WhatsApp's SMS Application: A Tool for Vocabulary Learning

Sahib Khatoon[1], Muhammad Usman Thaheem[2], and Quratulain Mirza[1]

[1] Mehran University of Engineering & Technology Jamshoro, Sindh, Pakistan
[2] National University of Modern Languages Hyderabad, Sindh, Pakistan

Corresponding author's email: sahib.khatoon@faculty.muet.edu.pk

Abstract
Since this world is progressing and the new generation is increasingly adopting mobile phones in their everyday lives, thus, WhatsApp media and other mobile applications are increasingly being used at educational institutions all around the world. Therefore, the current study investigated the WhatsApp SMS application's use in the vocabulary learning in the engineering university, Sindh, Pakistan. The study used a mixed-mode quasi-experimental pre-test post-test research design, in which students' vocabulary ability was assessed before they participated in WhatsApp classes and subsequently through post-test after the experiment. Moreover, students' experiences were also documented through the analysis of SMS messages they posted on a WhatsApp group (during experiment). The quantitative data was analyzed by conducting independent-samples t-test on SPSS and the findings of the study revealed that WhatsApp's SMS application usage posited a significant difference in the enhancement of vocabulary of the experimental group of students. Moreover, students' postings (SMSs) on WhatsApp group were analysed qualitatively following the thematic analysis. The qualitative analysis also revealed positive experiences of students concerning WhatsApp's SMS application in learning vocabulary. The current study reveals the benefits of WhatsApp's SMS application on tertiary students worldwide, as well as instructors, syllabus designers who develop courses for tertiary students, and policymakers who make educational policies, by instilling technology-enabled social media tools (specifically WhatsApp) in the ESL classroom context both nationally and internationally.

Keywords: *WhatsApp, vocabulary, engineering students, SMS messages.*

1. Introduction

Pakistan is still considered a developing country. It has a poor literacy rate and ranks low on the list of literate countries, moreover, in rural regions, the situation is considerably worse (Bhatti, 2016). English is the only foreign language in Pakistan that is required to be taught to students as a compulsory subject from primary school through graduation. It is the language of Pakistan's educated and privileged classes, and it is necessary to speak English to acquire a respectable job in the country (Bilal & Azhar, 2021). Moreover, integration of technology is even more complicated in Pakistani educational institutions, due to many reasons such as lack of resources,

lack of training, and so on. Nevertheless, the higher education commission of Pakistan is emphasizing to promote technology integration at the tertiary level of education (universities). Although, integrating technology and using technological tools in educational institutions is yet in infancy; it is the trend, and of the time nowadays in Pakistan (Farhat & Dzakiria, 2017). But, teachers and students incorporate a range of technology gadgets and social media sites to teach and study English in today's digital world globally (Khatoon et al., 2020). Since, the integration of various sophisticated gadgets and equipment, new paths for instructors and students have opened in which technology-based techniques and methods are being used to help minimize time and location constraints, allowing learners to study whenever and wherever they want (Islam & Hasan, 2020). Following the trend and need of the time, Khan (2009) performed research at Pakistan's Virtual University, which provides degree programs online. Students who took online classes had their perspectives about internet access, motivation, contentment, and they expressed their experiences with online learning. The study findings revealed positive effects of online programs. Similarly, the mobile devices are much used by practitioners and students in the teaching-learning environment because it has fostered practical effects on students' learning language in ESL/EFL context (Moreira et al., 2016). Accordingly, this new transformation in teaching and learning English methods and approaches have propagated the trend of E-learning and Mobile-Assisted Language Learning (Islam & Hasan, 2020). Moreover, the students, researchers, and teachers are in favour of these gadgets, devices used in the classroom for teaching and learning due to their resourcefulness, and flexibility and they provide opportunities for studying everywhere and at any time (Moreira et al., 2016).

Different social media platforms, such as Facebook Messenger and WhatsApp, offer messaging services. WhatsApp is a freeware, registered, cross-medium, and end-to-end encrypted MIM application for mobile phones with multimedia, group chat, and limitless messaging features (Kartal, 2019). According to Dehghan et al. (2017) on messaging services WhatsApp social network is growing fast among all other messaging services among all social networks. WhatsApp is a commonly widespread application on everyone's phone. It can be used on phones, laptops, and tablets also. The prime objective of WhatsApp was to offer instant message service at no cost with a connection to the internet. Those short messages "SMS" become the trend of the trade extensively. In addition, under Mobile-Assisted Language Learning, practitioners and students commonly employ mobile instant messaging (MIM) services in teaching and learning in ESL/EFL settings (Moreira et al., 2016). Moreover, social networking sites have evolved promising new ways to improve second-language specifically, vocabulary acquisition (Bensalem, 2018).

Vocabulary acquisition is a key element of language learning and one of the most essential aspects of second language acquisition (Knight 1994; Laufer 1992; Nation 2001; Yoshi & Falitz 2002). Since mastering vocabulary is one of the most essential aspects of learning a new language; it is a key component in improving students' language skills, particularly their reading comprehension (Fard & Vakili, 2018). Thus, vocabulary teaching through WhatsApp is very much possible. Since vocabulary learning through different social media tools is not a new idea whereas, vocabulary learning through WhatsApp' SMS application is in scarcity, thus, there should be studies on it. As

Knight (1994) stated, vocabulary learning is the fundamental aspect of learning a second language. In addition, WhatsApp is found an influential educational instrument to boost second language communication and it has an incredible potential to trigger students' participation which is one of the minimum exploited functionalities of mobile phones, and it encourages students' dynamic participation (Panah & Babar, 2020).

Linguists and academics in the early twentieth century focused on gender disparities in human language learning and investigated gender differences in vocabulary, communication, and grammar (Bhatti & Mukhtar, 2020). According to Khatoon et al. (2020), Pakistan has had a gender disparity in every sphere of life since, with the engineering industry being the most male-dominated, with women outnumbering males. Differences can be seen between engineering fields as well. For example, civil engineering is a predominantly male-dominated discipline, but software engineering has a sizable female student population. Gender differences breed other differences, such as behavioural and attitude differences. Thus, the current study is focusing on gender also in terms of finding out the differences (if any) in the enhancement of vocabulary performance after learning in the WhatsApp application context.

2. Literature Review
2.1 Vocabulary Learning in ESL context

Listening, speaking, reading, and writing are the four essential skills needed to master a language. Listening and speaking skills are usually the first to be grasped, followed by reading and writing skills. Furthermore, language learners must have a sufficient vocabulary to acquire these language skills. Simultaneously, no one can deal with or communicate without words in any language competence, according to Hunt and Belglar (2005), claim that "*words are the core of language understanding and use is a part of the lexicon*" (p. 2). Therefore, acquiring vocabulary is an important part of learning a language (Mahdi, 2018). Likewise, Wilkins (1972) stated that without grammar, very little can be communicated, and without vocabulary, nothing can be communicated at all.

The importance of vocabulary in the language acquisition process cannot be overstated. And this is only possible if the learners are taught using specific effective approaches for vocabulary instruction in particular and language acquisition in general (Raheem et al., 2021). Furthermore, vocabulary plays an important part in the development of a student's language competency in all linguistic skills, and there is no doubt in, ESL students who have a larger vocabulary will find it easier to improve their language skills (Yaacob et al., 2019). In second language acquisition research, the efficiency of vocabulary learning techniques has been extensively researched (e.g., Nakata, 2017; Nation, 2015; Webb & Chang, 2015). In the second part of the twentieth century, students were instructed to focus on implicit and accidental vocabulary acquisition. This meant that they were expected to provide them with techniques for recognizing vocabulary-related hints in a particular context—in this example, a textual context (Raheem et al., 2021). A substantial amount of recent research has focused on how computer-assisted language learning (CALL) and

mobile-assisted language learning (MALL) may help L2 learners in both EFL and ESL contexts improve their vocabulary knowledge (Yang et al., 2021).

2.2 Technology-based vocabulary learning in the ESL context

Technology has advanced tremendously, and its function in language acquisition has become increasingly important. These technologies may be utilized for language teaching and learning in a variety of ways is well-documented in the literature. The use of these technologies in foreign language learning and teaching has received a lot of attention recently, and several studies have investigated their possibilities in language learning contexts (Kartal, 2019). In both English as a Second Language (ESL) and English as a Foreign Language (EFL) settings, vocabulary acquisition is essential for second language (L2) learners (Yang et al., 2021).

Researchers and professionals in ESL have been investigating the modalities of vocabulary growth, both in conventional and digital learning, as a result of studies in vocabulary acquisition and learning in second language environments (Asllani & Paçarizi, 2021). In this vein, a study explored the acquisition of second language vocabulary through contact with two types of internet media: written blog posts and video blogs. It also investigated if there were any differences in which parts of vocabulary knowledge (orthography, semantics, and grammatical function) were best learned through these different mediums. The findings revealed that reading blog posts and viewing video blogs resulted in almost comparable amounts of accidental vocabulary development. There were some shreds of evidence that the two forms of media provided distinct types of vocabulary knowledge. Written blog articles resulted in more orthographic knowledge increases than movies. There was also some indication that the films helped people remember the grammatical functions of the target words as well as recognize and recall their meanings (Arndt & Woore, 2018).

Besides, the study was conducted in an Iranian university to see how Telegram stickers affected EFL learners' vocabulary development. The convenience sample technique was used to choose 60 Iranian intermediate EFL students (30 males and 30 females) from the Islamic Azad University, Shahreza Branch, who were enrolled in the second semester of the academic year 2016-2017. They were then divided into experimental and control groups at random. The learners' vocabulary knowledge was then assessed using a pre-test in both groups. The experimental group got their lectures via Telegram, whilst the control group was taught via traditional methods. The participants in both groups were then given an authorized post-test to see how far they had progressed. The findings suggested that teaching vocabulary using Telegram stickers might provide significant benefits to students. Overall, social networking aided the learning of new vocabulary items among Iranian EFL students. The findings have important consequences for language learners, instructors, and content creators (Ghobadi & Taki, 2018).

The study was conducted to use a mobile phone to look up the definition of a word in comparison to the traditional method of employing a printed dictionary. A vocabulary pre-test and post-test were carried out to determine the efficacy of utilizing compared to printed materials, cell phone technology is the more advanced dictionary. The findings of the experiment demonstrate that using

mobile phones improve students' knowledge of learning and understanding the meaning of words. When compared to a printed dictionary, the vocabulary got richer (Govindasamy et al., 2019). Moreover, a meta-analysis was done on research that examined the effects of students learning vocabulary using mobile devices with traditional methods of learning. The influence of utilizing mobile devices on vocabulary learning was investigated in this meta-analysis, which looked at 16 research with a total of 986 participants. In comparison to traditional methods, using mobile devices to acquire vocabulary was related to higher success ways. The results of the meta-analysis show that utilizing mobile devices has a moderate influence on vocabulary learning (Mahdi, 2018). Besides, the study was conducted with grade III students studying in various English medium institutes in Lahore Pakistan. The study aimed to explore how mobile assisted language learning (MALL) affects the vocabulary of young ESL students. The quantitative research strategy was used to achieve the present investigation's aims because the data was numerical. The results indicated a significant difference in performance between the experimental and control groups. The findings indicated that MALL may be used to transform vocabulary instruction in Pakistani ESL classrooms (Ali, Bashir etal., 2020).

2.3 WhatsApp instruction in learning vocabulary in the ESL context

Numerous social media sites have become the platform for interaction and integration of information, where people communicate with each other for sharing their thoughts, and information (Monica et al., 2014). Besides, numerous social media sites i.e. Facebook, Twitter, LinkedIn, Telegram, and WhatsApp, are persistently used by teachers and instructors in educational setups and all these social sites have a variety of functions and traits which make them different from others and they become apt for different purposes in educational contexts according to their suitability in the learning context (Alghazo & Nash, 2017). WhatsApp has surpassed other social media applications as the most widely used social networking application on mobile phones and desktops for university students, especially when it comes to language learning (Alqahtani, 2018; Yeboah et al. 2014). WhatsApp assists teachers in saving time, better managing the classroom, and keeping students informed about classroom activities (Awada, 2016). WhatsApp has become a strong instrument in L2 development in the realm of Second language learning (Andújar-Vaca & Cruz-Martínez, 2017).

Moreover, the WhatsApp application has numerous proficiencies including sending and receiving text messages, images, audio, and video files, and links. Precisely, the WhatsApp application is a social network site that people are using for communication rapidly. It has multiple features which offer ease to its user such as one can create the group as a platform of communication that can easily be used for different purposes. Thus, such interconnecting features make this device suitable device for educational purposes (Dehghan et al., 2017).

WhatsApp has been utilized in educational settings, such as language learning, and studies have shown that WhatsApp has a good influence on language acquisition (Kartal, 2019). Although WhatsApp is the latest invention, there is limited study on its efficacy in second language education in general, and in teaching and acquiring language skills or material, in particular, are found

(Dehghan et al., 2017). In this vein, a study was conducted, the purpose of this study was to look at the impact of WhatsApp in improving vocabulary acquisition among Iranian junior high school EFL students. There was a pre-test and a post-test. Four English groups were instructed, with the experimental group receiving vocabulary teachings through WhatsApp four days a week for four weeks, while the control group was taught textbook vocabularies within the classroom by a teacher. The findings indicated that WhatsApp had a major impact on students' vocabulary development (Jafari & Chalak, 2016).

Similarly, research was conducted to examine if WhatsApp might be used to teach new vocabularies in a foreign language and compare the results to traditional L2 vocabulary teaching methods. A pre-test revealed that there was no significant difference between the two groups. The first group received all their new L2 vocabulary teaching through WhatsApp, while the second group received traditional face-to-face instruction in the classroom. To compare the groups, a vocabulary exam was employed. The findings revealed no significant differences between the conventional and WhatsApp groups' vocabularies performance (Dehghan et al., 2017).

Moreover, one of the studies was conducted at Adiban English language institute, Baghmalek, Khuzestan, Iran. The researcher used the WhatsApp application for teaching ESL vocabulary to the experimental group whereas, the control group was taught in their conventional class. The pre-test and post-test were conducted to gauge the students' vocabulary performance. The post-tests of the experimental and control groups showed a significant difference, according to the findings of paired samples and independent samples t-tests. In the post-test, the experimental group outperformed the control group by a considerable margin (Fard & Vakili, 2018).

The study was conducted to compare the improvement of academic vocabulary knowledge of EFL students using WhatsApp to traditional vocabulary instruction at a public university in the Arabian Gulf area. It also attempts to find out how students feel about using WhatsApp to acquire language. The study included 40 Arab EFL students at the primary level who were enrolled. The findings revealed, that the WhatsApp group considerably outperformed the traditional group (Bensalem, 2018).

Besides, a comparative study was conducted to evaluate the impact of Facebook and WhatsApp on English vocabulary learning performance and learners' perceptions of the implementation method. Between the pre-test and post-test, the success of the students in the Facebook, WhatsApp, and control groups revealed a significant difference, indicating that the learning environments had varied effects on student performance. According to the findings, there was a significant difference in the mean scores of the students in the WhatsApp, Facebook, and control groups, and WhatsApp was more successful in increasing success. Although the Facebook group's mean scores increased higher than the control groups, the difference was not determined to be significant. According to the overall findings, WhatsApp is more successful in teaching vocabulary than Facebook (Çetinkaya, 2018).

2.4 Gender influence in learning English in the ESL context

Gender differences exist in all the human language learning processes, thus, they cannot be ignored in language learning and research (Ahmadi-Azad, 2019). Males and females view the world in very different ways. Females see themselves as individuals functioning in a network of relationships, whereas males see themselves as individuals living in a hierarchical social society. Gender disparities have deep historical roots. In various human civilizations, men and women have distinct roles, and as a result, the shift from a matriarchal to a patriarchal culture leads to a dominant position for the male, which may or may not be beneficial (Na, 2016). Males and females use distinct forms of language because of their varied attitudes toward social groupings. As a result, among the many elements that influence the quality of student-teacher interactions in the classroom, gender must not be overlooked (Holmes & Meyerhoff, 2005). Besides, language acquisition performance in virtual learning environments can be influenced by a variety of factors. Thus, gender can be a significant element among learner factors such as age, educational credentials, technological knowledge, and gender (Lin, L. F. 2011). One of the most important criteria utilized in SLA research to discriminate between learners is gender. Pakistan is a gender-biased country where gender influences in many ways (Khatoon et al., 2020). Gender disparities in various areas of second language acquisition have been the subject of several studies (Gallego, 2001).

Such as research in a Pakistani university that looked at undergraduate English as a second language (ESL) students' English language learning beliefs, anxiety, and learning outcomes. This research collects data from undergraduate ESL students using Horwitz's Views about Language Learning Inventory (BALLI) and investigates the impact of gender on Pakistani undergraduate ESL students' English language learning beliefs. Males and females had similar views on the component Motivations and Expectations, but considerably different beliefs in the factor Nature of Language Learning, according to the findings. The other three variables had gender disparities as well, although they were statistically insignificant (Iqbal & Yongbing, 2017).

Another study explored the influence of vocabulary acquisition techniques on ESL students in Pakistan by an experimental study. This research included 100 students in Grade 9 throughout the 2019-20 school year. The data was collected via a test and a questionnaire. Students who were taught using ESL learning strategies (semantic mapping, imagery, pictures, visual and auditory, group association, and word contact) progressed better than students who were taught using conventional vocabularies. In the experimental group, female students performed better. ESL male learners prioritized social association learning, whereas ESL female learners prioritized visual and auditory learning (Bhatti & Mukhtar, 2020).

Besides, the study to see how two learner background variables, namely gender, and discipline (academic major), influence the frequency with which learners employ vocabulary acquisition strategies. A questionnaire with 93 items on vocabulary acquisition techniques was used to collect data from 79 Turkish graduate students pursuing their master's or Ph.D. studies in a range of departments at 27 Turkish institutions. The findings of the study indicated a significant difference

in frequency of VLS usage between male and female learners in favor of females, with non-significant findings between science majors and arts and humanities majors (Yilmaz, 2017).

Moreover, the influence of interventionist dynamic evaluation on vocabulary learning in Iranian EFL learners was investigated, as well as any gender disparities in this process. Two complete courses of general English at Tabriz Azad University were chosen to attain this objective. Following a homogeneity test, one of the classes in the experimental group got mediation, while the other class in the control group did not. There was no statistically significant difference between the experimental and control groups, according to data analysis. Furthermore, there was no significant difference in performance between males and girls (Ahmadi-Azad, 2019).

Similarly, the research study with the purpose to see if there was a significant difference in vocabulary learning method preferences between males and females, as well as to see if there was a link between students' vocabulary learning tactics and their vocabulary size. The students in SMAN 1 Natar's first grade (100 students) were the sample of the study. Schmitt and Clapham's (2000) questionnaire and vocabulary size test were used as instruments. The study's findings indicated a significant difference in vocabulary learning strategy preferences between male and female participants (Lestari et al., 2009).

3. Methodology

The study followed a quasi-experimental pre-test post-test mixed-mode research design; in which students' vocabulary performance was checked through two tests (pre-test and post-test) before and after studying under the WhatsApp's SMS application's context. Moreover, students' experiences were also investigated by analysing the students' SMSs that they posted on the WhatsApp group. Thus, two groups two intact (experimental and control) (n=80) undergraduate students of computer system (section A) engineering students' (male and female) were taken for the study as an (experimental group) whereas the computer system engineering students' group (section B) was selected as a (control group) for the study. Before taking WhatsApp sessions on vocabulary learning, a pre-test and after the sessions, a post-test was administered. The experimental group was taught under the SMS application of WhatsApp five days a week for six weeks. On the other hand, the control group students were taught in their conventional class.

3.1. Sample of the study

The background of the two groups (experimental and control) was the same they all were from an engineering university, first-year students whose ages ranged from 19 to 21 who were studying "Functional English" subject during their second semester of study. The two intact classes of the engineering university were randomly selected for the study as there were three sections (A, B, C) of first year English class. Table 1 is demonstrating the group's representation.

Table. 1. Demographic representation of participants

Group	Number	Age	Gender	Discipline & Section
X Group	40	19+	Male & Female	Computer System Engineering
Control Group	40	19+	Male & Female	(A)
				Computer System Engineering
				(B)

3.2. Instruments

This study administered the pre-test and post-test before and after conducting the sessions in the engineering students' class (experimental group+ control group). As the piloting of the tool is a must thus, both tests were piloted with 20 students who were not involved in the actual study thus knowing the errors and imperfect leads and choices in the tests, pilot testing helped. Cronbach's formula of reliability measure was employed to estimate the reliability of the tests which was 0.82.

3.3. Intervention

Before the commencement of the experiment, participants were informed of the study's goal. All participants took a vocabulary pre-test before receiving their first session of vocabulary test items. Both the experimental and control groups were given the same list of 240 words over six weeks, with an average of 40 words every week. The duration of the class was 40 minutes, and it was conducted thrice a week. The experimental group received word lists through WhatsApp's SMS application after the teacher created a WhatsApp chat group and each participant provided their consent. On the other hand, the control group was given printed versions of the same word lists. All the students were allowed to use the dictionary also for their help. After the sessions, the participants were given the post-test in the same manner as they were given the pre-test. The goal of the post-test was to see how much the students' vocabulary had improved. Both the pre-and post-tests were the same. The researcher had to alter the materials to prevent students from memorizing the right answers rather than answering the questions based on their knowledge.

4. Findings and Discussion
4.1. The objective of the study

To answer the first objective of the study:
•   To explore if there is a significant difference in the vocabulary enhancement of experimental group participants using the WhatsApp application in the ESL context.
In the quantitative analysis Independent Samples t-test is done on SPSS to answer the above-mentioned questions. As the pre-test was conducted thus, the pre-test results of both groups (experimental and control) were computed on SPSS-26.

4.2. Quantitative Analysis
Pre-test results
Data were computed and by independent-samples t-test both groups' (experimental group and control group) pre-test scores were compared. The results are displayed in Table 2 which explain that there was no significant difference in the vocabulary pre-test mean scores of the experimental group (M=15.93, SD=1.78) and control group (M=16.30, SD=1.76); t (59) =.743, p = 0.47 found thus, both groups were homogeneous.

Table. 2. Pre-test scores of both groups (Experimental & Control)

Groups	N	Mean	SD	t	df	p
Pre-test	40	16.30	1.76	.743	59	.47
Experimental Group	40	15.93	1.78	.744		

The second objective was accomplished by computing the data to know the difference between the female and male students separately, the results are demonstrated in Table 3. Hence, an independent-samples t-test was conducted to compare male and female students' pre-test scores. Thus, the results showed that there was no significant difference found in the mean scores of boys' participants in the study (M=16.70, SD=1.62) and girls' participants (M=15.33, SD=1.54); t (27) =-.98, p = 0.34 in the vocabulary pre-test scores thus, boys and girls' students were homogeneous in the pre-test.

Table. 3. Mean scores of Pre-tests of (males &s)

Group	N	Mean	SD	t	Df	p
Female	34	16.70	1.62	.98	27	.34
Male	46	15.33	1.54	.98	26.9	.34

Post-test Results
To know the difference between the two groups after they took sessions through the WhatsApp application the data was conducted through post-test from both groups (Experimental and Control). The results were computed by carrying out the independent sample t-test to see the difference in the mean scores of the two groups (Control and Experimental).

Table. 4. Post-test scores of both groups (Experimental & Control)

Groups	N	Mean	SD	t	df	p
Control Group	40	19.23	1.99	6.16	44.78	0.00
Experimental Group	40	23.93	3.66	6.16		

To know the post-test scores difference of both groups an independent-samples t-test was conducted to analyse the difference in the scores after using WhatsApp as an application for the

enhancement of vocabulary. The results are presented in Table 4 which describes that there was a significant difference in the scores of the experimental group (M=23.93, SD=3.66) and control group (M=19.23, SD=1.99); t (58) =.6.16, p < .001/ respectively. Thus, the results are clearly showing that the WhatsApp' SMS application remained fruitful and effective in enhancing students' vocabulary.

Similarly, to answer the second objective of the study as to find out if there is a significant difference in terms of gender (males/females) vocabulary improvement in the context of the WhatsApp application in the ESL context. Students' (male and female) scores were separately computed to know the difference between both (male and female) participants' scores if any. Moreover, an independent-samples t-test was conducted.

Table. 5. Mean scores of Post-test of (males & females) Experimental group

Groups	N	Mean	SD	t	Df	p
Male	15	24.53	3.75	.89	27.94	.37
Female	25	23.33	3.59	.89	28	.37

An independent-samples t-test was conducted to compare males' and females' students' post-test mean scores. Thus, the results shown in Table 5 revealed that there was not a significant difference in the scores of boys' participants in the study (M=24.53, SD=3.75) and girls' participants (M=23.33, SD=3.59); t (28) = .89, p = 0. .37 in the vocabulary post-test scores thus, boys' and girls' students similarly performed in the vocabulary test of both groups.

4.3. Qualitative Analysis

To answer the objective of the study: "the students' experiences of learning vocabulary through the WhatsApp application" were analysed by students' chatting and postings on the WhatsApp group (created by the teacher) concerning learning on WhatsApp. Students' names are pseudo names to keep the research ethics in consideration. Their chatting snapshot is placed in the following Figure 1.

Fig 1 *WhatsApp chat on group*

Moreover, the researcher analysed those postings qualitatively by thematic analysis. According to Ivankova et al. (2006), "Qualitative data analysis entails classifying things, people, and events, as well as the qualities that define them."
The following are the themes derived from the data, as indicated in Table 6 (Themes):

Table. 6. Students' experiences concerning WhatsApp use in vocabulary learning (Themes)

Themes	Narratives/ SMSs	No of occurrence
Easy	Learning through WhatsApp is effortless and easy.	34
Objective oriented	I feel is quite a focused sort of group where we are only talking about learning and easily learning a language. It is quite a goal-oriented group.	31
Motivating	I love learning through WhatsApp, I feel motivated to learn vocabulary whenever I open WhatsApp and feel interested to open the group to learn.	44
Flexible	Isn't it quite practical we are holding phones in our hands and learning even any time anywhere with ease?	43
Exciting	Every time I attend sessions on WhatsApp my excitement increases to stay in the learning class more than before.	35
Practical	I think it's a very practical way of learning vocabulary through WhatsApp because we are not facing any problems with internet speed or laptop resources (which I do not have). It is easy to attend class on phone.	43

5. Discussion

Based on the findings mentioned in Table 2, students' pre-test means scores demonstrated there was no difference between both groups and were homogeneous and had no difference in acquiring the vocabulary performance in the pre-test before taking the treatment of WhatsApp application for learning vocabulary. Likewise, Table 4 and Table 5 are demonstrating the post-test results in which the experimental group surpassed and achieved good grades than the control group.

Moreover, the current study findings imply that the WhatsApp application is effective in teaching and learning vocabulary in the ESL context. As students of the experimental group were added to the WhatsApp group (created by the teacher). Thus, they were allowed to post their SMSs concerning their experiences of their current learning. All experiences expressed by them also revealed that students' found WhatsApp applications easy, comfortable, manageable, practical, exciting, motivating, objective-oriented, and flexible for learning ESL vocabulary. These findings demonstrated there is a significant difference in the mean scores of the two groups' post-tests results. These findings are consistent with the findings of (Bensalem, 2018; Çetinkaya, 2018; Fard & Vakili, 2018; Jafari & Chalak, 2016). All these studies showed an experimental group of these studies took the WhatsApp application's treatment for learning vocabulary in the ESL context and outperformed. The current study is in contrast with the findings of Dehghan et al. (2017), which demonstrated that there was no significant difference found after taking the treatment through the

WhatsApp application for learning vocabulary students of both groups (control and experimental) performed in post-test similarly.

Moreover, the current study revealed that vocabulary learning through the technology-integrated application (WhatsApp) is effective. Such findings are in line with (Ali et al.; Arndt & Woore, 2018; Ghobadi & Taki, 2018; Govindasamy et al., 2019; Mahdi, 2018; Yang et al., 2021). All these studies demonstrated that vocabulary learning becomes more effective when they are taught through any technology-integrated tool.

Besides, boys and girls concerning gender were also tested as demonstrated in Table 3 both gender had no difference in acquiring the vocabulary performance in the pre-test, which demonstrated no difference before taking the treatment. Likewise, when the post-test was computed it also revealed there was no significant difference found related to gender (boys' and girls') vocabulary mean scores in the post-test. These findings are in line with those (Ahmadi-Azad, 2019), which revealed there is no influence of gender students had on their language acquisition. Whereas this study's findings are in contrast with those (Bhatti & Mukhtar, 2020; Iqbal & Yongbing, 2017; Lestari et al., 2009; Yilmaz, 2017). These studies presented evidence of differences among male and female students' language learning specifically in vocabulary learning because of gender influence. Moreover, the claims (Ahmadi-Azad, 2019; Gallego, 2001; Holmes & Meyerhoff, 2005; Lin, L. F. 2011; Na, 2016) are also in contrast that gender influences students' language learning and language performance in the ESL context.

5.1. Pedagogical Implications

Information technology and social networking sites are rapidly intruding on every area of our community's social life, with obvious consequences in daily life. As a result, using WhatsApp, Facebook, and other similar social media platforms in education can be beneficial because students are already familiar with them and do not require training to use them in a learning environment. As a result, these platforms should be promoted in their educational setting. The study found that using WhatsApp as a platform for ELT teachers, English language learners, and institutions can improve vocabulary learning performance in the ESL context, and it also showed the potential outputs of using WhatsApp as a platform for ELT teachers, English language learners, and institutions.

It's a fascinating way for teachers to push their students to be more attentive and responsible. According to the present study's findings, students have more possibilities to become adept learners because of SMS posting, and therefore the concept of the authoritative class goes away. In the context of ESL, instructors are also becoming more updated and modifying their lesson plans to foster a more student-cantered setting, and the WhatsApp group has provided them with the ability to interact with peers and teachers at any time, which promotes a more student- cantered atmosphere. Instructors can create lesson plans and WhatsApp groups to enhance English language acquisition, and this atmosphere can also encourage students to study English.

6. Conclusion

In this study, researchers used WhatsApp to acquire new vocabulary items and compared the outcomes to standard vocabulary learning for ESL students. When compared to the traditional technique, the results demonstrated that utilizing the WhatsApp application greatly enhanced learners' vocabulary learning. Furthermore, for most participants, utilizing WhatsApp as a learning tool has been a positive experience since it has improved their motivation to learn vocabulary. Considering these findings, language instructors should think about utilizing the WhatsApp application to teach vocabulary and incorporating it into the classes and their lessons. Because educators may not have enough time in class to teach many vocabulary items, WhatsApp allows them to do so. It also allows them to communicate with all students via virtual communication.

7. Future Directions

Important to note that the instrument and sample utilized in the study have inherent limitations. The researchers believe that a sample drawn from any ordinary institution rather than an engineering university would have provided a more accurate image of the WhatsApp application in an ESL environment. Because engineering university students are more interested in their major engineering subjects and less interested in their compulsory or minor subjects (English), the findings can have a variety of directions and student experiences, so future researchers can conduct studies in public universities. Furthermore, the current study employed quasi-experimental research methods; additional research using different research designs is needed.

Furthermore, investigations comparing the effects of different social networking sites on educational settings should be undertaken. Although the present study focused on vocabulary acquisition with WhatsApp application courses, more research is needed to see how WhatsApp may be used to acquire other language skills including reading, writing, speaking, and listening. Educators' opinions on the usage of WhatsApp and similar apps in the classroom should be sought out, and they should be encouraged to participate. The current study focused on the tertiary educational institute further studies can be conducted in secondary schools also with the same social media application (WhatsApp) and English language skills (vocabulary learning, reading, writing, listening, speaking). More research studies can be done with or without gender differences or with other demographic variables. More comparative studies can be conducted on WhatsApp applications and any other social media sites to analyse their effect on learning the English language learning.

8. References

Ahmadi-Azad, S. (2019). The effect of Interventionist Dynamic Assessment on EFL Vocabulary Learning by considering Gender differences: a Case for Iranian Academic context. *International Journal of Language Testing and Assessment, 1*(1), 2018, 1-8

Alghazo, Y. M., & Nash, J. A. (2017). The effect of social media usage on course achievement and behavior. *Journal of Education and Practice, 8*(2), 161-167.

Ali, M. M., Bashir, A., Ikram Anjum, M. A., & Mahmood, M. A. (2020). Impact of Mobile Assisted Language Learning on the Young ESL Learners' Vocabulary in Pakistan. *Journal of Research & Reflections in Education (JRRE), 14*(1).

Andújar-Vaca, A., & Cruz-Martínez, M. S. (2017). Mobile instant messaging: WhatsApp and its potential to develop oral skills. *Comunicar: Revista Científica de Comunicacíon y Educacíon*, *25*(50), 43-52.

Arndt, H., & Woore, R. (2018). Vocabulary learning from watching YouTube videos and reading blog posts. *Language Learning and Technology, 22*(3) 22, 124–142.

Asllani, H., & Paçarizi, R. (2021). Enhancing second language incidental vocabulary learning through technology. *Journal of Educational and Social Research, 11*(4), 107-107.

Awada, G. (2016). Effect of WhatsApp on critique writing proficiency and perceptions toward learning. *Cogent Educ. 3*, 1–25 (2016).

Bensalem, E. (2018). The impact of WhatsApp on EFL students' vocabulary learning. *Arab World English Journal (AWEJ) Volume*, *9*.

Bhatti, M. S., & Mukhtar, R. (2020). Impact of Vocabulary Learning Strategies on Gender Based ESL Learners in Pakistan. REiLA: *Journal of Research and Innovation in Language, 2*(3), 134-140.

Bilal, H. A., & Azhar, P. (2021). Picture Word Inductive Model on Vocabulary Learnig. *International Review of Social Sciences*, 9(May).

Cetinkaya, L. Su tc u, SS (2018). The effects of Facebook and WhatsApp on success in English vocabulary instruction. *Journal of Computer Assisted Learning, 34*(5).

Dehghan, F., Rezvani, R., & Fazeli, S. (2017). Social networks and their effectiveness in learning foreign language vocabulary: *A comparative study using WhatsApp. call-ej, 18*(2), 1-13.

Fard, E. E., & Vakili, A. (2018). The effect of problem-based learning on Iranian EFL learners' vocabulary learning. Journal of Asia TEFL, 15(1), 208.

Farhat, P. A., & Dzakiria, H. (2017). Pronunciation barriers and computer assisted language learning (CALL): Coping the demands of 21st century in second language learning classroom in Pakistan. *International Journal of research in English Education*

Llach, M. P. A., & Gallego, M. T. (2012). Vocabulary knowledge development and gender differences in a second language. *Elia*, *12*(1), 45-75.

Ghobadi, S., & Taki, S. (2018). Effects of Telegram stickers on English vocabulary learning: Focus on Iranian EFL learners. *Research in English language pedagogy, 6*(1), 139-158.

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age?. *Medical teacher, 38*(10), 1064-1069.

Govindasamy, P., Yunus, M. M., & Hashim, H. (2019). Mobile assisted vocabulary learning: Examining the effects on students' vocabulary enhancement. *Universal Journal of Educational Research, 7*(12), 85-92.

Hashemifardnia, A., Namaziandost, E., & Rahimi Esfahani, F. (2018). The effect of using WhatsApp on Iranian EFL learners' vocabulary learning. *Journal of Applied Linguistics and Language Research, 5*(3), 256-267.

59

Hunt, A., & Beglar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a foreign language, 17*(1), 23-59.

Islam, A. S., & Hasan, M. (2020). The effectiveness of mobile assisted language learning (MALL) on ESL listening skill. NOBEL: *Journal of Literature and Language Teaching, 11*(2), 188-202.

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field methods, 18*(1), 3-20.

Jafari, S., & Chalak, A. (2016). The role of WhatsApp in teaching vocabulary to Iranian EFL learners at junior high school. *English Language Teaching, 9*(8), 85-92.

Kartal, G. (2019). What's up with WhatsApp? A critical analysis of mobile instant messaging research in language learning. *International Journal of Contemporary Educational Research, 6*(2), 352-365.

Khan, I. M. (2009). An analysis of the motivational factors in online learning (*Doctoral dissertation, University of Phoenix*).

Khatoon, S., Jafre, M., Abidin, Z., Mirza, Q., & Hussain, A. (2020). Blogging in ESL class-gender-based attitude of the engineering students. *International Journal of Evaluation and Research in Education (IJERE), 9*(4), 1128–1137. https://doi.org/10.11591/ijere.v9i4.20673

Knight, J. (1994). *Internationalization: Elements and Checkpoints. CBIE Research No. 7*. Canadian Bureau for International Education. 220 Laurier Avenue West, Suite 1550, Ottawa, Ontario K1P 5Z9.

Mahdi, H. S. (2018). Effectiveness of mobile devices on vocabulary learning: A meta-analysis. *Journal of Educational Computing Research*, *56*(1),134-154. https://doi.org/10.1177/0735633117698826

Monica-Ariana, S., & Anamaria-Mirabela, P. (2014). The impact of social media on vocabulary learning case study Facebook. *Annals of the University of Oradea, Economic Science Series*, *23*(2), 120-130.

Moreira, F., Ferreira, M. J., Pereira, C. S., & Durão, N. (2016, March). Collaborative Learning Supported by Mobile Devices: A Case Study in Portuguese High Education Institutions. In *WorldCIST (2)* (pp. 157-167).https://doi.org/10.1007/978-3-319-31307-8_16

Nakata, T. (2017). Does repeated practice make perfect? The effects of within-session repeated retrieval on second language vocabulary learning. *Studies in Second Language Acquisition*, *39*(4), 653-679.

Nakata, T. (2017). Does repeated practice make perfect? The effects of within-session repeated retrieval on second language vocabulary learning. *Studies in Second Language Acquisition*, *39*(4), 653-679.

Na, W. E. I. (2016). Gender differences in the use of English vocabulary learning strategies in Chinese senior high schools. *Studies in Literature and Language*, *12*(4), 58-62. https://doi.org/10.3968/8225

Panah, E., & Babar, M. Y. (2020). A survey of WhatsApp as a tool for instructor-learner dialogue, learner-content dialogue, and learner-learner dialogue. *International Journal of Educational and Pedagogical Sciences*, *14*(12), 1198-1205.

Siemens, G. (2006). *Knowing knowledge*. Lulu. com.

Raheem, M. A., Asif, M., Latif, M., & Javed, M. A. (2021). English Vocabulary Teaching Techniques at Secondary Level Schools in the Punjab, Pakistan. *Review of Applied Management and Social Sciences*, *4*(2), 479-484. https://doi.org/10.47067/ramss.v4i2.148

Webb, S., & Chang, A. C. (2015). Second language vocabulary learning through extensive reading with audio support: How do frequency and distribution of occurrence affect learning?. *Language Teaching Research*, *19*(6), 667-686.

Wilkins, D. A. (1972). Grammatical, Situational and Notional Syllabuses.

Yaacob, A., Shapii, A., Saad Alobaisy, A., Al-Rahmi, W. M., Al-Dheleai, Y. M., Yahaya, N., & Alamri, M. M. (2019). Vocabulary learning strategies through secondary students at Saudi school in Malaysia. *SAGE open*, *9*(1). https://doi.org/10.1177/2158244019835935

Yang, X., Kuo, L. J., Eslami, Z. R., & Moody, S. M. (2021). Theoretical trends of research on technology and L2 vocabulary learning: A systematic review. *Journal of Computers in Education*, *8*(4), 465-483.

Yeboah, J., & Ewur, G. D. (2014). The impact of WhatsApp messenger usage on students performance in Tertiary Institutions in Ghana. *Journal of Education and practice*, *5*(6), 157-164..

Yilmaz, V. G. (2017). The role of gender and discipline in vocabulary learning strategy use of Turkish Graduate EFL learners. *International Journal of Innovation and Research in Educational Sciences*, *4*(1), 2349-5219.