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STUDENTS' PERCEPTIONS AND ACADEMIC OUTCOMES: THE IMPACT OF META AI ON VOCABULARY LEARNING IN HIGHER SECONDARY ESL CONTEXTS IN MULTAN

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Abstract

In artificial intelligence, students of English vocabulary, particularly learners of English as a Second Language, are learning differently. This paper examined the impact of the Meta AI on vocabulary acquisition among higher secondary learners in Multan, Pakistan. I concentrated on two aspects, one being student academic performance, and the other being what they felt about the use of AI in their lessons. I worked with 120 students using a quasi-experimental mixed-methods design. I split them into two groups. One group was taught vocabulary using Meta AI tools, whereas the other was taught using conventional methods. To monitor progress, I administered pre- and post-tests on vocabulary and employed a questionnaire to obtain students' genuine views. Statistics show that students exposed to Meta AI demonstrated an actual improvement in vocabulary compared to those who attended regular classes. Still, it was not only about scores. Students who were using AI reported being more engaged and motivated. They prefer immediate feedback and believe their learning is more in their control. In short, it is not that Meta AI helped them remember words; they were eager to learn. In accordance with these findings, I will suggest introducing Meta AI into ESL instruction. It not only improves academic performance but also makes students more interested in the entire process.

Keywords: *Artificial Intelligence, Meta AI, English Vocabulary, English as a Second Language*

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Introduction

English has become the most widely used international language and it plays a vital role in cross border communication. It becomes a global language as it is used in business, trade, science, technology, and also used in diplomacy. Proficient English speakers have an edge because proficiency in English language open so many ways to actively participate in the global economy, access modern knowledge and also English speaker can engage easily with international communities. As English is a global lingua franca, it facilitates in interaction across the cultures and used as key medium for academic and professional advancement alongside Urdu. English is widely used in government affairs, higher education, law, media and in professional domains. After knowing English has been growing globally and has national relevance, the government of Pakistan introduced educational reforms to strengthen English Language skills. The major step that was taken in this direction was national Education policy 2009 which states that English will be the language of instruction and medium of education from grade 1 to higher education. According to that policy English Considered as a compulsory subject an promoted the use of English in Educational context. As a result of this milestone reform in educational policies and practices English is being taught as the essential part of upgoing in educational practices Although English has institutional importance but English language learning is a major challenge for students and they struggle with basic understanding of English. They are not able to excel in reading, writing. listening and speaking skills of English language. According to (Nation, 2013) "Vocabulary knowledge is essential for second language acquisition, influencing comprehension, communication, and overall language proficiency". Vocabulary is a key factor in achieving these skills for proper understanding and achievement of these skills. Students having low vocabulary knowledge have less comprehension abilities that effects their overall Academic performance. "Effective vocabulary learning strategies go beyond rote memorization and require meaningful engagement with language in context" (Schmitt, 2008). These issues are more pronounced at the intermediate level and the higher secondary level as the students need to read and write advanced and complex version of English and also, they have to appear in different type of assessments of English language in board exams. Incorporating artificial intelligence has been very useful in achieving these skills. According to (Lee, 2023)"Mobile and AI-based tools can provide learners with interactive and autonomous opportunities for practicing language skills."

Research Objectives

The study had these objectives:

To examine how Meta AI affects vocabulary achievement among higher secondary ESL students.

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To explore students' views on using Meta AI for vocabulary learning.

To compare the vocabulary learning results between AI-assisted instruction and traditional teaching methods.

Research Questions

Does using Meta AI significantly improve vocabulary learning outcomes for higher secondary ESL students?

What do students think about Meta AI as a tool for vocabulary learning?

Is there a significant difference in the academic performance of students taught with Meta AI compared to those taught with traditional methods?

Literature Review

Vocabulary knowledge comprises breadth, which is the number of words that one knows, and depth, which is the richness of word knowledge. Reading comprehension, oral communication, and general language ability depend on it (Nation, 2013). The traditional teaching of vocabulary is usually based on memorization and consultation in a dictionary. This might not be effective in facilitating deep learning and long -term retention (Schmitt, 2008). The more recent approaches are based on incidental learning by context, by different forms of input, and by promoting learner autonomy. Receptive and productive vocabulary knowledge is severely increased with repeated and contextual exposure to words (Webb, 2017).

AI in Language Learning

Perceptions of usefulness and ease of use of technology by learners are a significant factor in their adoption and successful interaction. The application of AI in education is premised on the theory of personalized learning and constructivist practices. The strategies help to create learning resources that are flexible to the requirements and interests of specific learners (Luckin et al., 2016). The AI systems are able to view the performance of the learners in real time, adjust the levels of difficulty, and offer the feedback that will assist in keeping the learner engaged and motivated (Woolf, 2020). Meta AI is an AI-based solutions that enable human-like interaction to be interacted with on a scale where learners can practice the language in a more natural way (Zhang & Zhang, 2023).

Meta AI and Vocabulary Acquisition.

Vocabulary Tools with the use of AI.

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Studies of AI in learning vocabulary demonstrate that interactive AI devices, such as chatbots and virtual tutors, are able to enhance the interest of learners and generate context-rich illustrations. The result is an improved retention (Amiri and Shirvani, 2021). An example of this is the use of AI in mobile applications, which are used in spaced repetitive learning and adaptive quizzes demonstrating superior vocabulary change over standard flashcards (Sun & Wang, 2024).

Feedback and Learner Autonomy:

AI feedback tools provide learners with instant feedback on the errors of language use. This immediate feedback will be important in strengthening the accurate vocabulary and stimulating self-correction (Li and Hegelheimer, 2013). Through fostering independence, AI tools enable the learner to control their vocabulary learning outside the classroom, facilitating both formative and informal learning (Godwin-Jones, 2018).

Perceptions of AI Tools by Students.

Perceived Ease of Use and Usefulness:

The Technology Acceptance Model (TAM) reveals that the perception that learners have of educational technologies in terms of their usefulness and ease of use has a significant influence on their intention to use them (Davis, 1989). Studies on ESL also indicate that students will be willing to use AI tools when they consider them useful in vocabulary enhancement and capable of being used with ease (Hsu, 2022). Positive perceptions are also related to increased motivation and increased time learning (Kukulska-Hulme, 2020).

Attitudes and Motivation

Attitudes of learners play a major role in the adoption of technology. When AI tools are perceived as something new and helpful, the students tend to feel more positive about language learning (Almalki et al., 2021). Conversely, the fear of technology or low levels of digital literacy may be an inhibitor to successful usage (Peterson, 2020).

Academic Results associated with AI-Improved Vocabulary Learning.

Learning Gains Empirical Evidence:

The overall evidence seems to favor the notion that AI is beneficial in vocabulary acquisition. Indicatively, Lee and Kim (2023) discovered that ESL learners who used an AI-based vocabulary tutor achieved much higher scores on post-tests on vocabulary as compared to control groups. According to other research, adaptive AI learning conditions result in quantifiable gains in reading comprehension, which is connected to superior vocabulary knowledge (Park & Yu, 2022).

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Contextual Variations:

Although the trends are generally positive, a few studies have mixed outcomes depending on the instructional design, the competency of the learners, and the cultural context. The effectiveness of AI programs in resource-constrained environments can be reduced due to such factors as poor access to technology, challenges in connectivity, and inadequate training of teachers (Al-Fadhli and Al-Ajmi, 2021). Thus, the studies that are devoted to contextual factors and, in particular, the educational setting that does not belong to the West are crucial.

Gaps in Current Research

Although the literature on the use of AI in language learning is growing globally, little research has been conducted on the topic in relation to South Asian ESL learners. The gaps in the research are very clear in terms of existing studies regarding the effects of Meta AI on vocabulary acquisition and attitudes of higher secondary school-going students in such cities as Multan.

Methodology

Research Design

The present study used a quasi-experimental mixed-method approach to gain a holistic picture of both the quantifiable and the qualitative data concerning vocabulary acquisition. The quantitative part of the research was focused on measuring vocabulary improvements, which would be achieved with the help of pre- and post-tests to plot the vocabulary knowledge level in students. This method could objectively measure the learning progress that could be attributed to the teaching methods. On the qualitative level, the study explored the subjective experiences and attitudes of the students regarding the usage of Meta AI in their learning process. The study aimed to use reflective responses and attitudinal surveys to get the finer details of student engagement, perceived usefulness, and other motivational aspects, as the test scores alone did not give a comprehensive picture of student engagement.

Population and Sample

The sample of the study was the higher secondary students taking English as a Second Language (ESL) courses in the public colleges in Multan. The study used purposive sampling, whereby the researcher deliberately chose the participants who would be representative of the population that would typically require the services of AI-assisted teaching. A total of 120 students took part, with close random allocation of students in two equally sized groups in order to reduce bias and achieve comparability. The Experimental Group of 60 students was involved in vocabulary learning tasks

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that would involve the central position of Meta AI and would combine its possibilities with everyday lessons. The Control Group, which included 60 students, in its turn, was exposed to conventional vocabulary teaching according to the traditional pedagogical approaches. Such a separation was helpful in making a straightforward comparison of the results of AI integration and traditional methods.

Research Instruments

In order to assess vocabulary growth, educators developed an extensive Vocabulary Achievement Test. This test was comprised of multiple- choice questions and vocabulary-based tasks put into context to assess both the knowledge of new vocabulary and its use. The test was done prior to and following the instructional intervention, which is a good measure to trace the individual and group progress throughout a certain period.

Besides academic performance, the paper also looked at the views of students concerning the use of Meta AI in their learning process. To this end, a comprehensive Students Perception Questionnaire was created; it was in the form of a Likert-scale response. The questionnaire also covered various dimensions such as the perceived usefulness of Meta AI and its ease of use, the level to which it was found to be interesting to students, and the level to which it affected their desire to learn vocabulary. The goal of the research was to determine not only the cognitive but also the affective reactions to the attitudinal variables that it captured, thus providing a multidimensional analysis of the role of Meta AI in vocabulary teaching.

This study aimed to investigate the role of Meta AI in vocabulary learning in higher secondary ESL learners in Multan, with the quantitative measure and the subjective experiences of the participants. The data demonstrates the great improvement in vocabulary mastery among students who used AI-assisted learning compared to those who used only traditional instructional tools. These students not only scored much higher in the tests, but they also strongly felt that Meta AI was very interactive and supportive and that it enabled them to develop independent learning habits.

Vocabulary Achievement Results Discussion

The close analysis of the data shows that the experimental group, the individuals who used Meta AI, showed a significant improvement in post-test performance, compared to the control group. Although both groups gained in exposure to the same curricular material--some improvement was recorded all across the board--the gain in achievement by the experimental group cannot be

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explained by simple practice. Rather, it highlights the sheer experience of technology-enhanced instruction on the profundity and permanence of newly acquired vocabulary.

The adaptive and interactive platform of Meta AI seems to be one of the driving forces of these outcomes. The more traditional classrooms tend to be linear and uniform, which may not be accommodating to the various learning needs of a student. Meta AI, on the other hand, provides students with the ability to review difficult vocabulary repeatedly as needed, with immediate, personalized feedback, and experience words in a multiplicity of natural contexts. This repetitive meaningful engagement with new vocabulary, including recognition and real use, helps to develop vocabulary longer.

Further, the AI system turned the students who used to be mere recipients of information into active participants of the learning process. Meta AI encouraged a higher level of thinking by asking learners to respond to material, ask questions, get personalized feedback, and use the new words in context. Being actively involved helps the memory to be retained, but also develops confidence to use the unknown vocabulary, as is seen in the better results in the test.

Statistical Findings

According to statistical analysis, the vocabulary achievement of the experimental and control groups was not similar. The independent samples t-test was used to compare the post-test performance of students taught with Meta AI-assisted instruction and those taught using traditional methods. According to the results, the experimental group ($M = 78.45$, $SD = 6.32$) was better than the control group ($M = 69.18$, $SD = 7.05$). This difference was significantly different ($t(118) = 7.24$, $p < .001$). This implies that Meta AI had a very significant role in enhancing the vocabulary learning outcomes of students. Also, paired samples t-test within the experimental group demonstrated a significant increase in the level of post-test scores compared to pre-test scores ($t(59) = 9.61$, $p < .001$), which ensured efficacy of AI-assisted instruction in the course of the intervention.

Combining the Perceptions of Students and their Academic Results

The quantitative results are also supported by the views of the students. The majority of the participants indicated that met AI was more dynamic, entertaining, and interactive in vocabulary learning than traditional rote memorization methods were. The key ingredient of a successful acquisition of a language is motivation, and the interesting nature of the Meta AI obviously encouraged students to put more effort and time into the process, which led to academic benefits.

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The positive, relaxed atmosphere that Meta AI offered both in terms of safety and pressure studied was a common motif in student feedback. The AI system also enabled learners to experiment at will, unlike in traditional classrooms, where fear of making mistakes can easily discourage them. This decreased amount of anxiety made new vocabulary more frequently used and practiced, and eventually fostered a stronger and bolder attitude to language learning.

The other notable strength was the instant feedback. Meta AI allowed the students to quickly correct their mistakes and eliminate the formation of poor usage habits due to timely corrections. This is unlike the traditional classroom, where the feedback is usually delayed or inconsistent, and this may result in mistakes going unnoticed and uncorrected over a long period of time. The reaction of the AI was therefore critical in strengthening correct language habits and speeding up development.

Meta AI and Learner Autonomy

One of the most transformational changes that was witnessed was perhaps the encouragement of learner autonomy using the Meta AI. The system enabled students to customize their studies: setting the time and frequency of interaction with new vocabulary, and the depth of the process. This was not only a flexible approach that helped to meet the needs of different learning speeds and preferences, but also to give a feeling of ownership and responsibility for their academic success.

This freedom is especially important to higher secondary ESL students in Multan who are often highly encouraged to show good results in high-stakes tests. When students are left to choose their own path, their personal determination and interest are likely to increase. This self-teaching strategy builds language-learning skills over time, enabling students to expand their vocabulary outside the classroom continually.

Relevance of the context to Higher Secondary ESL Classrooms in Multan

These findings are further compounded by the fact that in the Multan case of the state school system, teaching is still very much exam-focused and teacher-centered. With the paradigm shift created by Meta AI, students were introduced to a more modern, learner-oriented model of learning. The fact that the feedback is mostly positive proves that the students are not only open to the implementation of such innovations but can also be enthusiastic about the departure from the traditional pedagogy.

One should mention that not all students were familiar with technology, but the non-complicated and convenient design of Meta AI helped them go through the transition. This emphasizes the fact

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that AI-driven educational devices may be successful even in resource-limited settings, as long as they are well-conceived and contextually reflective. The paper indicates that infrastructural constraints should not limit technological development in the learning process, if the tools are easy to use and specifically target the requirements of students and educators.

Overall, the paper has shown that the introduction of Meta AI into ESL teaching may significantly influence the vocabulary growth, the motivation of learners, and the overall classroom atmosphere. Developing more effective, engaging, and equitable language learning experiences can be achieved by integrating adaptive technology with already existing curricular objectives. Educators in Multan and similar settings will be able to do so.

Recommendations

- In future research, bigger samples, more diversified, are needed to enhance generalizability.
- A longitudinal study is recommended to examine the long-term effects of Meta AI on language ability and vocabulary retention.
- Other language skills, such as the fluency of speaking, the accuracy of writing, and the understanding of reading, can be explored further in terms of the impact that Meta AI has on them.
- A comparative study of a number of AI platforms can tell us more about the optimal resources involved in teaching ESL.

Conclusion

The paper examined the effects of Meta AI on vocabulary acquisition among higher secondary ESL students at Multan, not only in terms of their test results but also in terms of what students believe about the technology. The findings are self-explanatory: the students perform better when teachers introduce AI into vocabulary classes. They recall more words, learn to apply them in various contexts, and become more confident in their knowledge. This can be observed in their post-test performance; students with Meta AI scored higher than those in regular classrooms. It is not only about good grades. Students are players who are fond of Meta AI. They are interested in tools that are practical and straightforward for self-learning. Individual needs and curriculum-related lessons provided in real time can make students feel less scared and more confident in their attempts to use new words. The spillage of that confidence is in motivation, which makes them strive more to do more.

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There's more. Meta AI is not simply a pedagogical tool. It changes the entire classroom aspect. Students set their own pace and determine how much they wish to learn new vocabulary. The AI motivates them to continue practicing even outside the classroom, which is uncommon in exam-based teaching. Meta AI places students in a position of control over their learning, which is typically under teachers' control. That is huge for higher secondary ESL education.

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