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Exploring the Effectiveness of AI-Driven Feedback in Enhancing Second Language Learners' Subject-Verb Agreement Skills: A Comparative Study of Meta AI-driven and Human Feedback

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Original Article

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Keywords

Meta AI-driven Feedback versus Human Feedback, Subject-verb Agreement, Second Language Learners, The Role of Feedback, Form-Focused Instruction (FFI), Educational Technology, Language Pedagogy

Abstract

This study investigates the effectiveness of Meta AI-driven feedback in improving subject-verb agreement skills, one of the several areas of difficulty for many English language learners. Being a crucial aspect of second language writing skills, English language educators explicitly work on subject-verb agreement to develop language learners' grammatical accuracy. Despite direct instruction and practice, English language learners in Pakistan continue to struggle with this aspect of grammar. Using form-focused instruction (Ellis, 2008) and the role of feedback in language learning (Hattie & Timperley, 2007) as a triangulated framework, this research aims to compare the effectiveness of Meta AI-driven feedback with human feedback, exploring learners' improvement regarding subject-verb agreement. Moreover, this paper examines learners' perceptions of Meta AI-driven feedback. To achieve its objectives, this study collected data from 50 learners who were divided into two groups: experimental and control. The data collection instruments included writing samples, pre-and post-tests, and a student questionnaire. A pre-test was conducted on both groups whose results did not differ considerably. However, after the feedback intervention, a post-test was conducted to assess the difference between the effectiveness of Meta AI-driven feedback and human feedback in enhancing learners' subject-verb agreement skills. The results of the experimental group in the post-test showed an average improvement; however, the control group achieved an increase in writing accuracy. This study advocates for a pedagogical approach that integrates AI-driven efficiency while upholding the indispensable role of human mentorship. These findings have significant implications for language pedagogy, suggesting that AI tools can complement traditional teaching methods to optimize learners' language proficiency.

1. Introduction

Grammar, one of the sub-skills, is crucial in second language teaching and learning, and its acquisition presents significant challenges for second language learners while they learn the language. Aguion et al. (2021) suggest that acquiring grammar involves the subconscious assimilation of grammatical knowledge, which is subsequently internalized and applied in communication. Learners perceive the multifaceted and intricate process of mastering grammar rules as both tedious and difficult. Various aspects of grammar hinder learners' proficiency, including irregular verb conjugations, complex sentence structures, nuanced distinctions between similar grammatical forms, and exceptions to rules that defy logical patterns. These challenges make it harder for learners to internalise some grammar points effectively. Subject-verb agreement, along with other aspects of grammar, is one of the many areas that offers learners serious problems, which can negatively influence learners' abilities to speak and write. Teachers often use explicit instruction, targeted practice, interactive exercises, and real-life language applications to help learners acquire these rules in a second language context. These methods engage learners and promote gradual mastery, but they may not be effective if learners do not receive detailed corrective feedback.

1.1 Background of the Study

The inspiration for conducting this research is rooted in the researchers' teaching experience as English language instructors for more than a decade. Our first-hand experience working with English language students of various levels at different schools, colleges, and universities made us aware of the fact that students experience difficulties regarding collocational errors, incorrect word forms, spelling errors, and subject-verb agreement errors (Stapa and Izahar, 2010). These mistakes can impede effective communication and undermine the learners' ability to express themselves clearly and accurately. Some of our university colleagues have also highlighted this situation at various departmental and academic meetings: Learners often make multiple subject-verb agreement mistakes that impede their writing and communication.

Second language learning is a complex process that involves the acquisition of various skills, including writing. Writing is a crucial language skill that enables students to communicate effectively. In an academic setting, learners are required to sit for examinations and demonstrate their linguistic competence through writing following its conventions. (Hogue, 1996:2). However, some learners often struggle with their writing skills, as it demands high grammatical accuracy, sentence structure, as well as the mechanics of writing. This study investigates the importance of human and Meta AI-driven feedback to help learners speak and write more effectively. To facilitate learners to speak and write better, teachers provide learners with detailed feedback on their quizzes and written assignments.

1.2 Statement of the Problem

Despite learning English at schools and colleges in Pakistan, second-language learners continue to make mistakes regarding subject-verb agreement. Language teachers provide learners with feedback on their written assignments and other grammar quizzes; however, the problem persists because the feedback teachers provide learners with is either delayed, undetailed, uncustomized, or beyond teachers' capacity. This study aims to investigate the role and effectiveness of AI-driven feedback on learners' subject-verb agreement skills in conjunction with human feedback, as this area is significant and demands special attention and innovative solutions.

1.3 Research Objectives

1. To evaluate how well Meta AI-driven feedback and human feedback can improve the subject-verb agreement skills of second-language learners
2. To investigate the impact of automated feedback on learners' subject-verb agreement skills
3. To explore learners' perceptions of Meta AI-driven feedback and its effectiveness in improving subject-verb agreement skills

1.4 Research Questions:

1. To what extent is Meta AI-driven feedback-driven feedback more effective than human feedback in improving second-language learners' subject-verb agreement skills?
2. What is the effect of automated feedback on learners' subject-verb agreement skills?
3. How do learners perceive Meta AI-driven feedback, and do they find it effective in improving their subject-verb agreement skills?

1.5 Significance

This study is significant for various stakeholders. For learners, it aims to improve subject-verb agreement skills and enhance their overall writing abilities, providing them with skills for more accurate and effective communication. In addition, teachers will benefit from the findings by gaining insights into effective feedback strategies and tools, enabling them to better support learners' writing and grammar skills development. Moreover, the findings of the study will help material developers and textbook writers to draw valuable insights from the study, which can guide them in developing instructional materials that will give coverage to subject-verb agreement rules and will devise tasks and activities on them to help learners improve their subject-verb agreement skills and, hence their writing.

1.6 Delimitation of the Study

This study is delimited in the following aspects: Firstly, the sample of the study is delimited to participants from the National University of Islamabad, Pakistan. Secondly, it is delimited to subject-verb agreement; it does not encompass other kinds of mistakes that second language learners make. Thirdly, it is delimited to the use of Meta AI-driven feedback; it does not use other AI tools such as Grammarly, Chat GPT, Deepseek, and perplexity, etc. Finally, it is theoretically delimited: this research paper employs the form-focused instruction by Ellis (2008) and Hattia & Timperley (2007).

2. Literature Review

Feedback constitutes a vital component in second language learning, particularly in the development of writing skills and the enhancement of grammatical accuracy. The significance of feedback for learners is multifold: it motivates them as well as guides their progress. It also supports improved performance. Hyland and Hyland (2006) argue that effective feedback should be specific, constructive, interactive, manageable, and consistent. The aspects of feedback not only facilitate language development but also help educators monitor their learners' progress with greater confidence.

With the growing integration of technology in education, the role of feedback has become even more significant. With the advent of artificial intelligence (AI), a new dimension about the delivery of feedback in some cases, like grammar correction as well as writing support, has been introduced. Turing (1950) envisioned AI as a means to address human limitations, proposing it as a potential solution where traditional methods may fall short. Therefore, its integration must be carefully

managed to avoid reducing feedback to surface-level corrections, particularly in complex grammatical areas.

Several studies have established the utility of AI-powered feedback in learning a second language. For example, according to Shi & Aryadoust (2024) and Wei (2023), AI feedback is adaptive and personalized, able to meet the needs of learners and increase learning outcomes. Moreover, Escalante et al. (2023) and Woo and Choi (2021) also state that AI feedback can deliver instant and customized feedback to a learner, leading to being more effective. However, in AI feedback, contextual understanding is still a big limitation. Concerning this, Hattie and Timperley (2007) point out the inability of AI to support the deeper cognitive processes for meaningful learning. This is mentioned in Chen et al. (2023) and Wilson et al. (2021), who recommend that the consequent improvement in AI systems should not only be able to provide an immediate correction but also to explain a deeper understanding within the correct context.

The influence of AI on writing instruction has been widely acknowledged, with numerous studies highlighting its positive effects on writing proficiency and grammatical accuracy. For instance, in Wein et al. (2023), Zheng et al. (2023), it is found that AI generates related feedback to improve the learners' writings. In line with Song and Song (2023), AI tools are essential in developing learners' proficiency, for they provide the learners instant support that traditional human feedback may not always provide. Also, Fleckenstein, Liebenow, and Meyer (2023) stress that learners need timely and individualized feedback to develop their writing skills. Despite these advantages of AI-driven feedback, it lacks the potential to provide in-depth explanations in particular contexts, which may hamper learners' cognitive development. (Chen et al., 2020; Zhu et al., 2020). However, human feedback is still critical to support deeper learning through providing tailored guidance and fostering trust (Zhu, Liu, & Lee, 2020; Wambsganss et al., 2021). Interestingly, these findings suggest that neither can completely replace the other when combined with AI.

Subject-verb agreement appears to be one of the most persistent grammatical problems in second language learning. Mas'ud (1996) and Eastwood (1994) argue that many learners experience difficulties in identifying subject and verb agreement in both speech and writing. According to Norhalimah (2016) and Suryo and Yustisia (2017) have reported that learners have difficulty distinguishing between singular and plural subjects. According to Huang (2006), subject-verb agreement makes up more than half of the Taiwanese English majors' errors, and thus it is of great significance in the instruction of learning Chinese as a second language. This issue is acknowledged as a persistent problem for ESL learners by Bhatia (1974) and Maziani (1984), and they have further indicated a need to develop instructional strategies and feedback that are aimed at correcting these types of recurring errors. Errors in subject-verb agreement are widely considered a natural part of the language learning process (Harmer, 2007; Ellis, 1997). Recognizing and addressing these errors is essential for improving grammatical precision and overall language competence. Stapa and Izahar (2010) argue that mastering subject-verb agreement is crucial for effective communication, while Ellis (1997) emphasizes that correcting such errors is central to language development. Recent research has increasingly focused on comparing AI-driven feedback and human feedback in correcting subject-verb agreement errors. The present study aims to contribute to this ongoing inquiry by evaluating how AI feedback can support traditional methods in helping learners improve their grammatical accuracy.

Both written and oral feedback are fundamental to language learning, particularly in the context of error correction. Surina and Kamaruzaman observe that learners often prefer direct feedback in both formats, especially when correct forms are explicitly provided. This finding is supported by Chandler

(2003), who notes that students benefit more from direct corrections than from being left to identify errors independently. While techniques such as error coding or underlining mistakes can promote self-correction and learner autonomy, many students favor more straightforward guidance that reduces ambiguity. Chandler (2003) further contends that direct feedback enhances clarity and comprehension, which are vital for language acquisition.

Keeping the significance of feedback in second language learning in mind, Hattie and Timperley (2007) presented a comprehensive model of feedback that emphasizes its role in bridging the gap between current performance and learning goals. Feedback, according to their framework, is instrumental in enhancing effort, engagement, and motivation, all of which contribute to reducing learning discrepancies. Their model supports the idea that feedback systems—whether AI-based or human-delivered—should be designed to promote continual progress and deeper understanding.

In conclusion, the literature reviewed highlights both the strengths and limitations of AI-driven feedback in language learning. While AI offers speed, consistency, and personalization, it falls short in delivering the contextual richness and explanatory depth provided by human feedback. This shortfall presents opportunities for further research, particularly into how AI can complement human input in addressing persistent grammatical challenges like subject-verb agreement. The current study seeks to explore this dynamic and evaluate the combined effectiveness of AI and human feedback in improving the grammatical accuracy of second-language learners.

3. Theoretical Framework

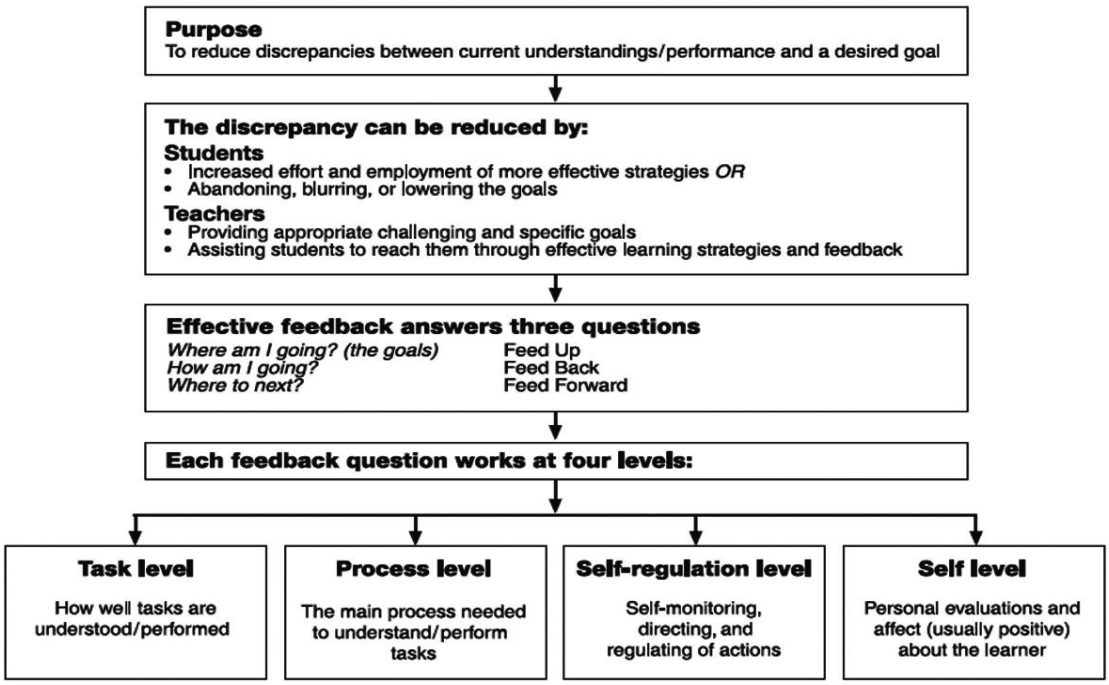
The research employs two theoretical frameworks: Form-Focused Instruction (FFI) (Ellis, 2008) and the role of feedback in learning (Hattie & Timperley, 2007). This triangulated theoretical framework enhances this investigation on the role of Meta AI-driven feedback and human feedback in improving learners' accuracy in subject-verb agreement.

Form-Focused Instruction (Ellis, 2008)

Ellis (2008) argues that FFI strategically positions grammatical focus and accuracy in communicative language activities. It emphasizes structured grammar teaching, with the contextual consideration better helping the learners internalize the language structures. Ellis differentiates between explicit FFI (explanations about direct grammar) from implicit FFI (incidental exposure through communication in meaningful interaction) (Ellis, 1991). In this study, Meta AI-driven feedback reflects explicit FFI that provides immediate corrections to promote grammatical accuracy. However, the human feedback may combine explicit and implicit methods, depending on instructor style, blending direct instruction with contextualized learning opportunities.

Hattie & Timperley's (2007) Feedback Model

Hattie and Timperley (2007) treat feedback as a tool for growth supported by three questions: Where am I going? (goals), how am I doing (performance), and what comes next? (future steps). They assert that effective feedback should be timely, specific, and actionable to close the learning gaps. This study contrasts between AI feedback-which is instant and uniform, and human feedback, which can be adaptive and contextually relevant. By applying this hybrid framework, this study investigates to what extent new AI corrections can either supersede or supplement the adaptive or contextually relevant human feedback in developing grammatical accuracy in language learners.



A model of feedback to enhance learning by Hattie & Timperley, 2007

Methodology

This mixed methods study explores the effectiveness of human versus Meta AI-driven feedback human feedback on improving learners' subject-verb agreement skills based on Ellis' (2008) Form Focused Instruction and Hattie and Timperley's (2007) feedback model. In assessing performance outcomes and perceptions of the learners, this methodology used both quantitative and qualitative approaches.

Participants

The study involved 50 first-semester undergraduate English students from the National University of Modern Languages, Islamabad. Participants were assigned to two groups: an experimental group receiving Meta AI-driven feedback and a control group receiving traditional instructor feedback. Written informed consent was obtained, and participants were screened for baseline subject-verb agreement difficulties via a pre-test.

Intervention Design

Over six weeks, both groups engaged in three weekly one-hour sessions. The experimental group utilized a Meta AI-driven feedback mobile application to draft and revise texts. The AI tool provided real-time feedback on subject-verb agreement errors, prompting learners to edit drafts iteratively. The control group composed 200-word essays, receiving instructor feedback combining implicit (contextual) and explicit (rule-based) corrections.

Data Collection

Data included biweekly writing samples, pre-/post-tests, and a Likert-scale questionnaire. Writing tasks from both groups were analyzed for grammatical accuracy, while the experimental group's AI interactions were documented via digital interaction logs (e.g., screenshots). The questionnaire, aligned with Hattie and Timperley's (2007) feedback framework, evaluated perceptions of feedback utility, clarity, accessibility, and satisfaction.

Data Analysis

For data analysis a dual analytical approach was adopted:

Quantitative Analysis: Pre and post-test scores measured improvements in subject-verb agreement accuracy. Likert-scale responses (ranging from *Strongly Agree to Strongly Disagree*) were analyzed using descriptive statistics to quantify perceptions of feedback effectiveness.

Qualitative Analysis: Thematic analysis of open-ended questionnaire responses identified emergent themes, such as learners' attitudes toward feedback methods, perceived usability of AI tools, and experiential reflections on grammatical learning.

Triangulation

By synthesizing objective metrics (test scores, accuracy trends) with subjective insights (learner perceptions, experiential narratives), the study ensured methodological rigor. Comparative analysis of writing samples and post-test outcomes determined the relative efficacy of feedback types, while qualitative data contextualized how feedback mechanisms influenced engagement and learning trajectories. This integration provided a holistic evaluation of pedagogical impact, balancing statistical evidence with learner-centred perspectives.

4. Quantitative Results

4.1 Results of the Pre-test

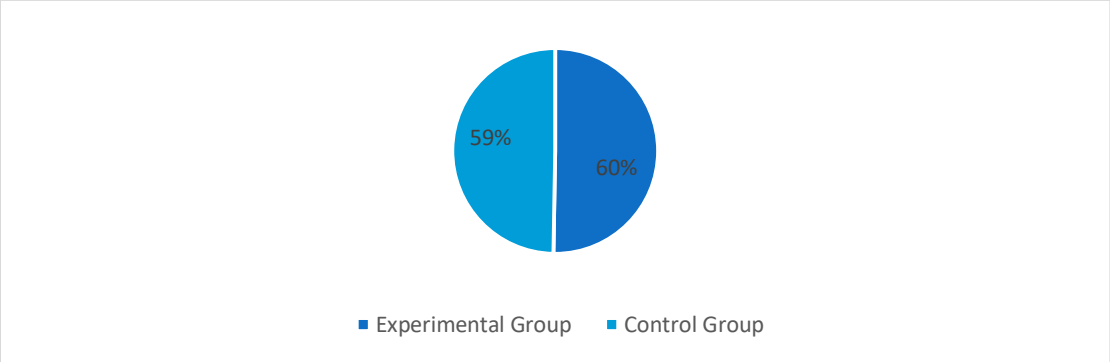


Figure 1: Pre-test Result

Pre-test results: Experimental group (Meta AI-driven feedback) = 60%, control group (human feedback) = 59%

4.2 Results of the Post-test

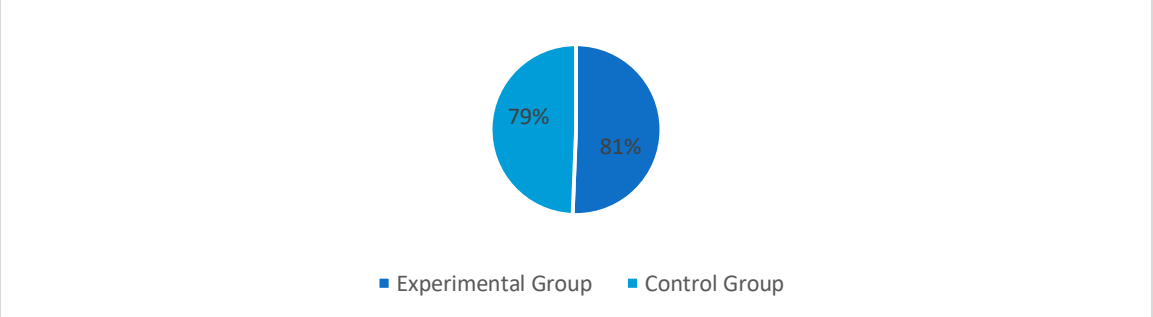


Figure 2: Post-test Result

In the post-test results, the experimental group, which received Meta AI-driven feedback, showed an average improvement of 81% in their quiz scores. In comparison, the control group, which received traditional human feedback, demonstrated a slightly lower average improvement of 79%. The results show that both human and Meta AI-driven feedback are essential to improve learners' knowledge and understanding of subject-verb agreement skills.

4.3 Students' Writing Samples

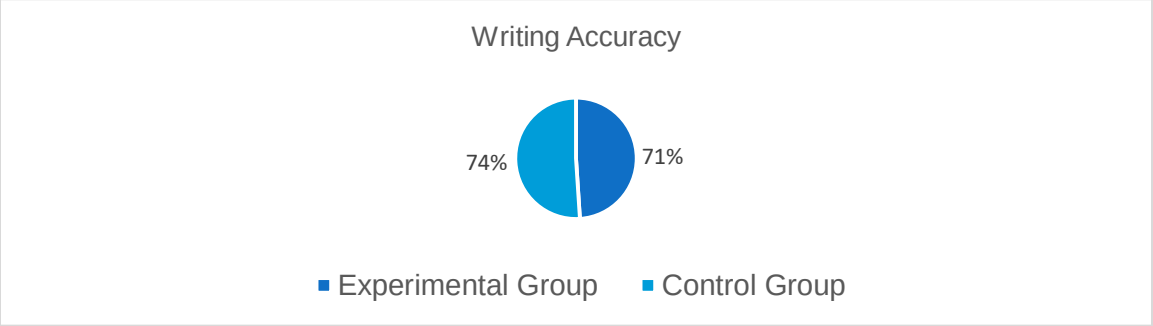


Figure 3: Writing Accuracy

In Figure 3, the evaluation of writing samples also revealed improvements in accuracy concerning subject-verb agreement errors. The experimental group experienced a 71% improvement, while the control group achieved a 74% increase in accuracy. These results highlight that both groups made significant progress, with human feedback showing a marginally higher impact on accuracy. This indicates that the Meta AI-driven feedback is a supplementary tool for teachers to provide learners with feedback.

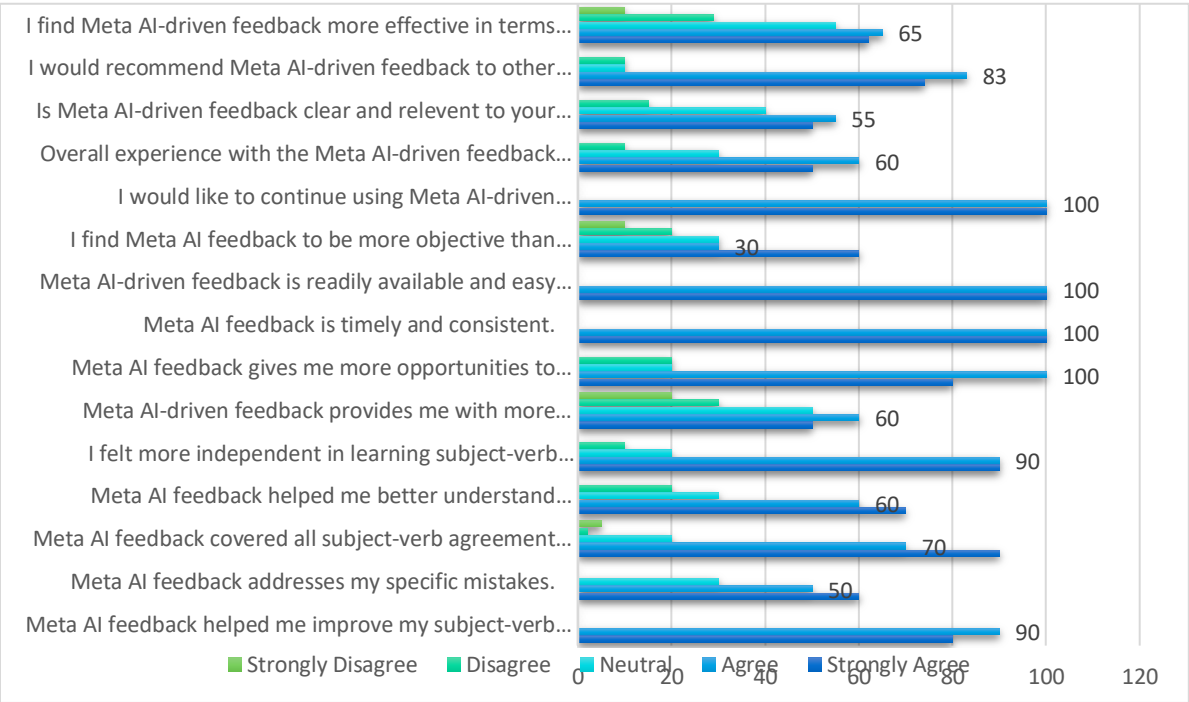


Figure 4: Statements on effectiveness of Meta AI-driven feedback-driven Feedback

The survey results reveal positive attitudes among learners toward using Meta AI-driven feedback for English subject-verb agreement feedback. A significant majority, 83%, indicated they would strongly recommend Meta AI-driven feedback to other language learners. Furthermore, 100% expressed a strong willingness to continue using the Meta AI feedback in the future, highlighting satisfaction with the tool's availability, timeliness, and consistency. The accessibility of the tool also scored high, with all participants agreeing that Meta AI-driven feedback is readily available and easy to access. These numbers signify that Meta AI-driven feedback is a useful tool for students to use in their language-learning journey.

The responses from the participants showed that the feedback given by Meta AI-driven feedback was helpful, with 65% agreeing that it was effective in terms of usefulness, while 55% felt it was clear and relevant to their writing needs. Overall satisfaction was high, as 60% rated their experience with Meta AI-driven feedback positively. In terms of learning, 90% of participants felt more independent in practicing subject-verb agreement rules, and 90% agreed or strongly agreed that Meta AI-driven feedback improved their skills in this area. Meanwhile, 60% agreed that Meta AI-driven feedback helped them better understand these grammatical rules, and 70% believed the feedback sufficiently covered all aspects of subject-verb agreement. These statistics show that Meta AI-driven feedback is effective as it provides timely and effective feedback.

However, responses about the objectivity of Meta AI-driven feedback were more divided; only 30% of participants felt Meta AI-driven feedback was more objective than human feedback. The tool was perceived as moderately effective in addressing specific mistakes, with 50% agreeing that it successfully pinpointed their errors. Overall, the feedback from Meta AI was seen as a valuable tool for enhancing grammatical skills, with a high level of satisfaction and enthusiasm for continued use among participants.

4.4 Qualitative Findings

Thematic Analysis of Participants' Perceptions of Meta AI-driven Feedback

The thematic analysis examines participants' perceptions of Meta AI-driven feedback in improving their subject-verb agreement skills, framed through Hattie and Timperley's (2007) feedback model. The following themes emerged from questionnaire responses, highlighting the strengths and limitations of Meta AI-driven feedback versus human feedback.

1. Clarity and Specificity of Feedback

More than half of the participants responded that Meta AI-driven feedback was pedagogically actionable and clear and specific. The students cited its capability in helping them pinpoint and correct subject–verb agreement errors with precise corrections and rule-based explanations that allowed them to make targeted revisions. This revision provided learners with a structured approach to identifying and overcoming recurring grammatical weaknesses.

2. Immediate Feedback and Real-Time Learning

The Meta AI-driven feedback was considered an immediate learning tool by most of the participants. Half of the participants highlighted that Meta AI-driven feedback provided real-time error correction that helped learners understand the subject-verb agreement rules in writing tasks. This instant AI feedback can be differentiated from the delayed human feedback, which could be due to the large sizes of the classes and the teachers' heavy workload.

3. High Error Detection Accuracy

Meta AI-driven feedback has been widely acknowledged by the participants to be very effective at identifying overt subject-verb agreement mistakes, which were initially ignored. It strengthened their confidence in using it to use it for foundational grammar checks. However, a small number of them noticed difficulties with syntactically complex sentences where contextual or stylistic differences occasionally led to oversights.

4. Enhanced Learner Autonomy and Engagement

The participants credited Meta AI-driven feedback for learner autonomy and engagement. The participants reported that they were able to independently review and revise their work without immediate instructor reliance. This self-directed approach decreased participants' anxiety concerning errors to foster iterative experimentation and active learning, particularly regarding grammar-focused tasks.

5. Human Feedback for Contextual Guidance

Most of the participants highlighted the efficiency of Meta AI-driven feedback, however, they prioritized and preferred the depth of human feedback as it provides contextualized understanding. Human feedback was valued for an explanation of errors in a broader linguistic or stylistic context, particularly in complicated cases where sentence structure is ambiguous or different creative choices are used. Furthermore, this type of personalized, adaptive feedback was considered indispensable for learning a more advanced level of language mastery.

6. Measurable Skill Development

Finally, participants attributed the Meta AI-driven feedback's iterative and detailed feedback to their increased accuracy in subject-verb agreement skills. This systematized approach facilitates the handling of errors, thus promoting grammatical rule awareness in learners and enhancing writing precision over time.

Findings

The findings indicate that Meta AI-driven feedback is effective due to its immediate, accessible, real-time, and rule-based feedback that promotes autonomy and foundational skill development among students. However, its limitation in contextual interpretation demands human feedback for a better understanding. Both modalities, on their own, have strengths and weaknesses; however, using a blended approach that utilizes the strengths of each modality can achieve this optimized learning outcome for different grammatical complexities.

5. Discussion and Conclusion

The results of the study demonstrated that the Meta AI-driven feedback effectively improved second language learners' subject-verb agreement skills, but it was not statistically superior to human feedback. The quantitative results revealed that marginally higher scores remain in the experimental group, with an 80% score in the post-test and 71% improvement in writing accuracy compared to the scores of the control group that received human feedback, which is 79% in the post-test and 74% in writing accuracy. Both modalities proved to be effective, and their respective roles came to light: Meta AI-driven feedback was useful at providing immediate and systematic corrections that made learners quickly identify and rectify their mistakes, while human feedback delivered personalized, context-sensitive explanations that complement grammatical understanding. As a result, the control group achieved higher scores in writing accuracy.

The learners perceived Meta AI-driven feedback as effective in enabling precision and real-time responsiveness that supported learners' autonomy as they enhanced their skills. However, some challenges emerged, mainly from unintelligible explanations of automated corrections or technical connectivity problems from participants. Though participants considered human feedback adaptable, paradoxically, they preferred Meta AI-driven feedback's detailed scalable guidance prioritizing efficiency over interpersonal interaction. Due to the lack of significant differences in outcomes between groups, the study highlights the potential of the blended feedback model. The strength in Meta AI-driven feedback's approach, however, is that foundational accuracy is reinforced instantaneously using rules, and human feedback focuses on the higher-order linguistic complexities, such as stylistic or contextual ambiguities. Thus, this synergy aligns with Hattie and Timperley's (2007) framework for feedback, where feedback serves not only to correct errors but also to deepen metacognitive engagement. Therefore, educators should consider the integration of AI tools like Meta AI-driven feedback into the curricula to avoid routine error detection. Future research should further explore the longitudinal impact such hybrid models have on writing proficiency and learner motivation in more diverse educational contexts.

Ultimately, this study advocates for a balanced pedagogical approach, one that integrates AI's efficiency without diminishing the irreplaceable value of human mentorship. In an era of rapid technological advancement, the goal remains clear: to cultivate resilient, self-regulated learners equipped to navigate both the precision of rules and the fluidity of language in context.

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