities over time by focusing on critical writing attributes such as coherence, cohesion, grammatical correctness, and general competency.

The second research question (RQ2) will utilise questionnaires given to students to determine how they feel about the utility and efficacy of ChatGPT-generated feedback compared to more conventional human input. These surveys aim to learn about students' thoughts, feelings, and preferences regarding various forms of feedback. Student surveys are crucial as they capture subjective perspectives, opinions, and experiences related to the effectiveness and practicality of different feedback approaches. This qualitative data collection method will illuminate students' preferences, providing valuable insights into their acceptance, satisfaction, and overall views regarding the usability and impact of ChatGPT-generated feedback versus traditional human feedback in writing instruction (Dalati & Marx Gómez, 2018).

3.4 Data Collection Procedures

The data collection procedures will involve multiple stages. Initially, a baseline assessment of students' writing proficiency will be conducted through pre-test evaluations. Following this, students will be assigned writing tasks and provided feedback through ChatGPT or traditional human feedback methods. For the experimental group, ChatGPT-generated feedback will be administered to students on their writing tasks, while the control group will

receive feedback from human instructors through established traditional methods. The students' responses and revisions based on the feedback will be collected for analysis. Upon completing the writing tasks, a post-test assessment will be conducted to measure the changes in students' writing performance based on the feedback received. Additionally, qualitative data will be collected through surveys administered to students to gather their perceptions and experiences related to the effectiveness and usefulness of ChatGPT-generated feedback in contrast to traditional human feedback (Alam, 2020).

3.5 Data Analysis Plan

The analysis will compare the impact of ChatGPT and human feedback on students' writing performance, focusing on changes in writing quality, grammar, and writing skills. Quantitative data from pre-test and post-test assessments will be analysed using statistical methods to identify significant differences between the two feedback methods. Furthermore, qualitative data from student surveys will be thematically analysed to explore students' perceptions, preferences, and experiences regarding ChatGPT and traditional human feedback. The analysis will identify common themes, patterns, and preferences in students' feedback-related experiences (Peck *et al.*, 2020).



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