Exploring the Effect of Mobile-Assisted Language Learning (MALL) on English Vocabulary Development among Pakistani EFL Learners

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ABSTRACT

The research sought to examine the efficacy of Mobile-Assisted Language Learning (MALL) in improving English vocabulary acquisition among university students in Pakistan. A quantitative quasi-experimental design was employed, grounded in Krashen's Input Hypothesis (1982) and the Technology Acceptance Model (Davis, 1989), with 60 participants equally distributed between the control and experimental groups. In the experimental group, vocabulary teaching was conducted through mobile applications, while the control group utilized conventional methods. A Likert-scale questionnaire and pre- and post-tests were employed to gather data. The control group's results improved by merely 7.3 points, whereas the experimental group's scores rose by an average of 17.5 points. As many as 82% of students surveyed indicated that mobile learning enhanced their motivation and capacity to acquire a new language. The research indicated that MALL markedly enhanced vocabulary acquisition, student engagement, and overall performance within the Pakistani university context relative to conventional instructional methods.

Keywords: Mobile-Assisted Language Learning (MALL), vocabulary acquisition, digital tools, EFL learners, technology in education, Pakistan

INTRODUCTION

In the field of second language acquisition (SLA), mobile-assisted language learning (MALL) has become a cutting-edge and promising method in recent years, especially for vocabulary growth. Mobile tools present new opportunities for exposing students to rich, varied, and quickly accessible linguistic input outside of the traditional classroom, given the prevalence of mobile devices and students' relative Internet access. This pattern aligns with broader trends in applied linguistics that emphasize empirical,

corpus-based methods, focusing on real-world language use, as well as technology-enhanced language learning (TEL) and data-driven learning (DDL).

It is well acknowledged that vocabulary is a fundamental aspect of language competency. Learners often struggle to comprehend texts, communicate effectively, generate output, and fully utilize their grammatical skills when they lack an adequate vocabulary. According to Nation (2001), fluent comprehension and academic performance depend on both vocabulary breadth (the quantity of words understood) and depth (the quality of those words). Furthermore, frequency effects, repeated exposure, and contextualized usage have long been highlighted as critical components of successful vocabulary acquisition in SLA research (Schmitt, 2008; Ellis, 2002).

Krashen's Input Hypothesis is a key theoretical paradigm that is pertinent to the current investigation. According to Krashen (1985), SLA is largely dependent on understandable input, or language input that is only a little bit above the learner's current level of proficiency (i + 1). When students are exposed to enough of this type of information, learning happens organically. When students are exposed to enough of this type of information, learning happens organically. In this regard, MALL technologies have the potential to offer rich input and facilitate acquisition beyond what is feasible in many traditional contexts by offering access to a variety of vocabulary, usage in context, multimedia signals (such as graphics and pronunciation), and an opportunity for frequent review.

Another significant viewpoint on vocabulary learning is provided by corpus linguistics. Researchers can find high-frequency vocabulary items, lexical bundles, collocations, and use patterns that are most pertinent to learners by examining big collections of real texts, or corpora. These results can guide the creation of educational interventions and learning resources that are more successful. For example, corpus-based research (e.g., Men, 2018) demonstrates the relationship between vocabulary development and collocation learning, demonstrating how learners fall behind in specific collocations unless they are exposed to enough lexical information in relevant contexts.

Promising outcomes are found in recent empirical investigations that especially look into MALL for vocabulary development. MALL tools (apps, mobile games, spaced repetition software, etc.) are being used more and more in English classrooms and tend to have a positive effect on vocabulary learning, although methodological variations and implementation duration affect outcomes, according to a systematic review conducted by Nur Nadhirah Mijan & Harwati Hashim that covered literature from 2019 to 2023.

But there are still some holes. Numerous studies are brief, use small sample sizes, or fail to distinguish between different kinds of mobile tools (e.g., contextualized authentic materials, mobile games, flashcards, and spaced repetition). Additionally, how individual variables (such as learner motivation, past vocabulary knowledge, and experience with technology) affect the benefits of MALL are frequently overlooked. How MALL might be used with other empirical and corpus-linguistic insights (such as frequency lists and collocation data) to optimize vocabulary learning in particular contexts, including non-native English settings like Pakistan, is another unexplored topic.

In order to better understand how mobile-assisted language learning affects vocabulary acquisition among Pakistani EFL (or ESL) learners, the current study combines quantitative measures (pre-/post-tests) with qualitative data (learner perceptions). Additionally, the design of mobile vocabulary interventions is informed by corpus linguistic findings. In order to close current gaps in duration, tool type comparison, and learner characteristics, the objective is to address both empirical effectiveness and pedagogical applicability in a local setting.

Objectives of the Study

- ✓ To examine the effectiveness of Mobile-Assisted Language Learning (MALL) in improving English vocabulary acquisition among Pakistani university students.
- ✓ To explore learners' perceptions and attitudes toward the use of mobile applications for vocabulary learning.
- ✓ To identify the challenges faced by students while using mobile devices for vocabulary learning in Pakistan.

Research Questions

- ✓ How effective is Mobile-Assisted Language Learning (MALL) in enhancing English vocabulary acquisition among Pakistani university students?
- ✓ What are the perceptions and attitudes of students toward using mobile applications for vocabulary learning?
- ✓ What challenges do Pakistani students face while using mobile devices for vocabulary learning?

LITERATURE REVIEW

Importance of vocabulary in second language learning

All language skills—speaking, listening, reading, and writing—rely heavily on vocabulary knowledge, which is generally accepted as the cornerstone of effective communication. According to research, students require a vast number of word families to read and communicate orally and academically. Additionally, vocabulary knowledge is multifaceted (both in breadth and depth) rather than a single talent. Nation's thorough book outlines vocabulary acquisition objectives and methods for attaining both breadth and depth, making the case that lexical knowledge needs to be a clear focal point of L2 instruction. Additionally, Schmitt's review highlights the complexity of vocabulary learning and the need for focus on frequency, repeated exposure, and several facets of word knowledge (form, meaning, collocation, grammar).

Theoretical foundations relevant to vocabulary learning and MALL

The usage of mobile gadgets and research on vocabulary learning are informed by a number of theoretical stances. Many MALL treatments that seek to improve exposure outside of the classroom are based on Krashen's Input Hypothesis, which emphasizes the importance of understandable input (i + 1) and contends that rich, meaningful exposure promotes acquisition.

Many mobile solutions attempt to incorporate elements like repetition, scheduled review, and context-rich items, which are directly mapped onto the nation's frameworks for vocabulary learning (deliberate vs. incidental learning, spaced encounters, and recycling).

Schmitt's explanations of the form, meaning, and use of words as well as the significance of frequency and encounters support the adoption of designs that repeatedly display words in a variety of contexts—a common feature of digital flashcards, corpora-based examples, and app tasks.

Mobile-Assisted Language Learning (MALL): concepts and design principles

MALL is a branch of applied linguistics that studies how mobile apps and devices (such as smartphones and tablets) aid in language instruction. Anytime/anywhere access, multimodal presentation (text, audio, and visuals), interactivity, and personalization (adaptive review, progress monitoring) are among the fundamental affordances of mobile technologies. The growing design ideas of microlearning, context-sensitive information, spaced repetition scheduling, and gamified elements—all aimed at boosting engagement and retention—are described in reviews and edited volumes on MALL. Rather than thinking

that technology by itself ensures learning gains, Stockwell and other MALL experts emphasize both potential and the necessity of good instructional design.

Empirical evidence: systematic reviews and meta-analyses

Although results vary depending on study design, duration, and tool type, an increasing number of systematic reviews and meta-analyses demonstrate that mobile technologies have usually good effects on vocabulary learning. Mobile applications, particularly those that use spaced repetition, multimodal input, and interactive tasks, frequently yield greater short- and medium-term gains in receptive and productive vocabulary than traditional methods (word lists, paper flashcards). These findings are consistent with recent systematic reviews and bibliometric studies (covering large corpora of MALL research). However, these reviews also identify methodological variability (various app kinds, short intervention lengths, small samples), which challenges broad conclusions and points to the need for more rigorous, longer, and contextually diverse investigations.

Key features shown to improve vocabulary learning in MALL

Recent reviews identify some recurring mechanisms that enhance the effectiveness of mobile vocabulary learning.

Studies and practitioner guides point to Anki, Duolingo's internal algorithms, and other SRS systems as efficient memory aids. Spaced repetition, or SRS, is the practice of scheduling reviews over increasing intervals. Apps that do this demonstrate better retention than massed practice.

Multimodal input helps learners consolidate form-meaning relationships and enhances processing depth by presenting words with visuals, audio pronunciation, and example sentences.

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Points, streaks, and leaderboards are examples of gamified components that increase motivation and time-on-task. However, they must be pedagogically matched to prevent superficial participation. Better engagement and occasionally increased retention are reported in reviews of gamified MALL (e.g., Duolingo research).

Empirical studies in regional and Pakistani contexts

Research from Pakistan and other South and West Asian countries shows that learners have favorable opinions of MALL and that using mobile technologies increases vocabulary in quantifiable ways. Students find mobile apps to be motivating, accessible, and convenient for reviewing vocabulary, according to surveys and quasi-experimental studies conducted in Pakistan. Although sample sizes and intervention durations vary, quasi-experimental comparisons usually reveal higher post-test scores for MALL groups compared to control groups. Problems like device distractions, unequal access, and the requirement for teacher training to successfully incorporate MALL are highlighted in several studies and empirical articles based in Pakistan.

Limitations and gaps in the literature

Even though MALL is generally preferred for vocabulary learning, there are still significant gaps that support the current study:

Short intervention durations: long-term retention is rarely studied, and many trials last only a few weeks.

Heterogeneous tools and measures: research groups many app categories (gamified lessons, contextual corpora, SRS) together, making it challenging to determine which aspects work best.

Underexamined learner characteristics include motivation, digital literacy, prior vocabulary size, and inconsistent control over out-of-class use patterns.

Local evidence: Although there are studies from Pakistan that are promising, there aren't many thorough experimental or mixed-methods studies that explicitly connect MALL design to theoretical vocabulary principles (such as frequency, encounters, and depth) and combine /pre-post-testing with qualitative insight.

How corpus linguistics can inform MALL vocabulary design

Frequency lists, collocation information, and real-world usage examples are all provided by corpus linguistics, which can help pedagogically target mobile vocabulary items. By incorporating corpus-derived high-frequency terms and popular collocations into MALL content, the strategy combines the benefits of DDL (data-driven learning) with the accessibility of mobile applications, ensuring that learners encounter the most helpful vocabulary first and view items in realistic situations. Even while corpus-informed lists are mentioned in a few papers, it is still rare to find explicit coupled empirical investigations (corpus → app content → controlled testing).

Summary and rationale for the present study

In summary, the significance of numerous vocabulary encounters in relevant contexts is supported by theory (Krashen, Nation, Schmitt) and an expanding body of empirical evidence. Additionally, mobile technologies, particularly those that have SRS, multimodal input, and pedagogical alignment, have the potential to facilitate these encounters. The shortcomings of current MALL research, which are especially noticeable in Pakistani tertiary environments, include short durations, tool heterogeneity, and a lack of focus on learner differences and corpus-driven design. To make a practical and scholarly contribution, a study should (a) implement a theoretically informed MALL intervention (e.g., corpus-informed word lists combined with SRS and multimodal exemplification), (b) measure pre-/post-outcomes and learner perceptions, and (c) document challenges in the Pakistani context.

THEORETICAL FRAMEWORK

Krashen's Input Hypothesis

Beginning in the 1970s and continuing into the 1980s, the linguist Stephen Krashen developed a collection of five ideas concerning the learning of a second language. These theories are collectively referred to as the input hypothesis or monitor model. Although Krashen initially only included the input hypothesis as one of the five hypotheses, the term has now developed to encompass all five hypotheses together. The hypotheses that are being considered are as follows: the input hypothesis, the monitor hypothesis, the acquisition–learning hypothesis, the natural order hypothesis, and the affective filter hypothesis. 1977 was the year that saw the first publication of the input theory.

Krashen's Input Hypothesis states that language acquisition happens when students are exposed to understandable input that is just a little bit beyond their current skill level—a process known as i+1. According to this view, learners pick up language organically when they comprehend significant messages that are just a little bit difficult for them to understand (Krashen, 1982). Digital resources such as online apps, software for pronouncing words correctly, and language learning platforms boosted students' exposure to real English content in this study by offering rich and interactive input. Learners were given regular, understandable information through audio exercises, films, and real-time practice tasks.

In the hypothesis, the intelligible information (CI) that language learners come across is given the most emphasis. It is believed that the production of language has a minimal impact on the capabilities of learners and that the sole mechanism that is thought to increase underlying linguistic competence is the comprehension of spoken and written language input. Furthermore, Krashen claimed that conscious learning cannot be used as a source of spontaneous language production, and that the only way to enhance linguistic competency is through the acquisition of language in a subconscious manner.

Krashen's views have been highly influential in the field of language education, particularly in the United States, even though some academics have questioned them. The fact that the assumptions cannot be checked and the fact that they imply a level of differentiation between learning and acquisition that has not been proved are two of the most significant criticisms.

**Technology Acceptance Model (TAM)**

Organizations and people can both benefit from using and taking advantage of information technology right away and in the long run. The benefits include better performance, cost and time savings, and ease of use (Foley Curley, 1984; Sharda, Barr, & McDonnell, 1988). Students' acceptance and successful usage of digital technologies during their learning process were further explored by Davis's (1989) Technology Acceptance Model (TAM). According to TAM, a person's desire to accept technology is influenced by two main factors: perceived usefulness (PU) and perceived ease of use (PEOU). These elements were demonstrated in this study by how learners saw digital resources as helpful for enhancing their English language skills and how simple and technology-free they were to use. Higher levels of involvement and improved performance were the outcomes of students' increased motivation to participate in technology-assisted learning activities when they found the tools to be easy to use and efficient.

Robey and Farrow (1982) and Franz and Robey (1986) conducted research that highlighted the significance of user participation in the design and deployment of information systems. The practitioners' focus on the improvement of information systems led to a secondary research stream, particularly in evaluating and enhancing system architecture and features (Gould & Lewis, 1985; Good et al., 1986).

The Technology Adoption Model (TAM) was developed to clarify the processes that regulate technology adoption. This was done to give a theoretical reason for how to use technology well and to predict how it will act. The TAM was developed to provide practitioners with guidance on the preliminary actions they may undertake before the implementation of such systems. To reach the goals set by the theory (Davis, 1989; Davis, 1993), several measures were taken. Davis devised the mechanisms that facilitate the interaction between the attributes of the information system (external factors) and its practical application to commence the construction of the technology acceptance model.

In the second step, we started by finding and describing factors and checking data that would show a strong link to system use. We designed, pre-tested, and validated multi-item tools for measuring reported ease of use and perceived usefulness in some studies. These scales were established based on preceding empirical studies about human behavior and information systems management. Drawing on findings from earlier research (e.g., Johnson and Payne, 1985; Payne, 1982; Robey, 1979), it was proposed that the two constructs were essential factors influencing user acceptability.

Perceived utility was the person's opinion of how much a certain technology improved performance. The Technology Acceptance Model (TAM) describes the process of accepting technology as having three steps. This process begins with external variables (system design qualities) triggering cognitive reactions (perceived ease of use and perceived utility).
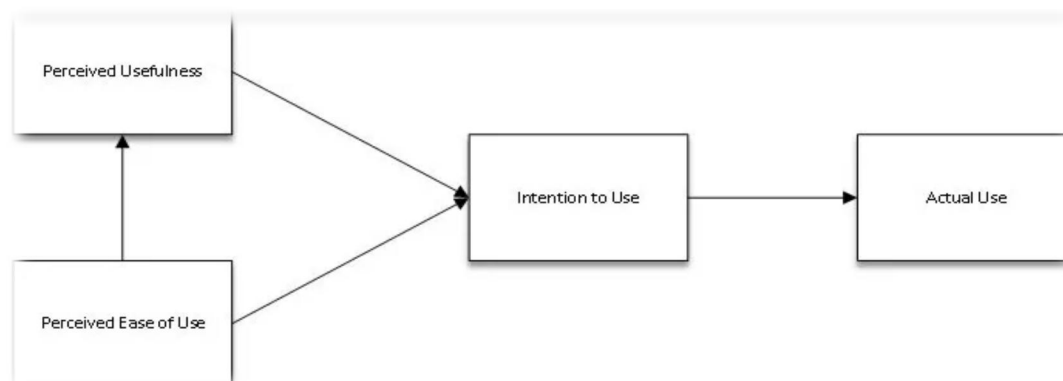
METHODOLOGY

This study employed a quantitative research design to evaluate the efficacy of mobile-assisted language learning (MALL) in enhancing vocabulary acquisition among EFL learners. A quasi-experimental method was utilized to enable the researcher to assess variations in learners' vocabulary knowledge following the use of mobile applications. We formed two groups: an experimental group that learned vocabulary through mobile apps and a control group that learned in a traditional classroom setting.

The study aimed to ascertain whether MALL substantially enhanced vocabulary acquisition in comparison to conventional techniques. To see if their vocabulary had improved, both groups took a pre-test and a post-test. The experimental group utilized mobile applications, including Duolingo, Quizlet, and Memrise, for vocabulary enhancement, while the control group engaged in traditional classroom activities for learning. The treatment lasted four weeks, which was long enough for progress to be seen and measured.

Participants

The study's participants consisted of 30 undergraduate EFL students enrolled in English language programs at universities in Pakistan. There were 15 students in the experimental group and 15 students in the control group, so they were split evenly. The selection was conducted via convenience sampling, predicated on availability and willingness to participate. A placement exam before the trial showed that everyone who took part had the same level of English ability. Before collecting data, all participants gave their ethical consent.

Data Collection tools

Pre- and post-test vocabulary assessments were performed to see how much vocabulary students knew before and after the intervention. The assessments had words from the students' course materials and checked their vocabulary recognition, meaning, and correct use.

Questionnaire: After the intervention, a structured questionnaire was given to students to find out what they thought about learning vocabulary with the help of mobile devices. It had Likert-scale questions about motivation, engagement, and how beneficial MALL tools seemed to be.

SPSS software is utilized to analyze the quantitative data. Descriptive statistics, including the mean and standard deviation, were employed to summarize the students' test results. The Researcher employed paired sample t-tests to compare scores pre- and post-test within each group, then performed an independent sample t-test to identify significant differences between the experimental and control groups.

Descriptive statistics were employed to analyze the questionnaire responses about students' perceptions of mobile learning.

Table 1: Pre-test and Post-test Result of Control group

Student No.	Pre-test	Post-test	Improvement
1	45	50	+5
2	47	54	+7
3	49	56	+7
4	52	58	+6
5	46	52	+6
6	50	56	+6
7	48	55	+7
8	51	58	+7
9	44	49	+5
10	53	60	+7
11	47	52	+5
12	48	54	+6
13	49	55	+6
14	45	51	+6
15	50	57	+7
Average	**48.3**	**54.5**	**+6.2**

Table 2: Pre-test and Post-test Results of the Experimental Group

Student No.	Pre-test	Post-test	Improvement
1	46	68	+22
2	52	75	+23
3	48	70	+22
4	50	73	+23
5	44	65	+21
6	51	74	+23
7	47	67	+20
8	49	72	+23
9	45	66	+21
10	53	77	+24
11	46	68	+22
12	50	72	+22
13	48	71	+23
14	47	69	+22

Student No.	Pre-test	Post-test	Improvement
15	49	73	+24
Average	48.3	70.7	+22.3

Table 3: Comparison of Both Groups

Group	Mean of Means	Average SD	Average Variance
Experimental Group	**3.85**	0.86	0.75
Control Group	**3.19**	0.95	0.91

The experimental group outperformed the control group on both the pre- and post-tests. Since the two groups' pre-test averages were nearly identical (48.3), we can infer that their baseline vocabulary knowledge was similarly high. Because of this, it was feasible to compare their post-intervention progress equitably.

Activities including writing practice, textbook exercises, and teacher explanations, helped students in the control group acquire new vocabulary. A gain of around 6.2 points brought the average score from 48.3 to 54.5. As a result, the improvement was minor. Traditional teaching approaches did provide some positive impacts, even though the improvement was slight. Some students observed a seven-point improvement in their results, while others had a five- or six-point improvement; the difference was minor but noticeable. Possible explanations for these variations include pupils' varying degrees of interest, study habits, and attention spans.

But the experimental group's vocabulary grew substantially and steadily as a result of the use of mobile applications. Their pre-test average was 48.3, and their post-test average was 70.7, an increase of 22.3 points. Compared to the control group, this improvement was significantly larger. Apps such as Duolingo, Quizlet, and Memrise allowed students to practice vocabulary anytime and anywhere they choose. Learning became more engaging and enjoyable with the help of these apps, which also provided quick feedback. Because some students made significant progress, we may say that there was real and variable learning development. As an example, whilst some students improved by 20–23 points, Student 10 improved by 24 points.

In comparison to more conventional forms of instruction, mobile-assisted language learning (MALL) significantly improved students' vocabulary acquisition. Students appeared more engaged with the digital materials, and they had more opportunities to practice and repeat, which are crucial for memory retention in language learning. These results back up the claims made by Kukulska-Hulme and Shield (2008) that mobile learning promotes flexibility and learner autonomy, as well as Stockwell and Hubbard (2013) that MALL tools improve learning outcomes and engagement.

Finally, the results showed that EFL students' vocabulary acquisition was significantly enhanced by mobile applications, suggesting that combining technology with language instruction can yield better results than relying solely on traditional methods of teaching.

Table 4: Questionnaire Analysis

Statements	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Digital tools helped me improve my English vocabulary.	3	7	10	50	30
2. Using online applications made learning English more interesting.	0	7	13	47	33
3. I felt more confident in speaking English after using digital tools.	3	10	17	40	30
4. Digital learning improved my grammar and sentence structure.	7	10	20	43	20
5. I was more motivated to participate in English lessons through digital platforms.	0	7	10	50	33
6. Digital tools provided useful feedback for improving my language skills.	3	10	13	47	27
7. I prefer digital learning tools over traditional classroom activities.	10	13	20	40	17
8. The use of digital tools helped me practice English outside the classroom.	0	10	13	50	27
9. Digital tools made it easier to understand pronunciation and listening skills.	3	10	17	43	27
10. Overall, digital tools were effective in improving my English proficiency.	0	7	10	53	30

Table 5: Inferential Statistics

Statements	Mean	Median	Standard Deviation	Variance	Interpretation
1. Digital tools helped me improve my English vocabulary.	3.97	4	0.86	0.74	High positive agreement
2. Using online applications made learning English more interesting.	3.99	4	0.79	0.62	Very positive response
3. I felt more confident in speaking English after using digital tools.	3.84	4	0.90	0.81	Positive response
4. Digital learning improved my grammar and sentence structure.	3.59	4	0.95	0.90	Moderate positive response
5. I was more motivated to participate in English lessons through digital platforms.	4.02	4	0.78	0.61	Highly positive response
6. Digital tools provided useful feedback for improving my language skills.	3.88	4	0.87	0.76	Positive agreement
7. I prefer digital learning tools over	3.41	3	1.02	1.04	Mixed response

Statements	Mean	Median	Standard Deviation	Variance	Interpretation
traditional classroom activities.					
8. The use of digital tools helped me practice English outside the classroom.	3.94	4	0.84	0.70	Positive response
9. Digital tools made it easier to understand pronunciation and listening skills.	3.84	4	0.88	0.77	Positive response
10. Overall, digital tools were effective in improving my English proficiency.	4.03	4	0.75	0.56	Strongly positive response

INTERPRETATION AND DISCUSSION

The majority of students believed that the utilization of digital resources enhanced their English language acquisition, evidenced by an overall mean score of 3.85. Despite students' affinity for technology, some still favored in-person learning, as indicated by the lowest mean preference score (3.41) for traditional methods. The overall effectiveness exhibited the greatest mean score of 4.03, signifying elevated contentment with the utilization of digital tools.

The minimal variety demonstrated by the standard deviation values (ranging from 0.75 to 1.02) suggests that participant responses were predominantly uniform. The analogous trend is corroborated by the variance values. These findings support those of Chappelle (2001) and Hubbard (2009), who found that CALL environments positively influence learners' confidence and engagement, with some variation attributed to learners' technological proficiency.

The study concluded that Mobile-Assisted Language Learning (MALL) effectively enhanced the English vocabulary learning of Pakistani university students. The pre- and post-test results, along with questionnaire responses, indicated that students in the experimental group surpassed those in the control group in vocabulary and overall English proficiency. The enhancement confirmed that mobile applications offer a dynamic, motivating, and engaging environment for language learning.

How effective is Mobile-Assisted Language Learning (MALL) in enhancing English vocabulary acquisition among Pakistani university students?

The study indicates that MALL substantially enhanced students' vocabularies. Students utilizing mobile applications exhibited a notable enhancement in their post-test scores relative to the control group. The comprehensible input provided by mobile technologies such as vocabulary applications, assessments, and online exercises is accountable for this advancement. Krashen's Input Hypothesis (1982) posits that language learning transpires when learners engage with meaningful and comprehensible content that slightly exceeds their existing proficiency level (i+1). This type of comprehensive input was delivered using mobile applications utilizing audio samples, visual assistance, and prompt feedback. Consequently, students were able to assimilate new vocabulary in practical contexts, enhancing their application and retention.

Burston (2013) and Stockwell (2010) noted same findings, concluding that frequent and readily accessible practice opportunities enhance vocabulary acquisition via mobile-assisted learning.

What are the perceptions and attitudes of students toward using mobile applications for vocabulary learning?

The questionnaire results indicated that most students held positive views regarding the use of mobile applications for vocabulary learning. Over 80 percent of respondents concurred or strongly concurred that mobile technologies enhanced the efficacy, motivation, and enjoyment of learning. Students reported increased exposure to English outside the classroom due to mobile applications enabling vocabulary practice at any time and from any location. The results validated the Technology Acceptance Model (Davis, 1989), which emphasizes that perceived usefulness and ease of use are critical determinants in students' adoption of technology. This study indicates that students were more likely to engage in self-directed learning when they found mobile applications to be functional and user-friendly. Research by Kukulska-Hulme (2009) and Ting (2015) indicates that MALL enhances motivation, autonomy, and adaptability in learning, hence promoting positive learning attitudes.

What challenges do Pakistani students face while using mobile devices for vocabulary learning?

Even if the results were good, many flaws were found. Some students had trouble with technology, such as slow internet connections, bad data plans, and old phones. Several participants observed that disruptions from social media and various mobile applications impaired their concentration during study sessions. Furthermore, several pupils had insufficient digital literacy skills, hindering their ability to utilize learning applications successfully. These issues correspond with previous research conducted by Ali and Hashim (2019), which identified infrastructural inadequacies and inadequate technological support as major impediments to the successful implementation of MALL in Pakistan.

The study showed that MALL greatly improved pupils' vocabulary and interest in learning. According to Krashen's Input Hypothesis, using mobile gadgets made it easier for learners to get meaningful input at any time, which helped them learn a language naturally. The Technology Acceptance Model demonstrated that students' positive perceptions and the user-friendliness of digital technology led to prolonged engagement, hence enhancing their vocabulary acquisition outcomes. The combination of these frameworks provided a strong theoretical basis for the improvements that were seen.

CONCLUSION

University students in Pakistan saw a considerable improvement in their English vocabulary acquisition when they used mobile-assisted language learning (MALL), according to the current study. Results from the post-test showed that the experimental group had consistently better performance, lending credence to Krashen's (1982) Input Hypothesis and suggesting that students can have better access to understandable input in digital learning environments. The positive sentiments revealed by the learners in the questionnaire were supported by the Technology Acceptance Model (Davis, 1989). This suggests that the perceived utility and usability of mobile applications have a significant impact on learners' desire to use them for language acquisition.

Students' vocabulary retention improved as a result of MALL's incorporation since it provided them with more control over their learning experience, faster feedback, and an enhanced learning environment. Conversely, this type of engagement and inspiration was missing from conventional classroom teaching. Despite these benefits, there were also many drawbacks, including difficulties with technology and a lack of training for educators and pupils.

The study found that mobile-assisted technologies are more than just supplemental aids; they are effective platforms for enhancing English vocabulary competency. The findings emphasize the importance of robust technological infrastructure, digital training for faculty and students, and integrating mobile

technologies into language programs at Pakistani universities. To further support these findings, future research might examine the effects of technology-enhanced learning environments on motivation and long-term language memory using longitudinal designs, larger samples, and several universities.

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