



Research article

The effect of technology-assisted language programme on vocabulary learning among EFL students at the tertiary level

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ABSTRACT

Mobile technologies have drawn the attention of the researchers and are gaining popularity in a variety of academic backgrounds. However, there is currently unavailability of studies on the benefits that various mobile technologies give to learning results. The objective of this current study was to examine how the mobile assisted language programme, WhatsApp affected Bangladeshi tertiary level EFL learners' vocabulary learning. The study included sixty-four EFL students who had intermediate level of English competency, and they were chosen using random sampling. After establishing the learners' homogeneity with a vocabulary examination/test, the researchers separated the participants into two categories, namely experimental group (N = 34) and control (N = 30) group, and then their vocabulary knowledge (i.e., synonyms and antonyms) was assessed. The research involved 14 session treatment with the control group using the usual traditional method and the experimental section using WhatsApp to teach new words. A vocabulary post-test for the both classes was conducted after the completion of the course. In addition, both groups were given an attitude questionnaire to see how they felt about the traditional vocabulary acquisition method and utilizing the WhatsApp approach. According to the findings of this study, the experimental group performed better than the control group. Furthermore, as compared to the other group, learners who utilized WhatsApp to improve their vocabulary skills showed a more favourable attitude toward learning foreign language vocabulary. The current research would have further ramifications for English instructors, learners, researchers, and other stakeholders as well.

1. Introduction

Digital technology is pivotal for language learning in this modern era. For facilitating the learning process, students can employ digital technology (Yang and Chen, 2007); the technology provides different affordability, such as interpersonal connection and interaction in social media. In addition, according to Jones and Shao (2011), learners' reaction to using new technology is positive, and they consider technology as a suitably combined and well-designed avenue for learning. Recently, learning by mobiles or mobile learning has become a new tendency to help learners deal with materials whenever the necessity arises (Lan and Sie 2010; Tahounehchi, 2021). The advent of new technologies has given effective means for language learning so that learners can enhance their knowledge of different sub-skills and skills (Astika, 2015). Moreover, tertiary level learners have significant readiness of using mobiles inside

and outside the language classroom (Ibna Seraj et al., 2020). In this regard, one of the topics that have gotten a lot of interest is vocabulary acquisition via mobile technology. There are a variety of mobile applications that can help pupils expand their vocabulary.

The WhatsApp program, which is extensively used all over the world, is one of these benefits. In addition, Whatsapp is the most well-liked mobile application across the globe, and it has over 1.2 billion monthly users who use this application for messaging and other purposes (Bensalem, 2018). It is a free texting and calling program that also allows users to share materials, such as photos, video, audio, contacts, and location. Because of the popularity of such apps, many language educators are interested in investigating how they may use WhatsApp to teach particular aspects of foreign/second language learning. One of the most important aspects of learning a foreign/second language is developing vocabulary, and vocabulary is one of the domains of language instruction

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that can take advantages from WhatsApp (Bensalem, 2018). Bensalem (2018) also adds that WhatsApp can be utilized to assist learners in explicitly learning the necessary words and terminology. However, little emphasis has been paid to how this application could be used for vocabulary learning, which is the aim of the current study. Other studies have been conducted, employing different methodologies in other English learning contexts, like English as a second language context (ESL); however, this study was conducted, administering experimental study and considering English as a foreign language (EFL) context. Thus, keeping the research gap, the purpose of the current study is to investigate the effect of technology-assisted language programme, i.e. WhatsApp on vocabulary knowledge (i.e. synonyms and antonyms) of the students, employing experimental study (pre-test and post-test) among EFL students at the tertiary level.

2. Literature review

2.1. Language learning via mobile device

Mobile phones have been used widely in modern society, and their use has been expanded to educational settings (Nazari and Xodabande, 2020). Mobile learning has a variety of benefits in second language classrooms; for example, it enables language teachers to give genuine subject matter, conversational language drill, and exercise completion drills (Chinnery, 2006). Furthermore, mobile assisted language learning (MALL) is a kind of teaching and studying system that utilizes smart phones or other handheld devices with various forms of wireless connectivity (Arancon, 2013). Mobile devices have distinct properties, including “accessibility, personalizability, and portability” (Saran and Seferoglu, 2010, p. 253), as well as corporal attributes, input/output capabilities, file storage and retrieval, and processor speed (Alzubi and Sabha, 2013) that make them useful for language learning and teaching. Furthermore, mobile gadgets assist learners with unique properties, such as intelligibility (Saran and Seferoglu, 2010).

According to the recent studies, MALL appears to be important at multiple stages of language instruction. Mobile technologies include a wide range of “handheld technology, such as smartphones, tablets, or gaming devices in a language learning context” and are not restricted to smartphones (Hsu, 2016, p. 2). In this context, Nazari and Xodabande (2020) suggested that mobile technologies’ personalized, portable, and dynamic qualities have opened up new avenues for theory and research development. They also came to the conclusion that if teachers opted to use mobile phones, both they and their students would profit. Similarly, movements like “Bring Your Own Device” stress interacting with and utilizing the capabilities of mobile technology in order to raise educational standards (O’Bannon and Thomas, 2014).

Over time, the scope of mobile learning research has also broadened. Because mobile learning is a relatively new field of education in which a device is utilized for discussion, engagement, and instruction (Stowe, 2013), several studies have examined its effect on language learning. Its role in language learning has been investigated in several research studies. Huang, Yang, Chiang, and Su (2016), for example, conducted their research for developing a 5-step vocabulary learning (FSVL) strategy. The study focused on five steps: obtaining, encountering, consolidating, comprehending, and utilizing a mobile learning device, as well as understanding the impact of mobile on motivating students and enhancing their English performance. The findings revealed that learners who studied using the FSVL technique and a mobile learning device had higher motivation and performance than their peers. In addition, they outperformed their peers who studied using the FSVL technique and traditional learning methods. Wang (2016) aimed to create a mobile-assisted learning system and see if it might improve the performance of classical Chinese students. According to the findings, the mobile-assisted learning system enabled users to have a flipped classroom learning experience at anytime and anywhere.

In Iranian context, Motallebzadeh, Beh-Afarin, and Daliry Rad (2011) used Short Message Services (SMS) so that EFL students can learn English terms. The results of their study showed that the experimental group’ students performed better than the control group’s students. Furthermore, the experimental group showed positive mindset about learning vocabulary via SMS. Moreover, the study of Basoglu and Akdemir (2010) was on lexicon acquisition to determine the differences in the impacts of using cellphones versus flash cards on vocabulary learning. The results of their study showed that significant difference existed between control and experiential groups, and the experimental group performed better than the control group.

The importance of new technologies in language learning/teaching, for example vocabulary, is a viable choice, and a variety of multimedia software can be utilized correspondingly (Astika, 2015). Mobile technologies have a good impact on vocabulary learning in particular. For instance, Lu (2008) utilized SMS for vocabulary acquisition among L2 learners in the third high school level. In the post-test, participants who used this service expressed a favourable impression regarding MALL or mobile learning. The study of Lin (2010) used computer assisted language learning programme based on video and its effects on incidental vocabulary acquisition of English learners who had varying degrees of English proficiency in both listening and reading skills. The findings revealed that video-based computer-assisted learning was an effective tool for individuals with high reading and listening skills. Suwantara and Orawiwatnakul (2015) evaluated the use of SMS to teach new terms to the experimental group outside of the classroom for 6 weeks. The researchers, on the other hand, gave the control group new words to learn in their classroom. The results showed that the experimental group had performed better than the control group.

Moreover, according to the review study of Ibna Seraj et al. (2021), there is lack of studies on the use of mobile phones in language classroom in Bangladeshi context. There are few studies (Begum, 2011; Hossain, 2018; Ibna Seraj et al., 2020; Shohel and Kirkwood, 2012; Shohel and Power, 2010) have investigated the use of mobile technology and English learning. Hossain (2018) investigated the use of mobile apps and its efficacy on English studying. The findings of his research work show that the majority of the students opined that they employed smartphones and other apps for learning English. In addition, those who used English learning apps performed better in English proficiency tests than those who did not employ mobile apps related to English learning. The majority of the students also found cellphones and apps to be very convenient and comfortable to use when learning the target language. Many of them believe that if EFL teachers in Bangladesh allow students to utilize smartphones and applications in the classroom, they will be able to facilitate the learning process one step further.

The goal of the study of Begum (2011) was to see if cell phones might be used as a teaching tool in Bangladeshi EFL classrooms. Conducting a case study, the researcher included one hundred undergraduate EFL students as subjects in certain SMS-based class assessments in the university’s English Department. The findings of the study revealed that, despite some challenges, cell phones have great potential as an instructional tool. These challenges can be overcome by sincere efforts from authorities and teachers, as well as a shift in the ethical mindset that regards cell phones as merely a distracting factor in the classroom. Shohel and Kirkwood (2012) investigated the difficulties and challenges faced by secondary school teachers when they used technology to enhance English learning and teaching practices. Their study has not focused on mobile technology and English learning. The study of Shohel and Power (2010) found that the usage of new mobile technologies has been proved to improve teacher education and training while also facilitating access to learning. However, the studies mentioned in the Bangladeshi context show that there has been little research work that investigated the effect of mobile technology on vocabulary learning.

The findings of studies on the use of digital technologies to improve vocabulary learning substantiate the favourable impacts of such technology. Furthermore, this area of research emphasizes the use of various

mobile applications to assist learners in their vocabulary development. Learners use a variety of widely-accepted applications, such as Skype, Go SMS Pro, and WhatsApp (Jadhav et al., 2013), and they can be utilized for improving learning outcomes. WhatsApp is an example of a commonly utilized mobile technology, and it is dependably used on identifiable computers and mobile phones (Ashiyan and Salehi, 2016). According to Jadhav et al. (2013), WhatsApp is the most popular messaging app among academics. As of January 2017, WhatsApp was the most popular mobile application in the world, with over 1.2 billion active users. Furthermore, according to Bensalem (2018), this program/app may be utilized on a variety of mobile devices, including Apple, Blackberry, and Android. Thus, the present study examined the effect of mobile technology on vocabulary learning.

2.2. The present study in the context of mobile app

In terms of language learning, Manan (2017) claims that WhatsApp mobile tool can assist communicative learning for second language learning students. Manan investigated the impact of WhatsApp on English as foreign language learners' speaking skill. The results revealed that the usage of WhatsApp had a beneficial impact on the learners' motivation to talk. Furthermore, Alghamdy (2019) examined the attitudes and achievement of two groups; the first one was control group, and the second one was experimental group which utilized WhatsApp. The study's findings revealed that pupils showed positive attitude about WhatsApp and their performance improved after being taught to use it. Generally, the portability, personalisation, wide use, communication-enhancing potentials, varied programmes of WhatsApp in language learning are all highlighted by these writers.

As a result of its widespread use, WhatsApp is widely used by many students, including Bangladeshi language students. WhatsApp also has audio- and video-sharing features, text-messaging that could help the students learn vocabulary. More precisely, the software allows users to highlight important text for subsequent use, which might be useful for vocabulary development. However, few researches have looked into whether or not WhatsApp may be used to learn vocabulary. This is the research gap the current study aims to examine. The study addresses the present research questions.

1. Does a statistically significant difference exist between the impact of conventional and mobile-assisted vocabulary learning on the vocabulary knowledge of EFL learners?
2. What type of attitude do the students show toward mobile-assisted vocabulary learning?

3. Methodology

3.1. Participants

The participants of this research work were 64 learners from two sections (classes), and they possessed an intermediate stage of English proficiency. The researchers conducted random sampling, taking 10 sections/classes into consideration; one of the sections (experimental group) received Whatsapp related vocabulary learning. The other section (control group) received traditional teaching lessons. For both of the sections, the same instructor taught the course. The experimental group consisted of 34 students who were 18 male and 16 female students. The control group comprised 30 students; out of them, 20 were male learners, and 10 were female learners. The first language of the students was Bengali. They had no prior experience staying in a place where English was the native language. They all studied English as a foreign language in elementary and senior school. The students' ages ranged from 16 to 22. The pre-test was carried out to classify the students on the basis of their knowledge and vocabulary performance. In addition, both the experimental and control groups received a vocabulary pre-test to establish homogeneity. An information sheet describing the study, a consent form,

and a personal information sheet for the participants were among the items utilized in the research.

3.2. Instruments

The data was collected using two instruments; the first one included a survey questionnaire to find out how students feel about using WhatsApp to teach English terminology. The second one was a vocabulary proficiency test which was conducted as post-test and pre-test. The researchers gave the experimental group Whatsapp application for learning new words and the controlled group (traditional classroom) intermediate book of Solutions for learning new words. The current study adopted the attitude questionnaire from a previous study, i.e. Heidari Tabrizi and Onvani (2018). The questionnaire consists of 15 items; the items focus on vocabulary learning from different perspectives, namely metacognitive and cognitive, using Whatsapp. In addition, the questionnaire comprises five Likert-type constituents that range from "Strongly disagree" to "Strongly agree". For determining the questionnaire's reliability, the Cronbach alpha coefficient was calculated, and the value was $r = .89$.

The researchers designed a vocabulary test and conducted the same at the start of the study to determine the learners' level of vocabulary competency. The test consisted of three parts. Part A received 9 points, part B received 6 points, and part C received 10 points. Part A consisted of nine fill-in-the-blanks questions, and the researchers asked the students to complete the words after reading the sentence. In section B, the learners were given eight words; the researchers asked the students to fill in the blanks with the correct term (s). Part C had a similar query to Part B; however, this section had more words (i.e. 9). The total score of the test was 25. For two reasons, the researchers chose this test. First, the language school/institute where the research was done widely used the test. As a result, the researchers consulted the language school's supervisors in order to learn more about the test. In addition, in order to cross-check the supervisors' judgment, the researchers consulted four teachers from the school/institute. They confirmed that this test was appropriate for the students at this level of competency. Second, in the next round, the researchers consulted an expert (a TEFL Ph.D. holder) to remark on the test's applicability, and its correctness was determined through discussion and amendment.

3.3. Treatment

The learners received 14-session treatment period, and the students used WhatsApp to practise their new terminology learned in the class. This application provided a tailored vocabulary learning experience for learners by allowing them to use it in a variety of situations while using their tablets and mobile phones. Furthermore, they might utilize WhatsApp to complement their own resources and make better use of their time, especially in varied social situations. To engage the learners in the activities, the teacher would play a part in sharing the relevant realia (for example, stickers, pronunciation cues, and pictures) and vocabulary in accordance with this technique. Contextualizing the words, peer and individual work on the words, setting an example, and playing with antonyms and synonyms were all part of the exercises. The learners could browse through their vocabulary armoury on the app and revisit them, allowing them to complete the activities effectively if they forgot the meanings of the words. Helping the students employ the terms in new circumstances was a major focus under treatment. For example, the students would use WhatsApp's story-making feature to produce stories that their connections and classmates might see the words in their proper contexts. On the contrary, the teacher, for the control class, used a teacher-fronted perspective to present the learners with the meaning of the phrases in English. The control group did not have much engagement with technology, and the words would be received by this group as dominantly detached from their context in various inter-sentential and sentential formulations/constructions.

3.4. Procedure

The first stage was to conduct a vocabulary pre-test to determine the participants' vocabulary skill level and to ensure that everyone was alike. This test had a time limit of 15 min to complete. The students were then separated into two groups; one of the groups was experimental group that learnt new English terms via WhatsApp, and the other group was control group that learned new words the old fashioned way. The treatment then commenced, and the treatment involved the teacher teaching new vocabulary from the Solutions textbook through WhatsApp for the experimental group and traditional face-to-face instruction for the control group. The treatment took 14 sessions to complete. The researchers gave a vocabulary post-test to both groups at the end of the semester, with the same administration as the pre-test. The post-test was the identical test that was conducted in the study's pre-test phase. Lastly, both groups were given an attitude questionnaire to assess their attitudes regarding using WhatsApp and traditional vocabulary acquisition procedures. The reliability index for the pre-test was .79, and the reliability index for the post-test was .77.

3.5. Data analysis

SPSS was used to examine the data derived from the pre-test and post-test. To do so, the researchers employed an independent samples t-test for comparing the pre- and post-test results of the control and experimental groups. The Skewness and Kurtosis ratios over their standard errors were used to assess the data's normalcy, and there were no violations. Furthermore, a chi-square test was also employed to ascertain if there was any notable dissimilarity in the attitudes of the learners toward learning English terms across WhatsApp and traditional groups.

4. Results

As previously stated, the researchers conducted an independent samples t-test for investigating probable variations in pre-test performance between the two categories of students. The descriptive statistics results are shown in Table 1, and independent sample t-test results are shown in Table 2. The results shown in Tables 1 and 2 reveal that the mean scores of the two groups (control group, $M = 13.3667$; experimental group, $M = 13.4706$) regarding the pre-test of vocabulary did not differ significantly. This can be expressed by $t(62) = .831, p > .05, 95\%$, and the confidence interval was $[-.14593, .35378]$. In addition, Cohen's d was .2085 that represents a smaller size effect.

Research question 1 is "Does a statistically significant difference exist between the impact of conventional and mobile-assisted vocabulary learning on the vocabulary knowledge of EFL learners?"

In addition, the researchers conducted another independent sample t-test to compute the differentiations between the means of control group and experimental group on the vocabulary post-test. Table 3 demonstrates descriptive statistics of post-test vocabulary results of the two categories of students. Table 4 shows the results of independent sample t-test for post-test vocabulary by two groups.

As shown in Tables 3 and 4, in terms of post-test vocabulary leaning, the experimental group ($M = 21.1176, SD = 1.06642$) had a higher mean than the control group ($M = 14.200, SD = .88668$). It can be said that the effects of conventional and mobile-assisted vocabulary learning show statistically significant difference between them. This can be expressed by $t(62) = 27.996, p < .05, 95\%$, and the confidence interval was $[6.42372, 7.41158]$. In addition, Cohen's d was 7.08 that represents a

Table 1. Pre-test results of vocabulary between two groups.

Class	N	Mean	Std. Deviation	Std. Error Mean
Experimental Group	34	13.4706	.50664	.08689
Control group	30	13.3667	.49013	.08949

large size effect. From Tables 3 and 4, it is evident that the group which received the treatment (Whatsapp group) did better than control group; thus, the acquired data has answered the first research question.

Research question 2 relates "What type of attitude do the students show toward mobile-assisted vocabulary learning". Additionally, the researchers conducted a chi-square test to investigate if there were any differences in attitudes toward vocabulary learning between experimental (WhatsApp) and control (traditional) groups. As shown in Tables 5 and 6, the experimental group chose "strongly agree" (50.5%) more frequently than the control group (33%). On the contrary, the control group chose "slightly agree" (30.0%) more than the experimental group (28.5%). The control group (15.5%) chose "slightly disagree" more than the experimental group (9.0%). The data also revealed that the control group (18.5 %) chose "neither agree nor disagree" more often than the experimental group (12.0%).

As shown in Table 6, the results of the Chi-Square can be represented by $(\chi^2(3) = 8.792, p < .05, \text{Cramer's } V = 1.97)$, and Cramer's V shows small effect size. The results of Chi-Square reveal a substantial difference in attitudes toward acquiring words between the two groups, and the experimental group shows a stronger proclivity for mobile-related vocabulary learning. From Table 5, it is obvious that compared with the other group, the students who utilized WhatsApp in order to improve their vocabulary knowledge showed more favourable viewpoint toward learning new words. Concerning the acquired data presented in Table 5, the finding has answered the second research question of the current study.

5. Discussion and conclusion

The purpose of this study was to examine the effect of mobile learning, specifically the use of WhatsApp, on the development of vocabulary learning of Bangladeshi tertiary level EFL learners. The results revealed a statistically significant difference between the control and experimental groups' vocabulary learning. In the post-test of vocabulary, the experimental group had a much higher mean compared with the control group. The finding of this current study is congruent with earlier research of Motallebzadeh et al. (2011) and Wang (2016). The study of Motallebzadeh et al. (2011) and Wang (2016) reported positive effect of using digital technology to improve learners' vocabulary learning. This research demonstrates how novel technology can successfully affect the process of vocabulary acquisition. Furthermore, the result of the present study aligns with the findings of recent studies conducted by Tahounehchi (2021) and Bensalem (2018); the studies conducted by Tahounehchi (2021) and Bensalem (2018) demonstrate that the group which received the treatment did better than control group. The effectiveness of WhatsApp is supported by the results of Fageeh (2013) and other studies, i.e., Basal et al. (2016) and Lawrence (2014); on the other hand, the results of Dehghan et al. (2017) do not support the efficacy of Whatsapp. The study of Dehghan et al. (2017) suggested that rather than WhatsApp's value as a learning tool, the findings were influenced by the students' lack of attentiveness to the given activities.

In addition, according to the chi-square test results, the experimental group showed a more positive attitude to adopting mobile technology for learning vocabulary. The result of favourable attitude towards mobile technology adaption is similar to those reported by Wang et al. (2016) and Afshari et al. (2013). The findings of the studies carried out by Tahounehchi (2021) and Bensalem (2018) match the result of the present study; in comparison with the other group, the students who utilized WhatsApp in order to improve their vocabulary knowledge showed more favourable viewpoint toward learning new words in English as a foreign language. Moreover, the results of the current study are consistent with those of earlier research, such as Alhadhrami's (2016), and Gutiérrez-Colon et al. (2013); their research studies showcased that Whatsapp was useful in learning English language and improving English reading skill. Since these gadgets are employed by learners in their social lives, it appears that their usage of digital technology progressively making

Table 2. Results of Independent Samples t-test regarding pre-test.

Pre-test	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2 tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								lower	Upper
Equal variances assumed	2.155	.147	.831	62	.409	.10392	.12499	-.14593	.35378
Equal variances not assumed			.833	61.455	.408	.10392	.12473	-.14545	.35329

Table 3. Post-test results of vocabulary between two groups.

Class	N	Mean	Std. Deviation	Std. Error Mean
Experimental Group	34	21.1176	1.06642	.18289
Control group	30	14.2000	.88668	.16189

corresponding positive changes in their views. Learners are more likely to take advantage of mobile use and engage in a learning path determined by mobile technology when the prospect of mobile use is widened to the educational setting (Saran and Seferoglu, 2010). The current study has explored two research questions, and the finding of the first research question of the study exhibits that the group which received the treatment (Whatsapp group) did better than control group. In addition, the result of the second research question indicates that the students who utilized WhatsApp in order to improve their vocabulary knowledge demonstrated more favourable viewpoint toward learning new words in English as a foreign language context.

5.1. Pedagogical implications

The findings of the current study highlight the fact that the employment of WhatsApp improves vocabulary learning more than conventional education. The constructivist theory is supported by this study because WhatsApp assisted pupils in building their vocabulary knowledge. In light of the findings of the current study, it is advised that teachers who teach English language think about incorporating WhatsApp into their curriculum and using it to teach vocabulary in English-instructed classrooms. Considering that the instructors might not have adequate time to teach vocabulary in class, WhatsApp enables English language teachers to teach a greater number of vocabulary items to the students.

WhatsApp could be beneficially used in educational contexts for various types of learning due to its broad use around the world. This program could be extremely useful in language schools, and in particular

for learning vocabulary. As previously stated, it provides a variety of utilities that can be used to successfully revolutionize vocabulary acquisition. It is advocated that teachers are encouraged to use mobile phones or software in EFL classrooms because of the importance of vocabulary acquisition and the challenge that learners confront when learning vocabulary. The use of technology stimulates students to learn new words and phrases and thus helps them enhance their vocabulary learning. According to the findings of this study, such technologies, notably the WhatsApp application, could help learners develop their vocabulary learning process.

5.2. Limitations

The findings of the current study should be interpreted with caution because other mediating factors, such as the learners' pre-existing attitudes toward technology or the teachers' extra effort for the WhatsApp group could have influenced the outcomes for this study. WhatsApp played a significant role in the learners' vocabulary gains. Other control groups may be used in future studies to overcome these constraints/limitations. Moreover, further research needs to investigate the way of expanding the knowledge base of WhatsApp's contributions to learn vocabulary in depth. The participants in this study were only tertiary

Table 6. Chi-Square tests results of attitude of the students towards learning words.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.792 ^a	3	.005
Likelihood Ratio	9.001	3	.005
Liner-by Liner Association	8.753	1	.005
Cramer's V	.197		.005

^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 17.50.

Table 4. Results of Independent Samples t-test concerning post-test.

Post-test	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2 tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								lower	upper
Equal variances assumed	1.116	.295	27.996	62	.000	6.91765	.24709	6.42372	7.41158
Equal variances not assumed			28.323	61.799	.000	6.91765	.24424	6.42938	7.40592

Table 5. Percentage of attitude of the students towards learning words between two groups.

	Options					Total
	Strongly Agree	Slightly Agree	Neither Agree or Disagree	Slightly Disagree	Strongly Disagree	
Experimental Group	50.5%	28.5%	12.0%	9.0%	0.0%	100.0%
Control Group	33.0%	30.0%	18.5%	15.5%	3.0%	100%

level students from a university. Furthermore, it would be beneficial to investigate how learners of various competence levels use WhatsApp for learning vocabulary, as well as to assess how learners' views of WhatsApp change over time would be easier if they were examined during the course of education.

Declarations

Author contribution statement

Dr. Md. Kamrul Hasan: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Professor Dr. Abdul-Hafeed Fakih; Dr. Prodhan Mahbub Ibna Seraj: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Dr. Hasmirati: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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