



Effects of Mobile-Assisted Blended Learning on University Students' English Speaking Proficiency in Korea

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Many learners in Korean EFL contexts find it challenging to speak English fluently due to the lack of practice and exposure. Some recent studies have attempted to rectify this through the incorporation of various tools and methods. Of these, a popularly emerging concept is the use of mobile or personal learning devices. However, their potential is far from being recognized in actual classes due to its challenges relating to scheduling and developing an appropriate model in teaching and learning speaking skills. This study offers a blended learning model that incorporates mobile devices and social networking to overcome the contextual limitations of Korean or Asian EFL learners and examines the impact of the model in English speaking. The study uses an experiment involving 125 participants to investigate the effects of mobile-assisted blended learning (MABL) implementation on the students' level of speaking proficiency and its factors. The results showed that the MABL implementation positively affected the students' speaking proficiency and its aspects, such as intelligibility and comprehensibility. Further studies implementing large-scale experiments with students of different proficiency levels and exploring their affective factors and behaviors in MABL environments based on the model used in this study are suggested.

Keywords: speaking proficiency, mobile-assisted language learning, blended learning, MABL

Introduction

English language learners in English as a foreign language (EFL) environments find attaining speaking proficiency a challenge despite its omnipresence, English as a lingua franca (ELF) in the world, and the relatively recent emphasis on fluency and the conveying of meaning rather than accuracy in English speaking (Galante & Thomson, 2017; Saito et al., 2016). The learners still struggle to understand and convey meaning due to some aspects that the authentic English incorporates, such as clustering, duplication, reduced form, performance variables, and other factors, such as inhibition, risk-taking, and anxiety (Brown, 2007; Horwitz et al., 1986; Kim, 2013). The focus of speaking proficiency has been shifting from the native-like accuracy of accents to the conveying and understanding of meaning, segmental appropriacy, and fluency. These elements are related to intelligibility and comprehensibility of speech rather than correctness (Jung, 2010; McKay, 2002). Although their specific constructs differ in some studies, some researchers have asserted that increasing language learners' intelligibility and comprehensibility will improve their speaking proficiency (Lee et al. 2014; McKay, 2002; Saito et al., 2016). Intelligibility relates to how much a speech is understood, and comprehensibility relates to how easily comprehensible a speech is (Barrass et al., 2020;



Galante & Thomson, 2017; Jung, 2010; Munro & Derwing, 1995).

As technology develops, more tools become available that can help learners improve their proficiency in English. Overcoming the difficulties of authentic spoken English remains adamant, despite several studies incorporating various technologies into language classrooms. Some studies attempted different methods, ranging from employing communication skills and strategies instruction (Chen, 2016; Lam, 2010; Nakatani, 2006; Richards & Rodgers, 2014; Willis & Willis, 2007; Yoon, 2016, etc.) to incorporating technology into the classroom in different environments (Chapelle & Jamieson, 2008; Felix, 2005; Lee, 2015, 2021; Stockwell, 2008; Windeatt et al., 2000, etc.) to help solve this problem. Blended learning and mobile-assisted language learning (MALL) have recently been becoming more and more popular, as their potential is regarded highly beneficial to the learners if their challenges and issues can be overcome (Chen, 2016; Felix, 2005; Kukulska-Hulme & Shield, 2008; Lee, 2021; Lee & Cho, 2019). However, there is a need to find a way to overcome the challenges facing blended learning and MALL by appropriately improving the digital literacy of teachers and learners and developing effective educational models (Choi & Lee, 2020; Lee, 2015, 2021; Lee & Cho, 2019).

This study combines the concepts of blended learning and MALL as mobile-assisted blended learning (MABL) and measures its effectiveness in improving language learners' speaking proficiency in a foreign context. The integration of the two concepts into a speaking classroom is a relatively new attempt, and only a few studies are present. With multimedia incorporations to the language classroom widely attested to be conducive to foreign language learning processes (Kukulska-Hulme & Shield, 2008; Lee, 2021; Stockwell, 2008), there is a need to investigate whether this exploitation of MALL in a blended learning environment, with its added ubiquity and workload, will also be effective. Therefore, developing an efficient and effective model for the implementation appears to be an urgent need.

The study aims to provide an appropriate blended learning model and test the ubiquity and effectiveness of MABL implementation in improving students' speaking proficiency. To satisfy these needs, the research questions for the study are as follows: 1) Does MABL improve students' speaking proficiency? and 2) Which elements of intelligibility and comprehensibility do MABL improve more?

Literature Review

Shifting Concepts of and Activities for Speaking Proficiency

The importance of speaking skills in English language learning has been shifting from focusing on the accuracy of accents and pronunciation to the conveyance of meaning, fluency, and communicative strategies. Although many students still seek to attain a native-level or native-like accent (Harendita, 2014), many native assessors of spoken English deem intelligibility and comprehensibility of speech more important than the native-like accuracy of spoken grammar and pronunciation (McKay, 2002; Saito et al., 2016). This shift seems to have mainly occurred due to English evolving into ELF that people from various backgrounds use (Brutt-Griffler, 2002; Jung, 2010; Llorca, 2004; McKay, 2002). Communications between non-native speakers are now far more common than those among native and non-natives, and various studies have reported communication apprehensions stemming from cross-cultural pragmatics (Nation, 2003; Nault, 2006; Yu, 2006).

There is a need to assert importance in teaching English speaking with the precise production of sounds and understandings of conversation that include variations of English and differing cultural aspects (Jung, 2010). These aspects are included in the concepts of intelligibility and comprehensibility, and there have been diverse definitions due to their complexity (Kaur, 2018; Sheppard et al., 2017; Thomson, 2018). The most followed conceptualization of the two appears to be the definitions by Munro and Derwing (1995). Their definition refers to intelligibility as the extent to which listeners can correctly identify the speaker's words and comprehensibility as the listener's perception of the difficulty of understanding the speaker's meaning. In other words, intelligibility is associated with recognizing words and utterances, and the

meaning of those words and utterances is attributed to comprehensibility.

In assessing intelligibility and comprehensibility, previous studies have asserted elements of the English language (such as pronunciation, grammar, etc.) related to the two concepts (Jung, 2010; Munro & Derwing, 1995; Thomson, 2018). However, these elements that affect intelligibility and comprehensibility have not been applied consistently. Although the posited elements are based on Munro and Derwing's (1995) definitions, the selection of these elements appears heuristic. For instance, Munro and Derwing (1995) mention the ability to paraphrase as an element to measure intelligibility, which does not appear in Jung's (2010) or Thomson's (2018) criteria. This study will therefore argue the following elements for intelligibility and comprehensibility. 'Grammatical Range and Accuracy' and 'Segmental Accuracy' will be used to assess intelligibility, while 'Fluency and Coherence' and 'Lexical Resource' will measure comprehensibility. 'Grammatical Range and Accuracy' will focus on the recognizable grammatical accuracy of the speaker's utterance of speech, and 'Segmental Accuracy' will attribute to the recognizable phonology of individual words of the speaker. 'Fluency and Coherence' pertain to the flow and meaning of speech understandable by the listener, and 'Lexical Resource' refers to the appropriate vocabulary use to convey meaning understood by the listener.

In the context of EFL, there is a lack of exposure and practice to improve the proficiency of the target language compared to ESL, especially in Asia (Hu, 1988; Hwang & Chen, 2013; Hwang et al., 2011; Liu, 2009; Shen & Swanthep, 2011; Wang & Motteram, 2006; Yen et al., 2015). As one of the aims to overcome this, various researchers have tried implementing different activities encouraging core communication aspects to at least increase the amount of practice, including communication-focused activities such as information gap, role-playing, storytelling, and presentation (Basturkmen, 1994; Hwang et al., 2016; Lee, 2021; Richards, 2008). Some of these activities appear to have benefited and expanded with the help of mobile and web-based technologies. Several researchers reported that students exposed to activities reinforced by web app content improved L2 speaking skills and responded positively (Ghoneim & Elghotmy, 2016; Hwang et al., 2016; Wang & Chen, 2007). For example, Wang and Chen (2007) reported that students performed role-plays in an online environment using online communication tools and project-based learning tools and that they exhibited positive attitudes toward their learning experiences. Hwang et al. (2016) used project-based learning tools to conduct storytelling activities and found that students' speaking skills improved significantly. Ghoneim and Elghotmy (2016) used a project-based learning tool to create a collaborative environment for presentations and reported their participants' improvements in accuracy and fluency. These positive results related to web app content interaction and speaking activities can be applied to MALL and MABL implementations.

Mobile-Assisted Language Learning

In essence, MALL is a language learning environment that utilizes mobile devices. Language education through mobile and wearable devices, smartphones, tablet PCs, and apps, i.e., MALL, can be further activated by supplementing classroom instruction (Lee & Cho, 2019). The combination of wearable technology, augmented reality, virtual reality, and metaverse will soon be widely available and provide learners with a more diverse and realistic learning experience. They can show the appearance of the real world in connection with various apps and will provide learners with opportunities for authentic experiential learning. It is possible to provide activities that can arouse learners' interest, keep students engaged, and enhance retention (Lee, 2021; Schaffhauser, 2017).

MALL can promote various interactions between teachers and learners, between mobile devices and learners, and between learners and learners, and learners can perform self-sufficiency and creativity-enhancing learning. In addition, it enables self-directed learning by respecting the individual differences of individual learners. Nyiri (2002) said that the problems of traditional education could be overcome through smooth interaction between instructors and learners and between learners in terms of communication. In addition, since various and abundant information and materials related to the subject can be collected as needed, it can be beneficial in acquiring accurate content knowledge and directly or

indirectly experience learning experiences (Hwang & Chang, 2011). In this way, instructors can receive a lot of help in creating various learning environments and reinforcing the learning process, and through this, learners can learn by level and self-directed learning according to their levels and characteristics (Cho, 2009; Lee, 2021). MALL has reduced anxiety in speaking tasks (Kessler, 2010; Lee, 2021), and the advantages that it has over CALL is that it does not necessarily require additional hardware such as microphones and cameras, but more importantly, the ubiquitous nature of mobile devices which allow users to access information anywhere and anytime (Lee, 2021; Stockwell, 2008).

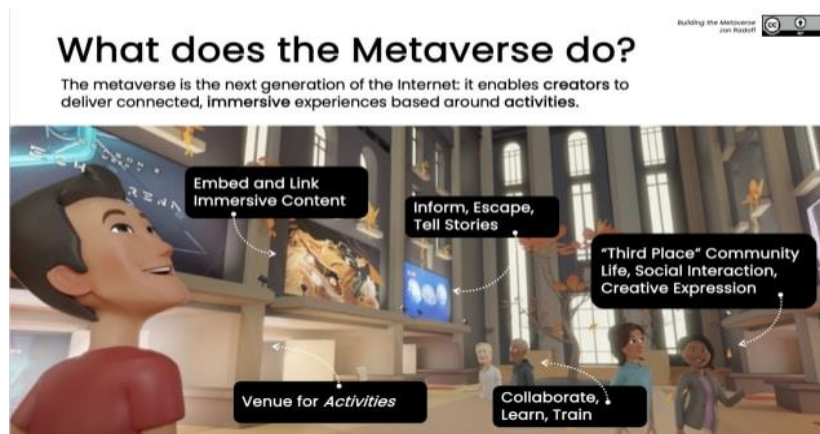


Figure 1. What does the Metaverse do? (<https://www.slideshare.net/jradoff>).

MALL has therefore been a popular form of instruction, but it seems to have mixed results in terms of effectiveness. Many studies have listed challenges and problems with MALL, ranging from scheduling issues to digital literacy-related issues (Kukulka-Hulme & Shield, 2008; Lee, 2021; Thornton & Houser, 2002). It is also known for its efficiency in helping students become autonomous since it is easy to keep track of one’s learning progress through self-regulation and reflection (Shea & Bidjerano, 2010). However, many learners are not accustomed to it to realize its potential and need training and guidance (Lee, 2021). Despite this, in Burtson’s (2013) and Shadiev et al.’s (2017) literature reviews, it was noted that most MALL studies employed a teacher-centered model of instruction. For MALL to realize its full potential, two elements are required. An efficient, learner-centered pedagogical model that can facilitate flexible schedules while encouraging students’ autonomy needs to be developed. A method that appropriately improves teachers’ and learners’ digital literacies also needs to be found.

Mobile-Assisted Blended Learning

Blended learning environments integrate traditional face-to-face classrooms and online learning environments (Garrison & Kanuka, 2004; Graham, 2006). These environments can offer students rich interactions in offline environments while providing an increased amount of online practice. In other words, blended learning implemented in a language classroom can maximize students’ exposure and practice. The implementation includes a shift in teachers’ roles into a more passive one, and the learners become more active as they take charge of their learning (Lee, 2021). Although a couple of challenging issues arose in earlier studies of blended learning due to teachers finding it difficult to adapt to this shift and the increased workload to both students and teachers (Compton, 2009; Hughes, 2005; Kang & Lee, 2020; Lee, 2021; Yoon & Lee, 2009, 2010), successful implementations reported higher achievement levels along with inspired interactions and peer collaboration among the students (Jin, 2014; Kang & Lee, 2020; Lee, 2021; Lee & Lee, 2012; Rovai & Jordan, 2004; Yoon & Lee, 2009, 2010).

Considering the blended learning’s face-to-face and online environments (Graham, 2006; Ting, 2014) and MALL’s ubiquitous nature (Lee, 2015, 2021; Kukulka-Hulme & Shield, 2008; Stockwell, 2008), the

two can be thought to be entirely compatible. This study proposes combining these concepts as an appropriate model to overcome EFL learners' difficulties and denote the combination as Mobile-Assisted Blended Learning (MABL). Although the idea of MABL did appear in previous literature (Ardi, 2017; Jin, 2014; Lee, 2009, 2021; Yoon & Lee, 2009, Yoon et al., 2013), only a few denoted it as MABL (Baek & Lee, 2018; Lee, 2021; Lee & Cho, 2019). The potential and challenges of MABL can naturally be similar to those of MALL and blended learning. It is challenging to schedule appropriately and can be distracting and potentially be subjected to technical difficulties relating to connectivity stemming from digital illiteracy (Kukulka-Hulme & Shield, 2008; Lee, 2021). However, it benefits from ubiquitous factors, can reduce students' anxiety, has vast amounts of content, encourages learners to be more engaging and autonomous (Kessler, 2010; Shea & Bidjerano, 2010; Stockwell, 2008; Thornton & Houser, 2002). In Jin's (2014) study, the effect of using a smartphone SNS application in a blended environment for improving students' grammar was investigated. Although the results showed positive findings, the study could not gather valuable practical information for students' behaviors in the MABL environment. Ardi (2017) reported that in their case study investigating the use of a mobile learning platform for facilitating learner autonomy, despite students being able to control their learning management, interaction and collaboration between them were maintained. A potential reason why no facilitation for autonomy occurred can be attributed to the two-week research period; there probably was not enough time for students to develop autonomy while getting accustomed to the new mobile learning platform.

Comparing these studies indicate the importance of an effective and efficient pedagogic model (Kukulka-Hulme & Shield, 2008). Baek and Lee (2018) investigated the perception of MABL in English-speaking classes, and Lee and Cho (2019) explored students' perspectives and preferences of using MABL. Both studies reported overwhelmingly positive perspectives from their participants. However, some students also complained of difficulties during learning activities and reported concerns about the difficulty of interaction, the burden of learning, and the resulting achievement. As seen in the above literature, researches focusing on MABL are very few since it is relatively new compared to studies involving MALL. Research that investigates MABL's effectiveness, as well as how students interact and behave in MABL environments in detail are required because the differences in each context can be vast, although EFL contexts may share problems originating from lack of exposure and practice (Baek & Lee, 2018; Hu, 1988; Lee, 2021; Lee & Cho, 2019; Shen & Swanthep, 2011).

Therefore, empirical research needs can be drawn from the above literature. First, the integration of MABL environments into speaking classes is relatively new. Thus, currently, only a few studies are investigating MABL's effects on speaking and other language skills, too. There is a need to examine whether the benefits of MABL can bring about positive results in improving EFL students' speaking proficiency. Second, there is an urgent need to develop a proper framework and model for MABL. Most of the shortcomings in previous literature implementing MALL or blended learning can be attributed to the lack of systematically appropriate, effective, and efficient blended learning and teaching models. In this study, based on a MABL model including more specific learning contents, learning activities, interaction types, etc., the effects of MABL and efficient teaching and learning methods are presented.

Method

Participants

The participants of the study were 125 Korean university students enrolled in a mandatory English speaking course in a Korean university from varying majors. The students ranged from freshman to junior years, and they were assigned to classes of around 20. The participants were divided into a control group and an experimental group, and their speaking abilities were at the intermediate level. The control group received traditional speaking classes that did not focus on mobile devices and blended learning, while the experimental group was exposed to the MABL treatment. Students were also divided into groups of four

or five in each class for classroom activities. Table 1 shows the division of the students into their respective groups.

TABLE 1
 Students Divided into Groups

Group	No. of Students	Level	Year
Control Group	56	Intermediate	Freshman to Junior
Experimental Group	69	Intermediate	Freshman to Junior
Total	125		

Data Collection Instruments

The coursebook and the mobile app

The students in both groups used the coursebook *World Link 1* from National Geographic. The textbook consisted of thematic units, which were divided into two lessons (A and B). Each lesson entailed a related topic of the unit’s theme, and the students went through the lessons week by week. For example, a unit with the theme ‘People’ had ‘Getting to know you’ as a topic for Lesson A and ‘Appearance’ for Lesson B. Both control and experimental groups were taught one topical lesson per week, completing one thematic unit in two sessions.

The experimental group of students used the social networking app ‘Kakaotalk’ as both the communication medium and classroom for mobile environments of the experiment. The app was chosen because it was the most used social networking app among the students and its’ voice note function. This feature enabled students to leave short voice messages available to be played by others in the chatroom, allowing for an almost synchronous voiced communication. It also allowed students and the teacher to interact with each other through voice without being in a face-to-face environment.

The experiment

The quantitative data collection of the study involved the experiment during two semesters. The control group was given traditional instruction, and the experimental group was exposed to a MABL environment. The traditional speaking instruction closely followed the textbook, with typical speaking activities that used materials, pictures, videos, reading texts, etc., to induce role-play, information gap, and discussion activities. The materials were mainly presented through interactive screens inside the classroom and handouts. Figure 2 details a general outline for the control group’s activities.

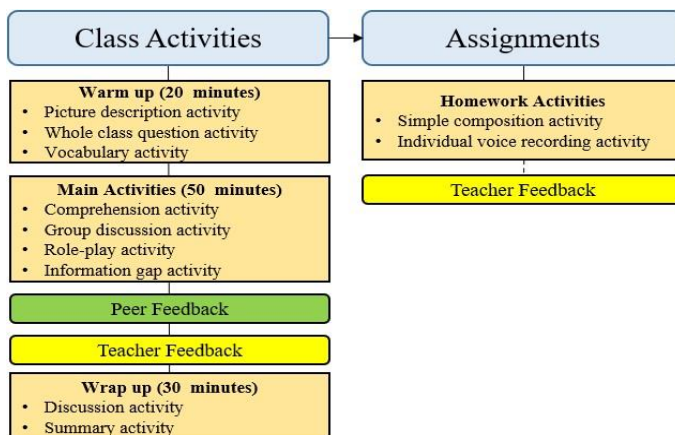


Figure 2. A model of traditional class for the control group.

There were a few differences in the experimental group’s treatment. While the control group’s model was designed to have the same activities each week, the experimental group’s model (Figure 3) utilized a two-week cycle. Lesson A was taught during the first week of the cycle, and Lesson B was taught in the second. The experimental group students were exposed to and participated in various activities using mobile devices in and out of classes, allowing for more feedback and discussion. For the first week of the cycle, the students were taught the contents of Lesson A while recording their discussions for a later listen and going over the crucial aspects of the topic. For the second week of the cycle, on top of being taught the contents of Lesson B, the students engaged in collaborative storytelling activities relating to the thematic unit. The model for the experimental group’s MABL implementation is presented in Figure 3.

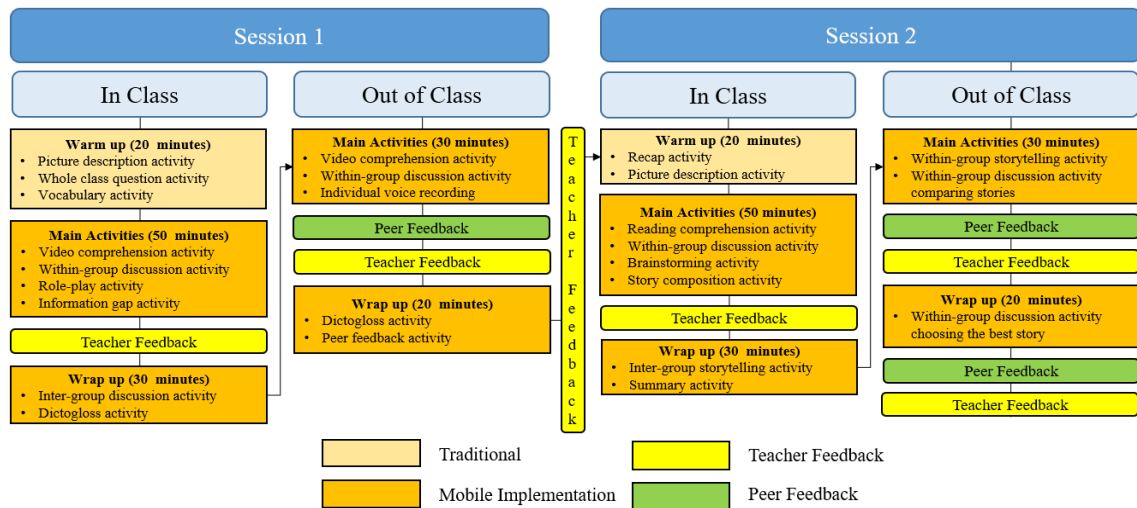


Figure 3. A model of MABL classes for the experimental group.

Pre- and post-tests were conducted to measure the students’ levels before and after their respective treatments. The tests consisted of a topic-based conversation with the researcher, where the topics were related to the thematic units the students used (*World Link 1* from National Geographic). Students were given a maximum of five minutes for the tests, with three minutes for their prepared speech and two minutes of answering questions about their topic from the teacher. The tests were assessed by the researcher and two other professors teaching in the same university course, using a rubric that combined the descriptors of the IELTS speaking test with concepts of intelligibility and comprehensibility discussed in the literature into consideration. As mentioned before, students’ ‘Grammatical Range and Accuracy’ and ‘Segmental Accuracy’ were assigned to measuring intelligibility, and comprehensibility was measured by assessing ‘Lexical Resource’ and ‘Fluency and Coherence.’ The reason for adopting the IELTS descriptors was that most of the raters had experience in assessing IELTS speaking tests.

Reflective journals

The students were asked to complete a reflective journal every two weeks when they finished a thematic unit. Three questions in their journals inquired about the students’ participation and improvements. Based on the following questions, they were instructed to express their opinions in a few sentences as possible, rather than simply answering yes or no.

First, were there any difficulties you encountered? If so, what were they, and how could you overcome them? Second, do you think you participated enough in the discussion for this unit? If not, why? Finally, do you think you improved your speaking abilities? What do you think helped you improve?

The questions were provided in English but could be answered in their native language to alleviate their workload. The reflective journals had two purposes; to help identify the possible reasons for

MABL’s effects and encourage students to become self-aware of their learning processes.

Interviews

Interviews were conducted with seven students (three male and four female students) who volunteered to participate in the experimental group after the course. It was used to provide in-depth information and insight on the effectiveness of MABL implementation. The interviews were semi-structured, with a few set questions asking students’ opinions on the MABL implementation, along with their problems.

First, were there any difficulties you or your group encountered? Second, how do you think MABL helped you improve English speaking? Finally, what type of activities did you find most helpful in the MABL speaking class?

The questions were designed to triangulate possible difficulties the students faced, the reasons for their behavior, and help figure out which elements of MABL were most helpful to them in improving their speaking proficiency. Follow-up questions relating to the students’ answers from the interview and their reflective journals were also asked for further elaboration if needed.

Procedures

The study lasted for 16 weeks (one semester). The pre-test was conducted on the third week since the students were given two weeks of induction period to become accustomed to their respective environments. Each group was exposed to their respective environments from the fourth week until the eighth week, when they took a midterm exam as per university regulation, before continuing until week 16, when the post-test was conducted.

As mentioned previously, reflective journals were provided to the students every two weeks or when they finished a unit in their coursebooks, starting from the fifth week. The interviews were conducted after the post-test during the following month after the course had finished. Table 2 shows the week-by-week procedure of the control and experimental groups. The first two weeks of the semester were used as orientation and induction weeks to familiarize the students with the course materials and use implemented MABL devices and applications for the experimental groups. The pre-test was held in week three to give the students an idea of how their speaking skills were assessed and gauge their speaking abilities before the treatments. The post-tests were held in week 16.

TABLE 2
The Experiment Procedure

	The Control Group	The Experimental Group
Week 1	Orientation Week	Orientation Week
Week 2	Induction Week	Induction Week
Week 3	Pre-test	Pre-test
Week 4 - 15	Traditional Instruction: Vocabulary, video comprehension, role-play, information gap activity, group discussion, voice recordings, dictogloss, peer and teacher feedback	Two-Week MABL Implementation: Vocabulary, video comprehension, role-play, information gap activity, group discussion, mobile voice recordings, dictogloss, storytelling, peer feedback, focused teacher feedback, reflective journals
Week 16	Post-Test	Post-Test

Methods of data analysis

The quantitative results of the experiment were analyzed using SPSS. The students’ pre-and post-test data were assessed by three raters, who were all teaching at the same university. The first rater was the researcher, a British national with four years of teaching experience in universities. The second rater was from the United States, with ten years of teaching experience, and the third rater was a Canadian native with eight years of

teaching experience. The second and third raters also had experience as IELTS raters in the past. Pearson’s correlation tests showed a high correlation between the raters; 0.925 between the first and second, 0.931 between the first and third, and 0.919 for the second and third. The scores used for the statistical analyses were the average scores given by the three raters. The rubric used was created to reflect the elements of intelligibility and comprehensibility. The rubric detailing the criteria and their scores is presented in Table 3.

TABLE 3
Intelligibility and Comprehensibility Rubric for Pre- and Post-tests

Scoring Criteria	Total: 100
Grammatical Range and Accuracy	30
<ul style="list-style-type: none"> • Can use grammar accurately. • Can appropriately use a mixture of simple and complex structures. • Can use the full range of grammatical features. 	
Segmental Accuracy	20
<ul style="list-style-type: none"> • Can produce accurate utterances of sounds and words. • Can use the full range of segmental features. • Can be easily understood. 	
Fluency and Coherence	30
<ul style="list-style-type: none"> • Can develop topics coherently. • Can retain coherence even with hesitations. • Can convey meaning with ease and without error. 	
Lexical Resource	20
<ul style="list-style-type: none"> • Can use appropriate vocabulary to convey meaning. • Can use idiomatic phrases with ease and without error. • Can paraphrase successfully. 	

The independent samples and paired *t*-test analyses were conducted for the pre-and post-tests to identify the significant differences between and within the groups. The above statistical analyses were conducted for the total scores for the first research question, and then again with individual scores for the elements of intelligibility and comprehensibility to try and answer the second research question.

As for the qualitative data analysis, reflective journals and interview data were analyzed and coded. The data relevant to the research questions are presented descriptively in the results. The common purpose of qualitative data was to identify any possible reasons for the effects of the MABL implementation. The reflective journals of the students were analyzed to gain insight regarding students’ intentions and reflections. The data were used to offer insight into what the students thought helped them improve while being exposed to the MABL implementation and its activities. These are provided descriptively in the results.

The interview data were also analyzed and coded by questions. They required translation from Korean since the students were able to provide more information in their native language. The obtained data helped clarify ambiguous answers from the reflective journals and students’ observed behavior and offered insight into the effects of MABL implementation.

Results and Discussions

MABL and Improving English Speaking Proficiency

The experiment, reflective journals, and interviews were conducted and analyzed to investigate the effects of MABL on students’ English speaking proficiency. Research Question 1 was derived from the analysis of pre-and post-tests, reflective journals, and interviews. The pre-and post-test results of the control and experimental groups were scored by three raters.

First, Table 4 shows the independent samples *t*-test with the descriptive statistics for both the pre-test and the post-test in the control and experiment groups. The two groups’ mean scores in the pre-test were

quite similar; the experimental group had 51.39 scores, and the control group achieved slightly higher mean scores (52.57). The independent samples *t*-test for the pre-test scores revealed no significant differences between the groups ($t = 0.575, p = 0.566$), indicating homogeneity between the groups. The post-test scores of both groups improved compared to the pre-test scores, but the control group achieved lower mean scores (56.45) than the experimental group (62.49). The *t*-test indicated a significant difference between the groups ($t = -3.28, p = 0.001$), showing the MABL implementation did affect the students' overall speaking proficiency level.

TABLE 4
Independent Samples t-test for English Speaking Proficiency

Test	Group	N	Mean	SD	<i>t</i>	<i>df</i>	<i>Sig.</i>
Pre-test	Control	56	52.57	9.983	0.575	123	.566
	Experimental	69	51.39	12.699			
Post-test	Control	56	56.45	9.852	-3.279	123	.001
	Experimental	69	62.49	10.527			

Paired-samples *t*-tests were conducted to find out whether the two groups improved their speaking proficiency. Both groups appear to have achieved higher mean scores for their post-tests, with varying degrees. The experimental group's mean score seems to have improved more (11.1) than the control group (3.88). Table 5 details the results of the paired-samples *t*-test for the groups. They showed statistically significant differences for their pre-and post-test scores, indicating that each form of instruction successfully improved the students' speaking proficiency. From these statistics, it could be discussed that the MABL implementation was more effective in improving the students' speaking proficiency since the experimental group showed more significant increases in their mean scores.

TABLE 5
Paired-samples t-test for English Speaking Proficiency

Group	Test	N	Mean	SD	<i>t</i>	<i>df</i>	<i>Sig.</i>
Control Group	Pre-test	56	52.57	9.983	-5.934	55	.000
	Post-test	56	56.45	9.852			
Experimental Group	Pre-test	69	51.39	12.699	-6.596	68	.000
	Post-test	69	62.49	10.527			

The following excerpts were taken from the students' reflective journals, focusing on how they benefitted from the MABL implementation. Excerpts 1 and 2 are from the final question of the reflective journal, which asked the students whether they felt their speaking abilities improved and what they thought helped them.

Excerpt 1 (Answer to question 3 – s84 from reflective journal)

Yes. I was afraid of pronouncing words badly and making mistakes at first, but after listening to my group's feedback, I realized it was ok to make a few mistakes because no one's pronunciation was perfect.

Excerpt 2 (Answer to question 3 – s109 from reflective journal)

I think I gained confidence in speaking because I could notice my group members' mistakes when they were speaking. I didn't give feedback for the things I wasn't sure about, then the teacher's feedback showed that I was right.

In a MABL environment, it becomes possible for teachers to provide immediately, focused, and direct feedback and for students to give peer feedback easily. Excerpt 1 indicates a student experiencing a boost in their confidence through peer feedback, while excerpt 2 shows their growth in confidence caused by teacher feedback. This effect of feedback helping students improve their language skills or confidence is reported in previous literature (Kukulska-Hulme & Shield, 2008).

Another benefit from the MABL implementations is the increase in the practice and exposure the

students experienced. This phenomenon was the most frequent answer the students reported on their reflective journals. Excerpt 3 shows another response from the same question of the reflective journal, detailing that the students recorded multiple times until satisfied before finally sharing with the group. Numerous recordings of the same speech increase the amount of speaking practice remarkably and sometimes make the student aware of the strange or bad speech habits.

Excerpt 3 (Answer to question 3 – s122 from reflective journal)

I was afraid to speak English in front of someone so sharing opinions with others was hard. But I think it helped me improve because I recorded multiple times before sharing, and it made me listen to my own accent and compare it with others.

This notable effect of increased practice and exposure is well attested in previous blended learning studies (Garrison & Kanuka, 2004; Graham, 2006; Hughes, 2005; Lee, 2021; Lee & Cho, 2019), but primarily due to the additional materials and instruction adapted to the online environments. The students in the study were not instructed to do multiple recordings of the same speech, and thus this could be argued as a phenomenon for students developing autonomy. An analysis of interview data in excerpt 4 shows another instance where students demonstrated their autonomy.

Excerpt 4 (Interview – s5)

I think the atmosphere of the discussion activities helped me. Even after we finished answering the discussion questions, our group kept continuing the conversation. In class, we did not have much time to keep talking because of other activities, but in the mobile environment, we had more time, so once we finished and we had more things to say, we would just carry on.

While demonstrating the increased practice and autonomy for the students, the above excerpt also implies MABL's ability to facilitate communicative activities. The students were able to exploit the self-regulative nature of MABL in a friendly environment, allowing them to engage in conversation more. It seemed to include the rapport between the students as a possible element for this MABL implementation's success, especially since collaborative and communicative activities were abundant. If the students did not have this positive atmosphere, it would not be easy to expect them to continue conversing after the activities. It was also evident in some of the student groups, leading to comparably fewer participation rates, but does not seem to have affected the overall effectiveness of MABL in improving speaking proficiency.

In sum, the results for the first research question clearly showed that the MABL treatment was effective in improving the students' level of speaking proficiency. Statistically significant differences were identified between the control and experimental groups in their post-test results. Although both groups significantly improved, the MABL treatment group showed more gains in their scores. From the excerpts, beneficial effects of MABL like increased practice exposure, teacher and peer feedback, and the self-regulative nature of the mobile environment were identified, which are in line with previous studies (Baek & Lee, 2018; Kukulska-Hulme & Shield, 2008; Murphy, 2010; Yoon, 2016).

An interesting effect that emerged from this study is the level of rapport among the students. In the mobile environment where students were not necessarily restricted by class time, some went beyond their workload, continuing conversation even after the required discussion points were covered. In contrast, some students with low levels of fraternity failed even to finish the required tasks. These results support the importance of student interactions (Gardner et al., 1992; Rovai & Jordan, 2004).

MABL and Improving Intelligibility and Comprehensibility

For the second research question, statistical analysis was performed to examine which elements of intelligibility and comprehensibility in speaking proficiency were improved by implementing MABL.

Similar to the analysis for speaking proficiency, descriptive statistics, independent samples *t*-tests, and paired samples *t*-tests were conducted along with the analysis of reflective journals and interviews.

First, Table 6 details the independent samples *t*-test of both groups for both elements of intelligibility. The mean scores were quite similar for the pre-tests, with the control group scoring higher than the experimental group. The control group achieved slightly higher mean scores for ‘Grammatical Range and Accuracy’ and ‘Segmental Accuracy’ (15.67 and 10.91 respectively), while the experimental group reported higher mean scores for the post-tests (18.62 and 12.97 respectively). The independent samples tests revealed no significant differences for the pre-tests in both elements of intelligibility, inferring homogeneity between the two groups. However the post-test scores showed that for both ‘Grammatical Range and Accuracy’ ($t = -2.943, p = 0.004$) and ‘Segmental Accuracy’ ($t = -2.200, p = 0.030$), the two groups were significantly different. It seems plausible that MABL was effective in improving the students’ intelligibility, judging from the larger increase in the experimental group’s mean scores.

TABLE 6
Independent Samples t-test for Intelligibility

Elements	Test	Group	N	Mean	SD	<i>t</i>	<i>df</i>	<i>Sig.</i>
Grammatical Range and Accuracy	Pre-test	Control	56	15.67	3.239	.454	123	.651
		Experimental	69	15.36	4.239			
	Post-test	Control	56	16.87	3.165	-2.943	123	.004
		Experimental	69	18.62	3.416			
Segmental Accuracy	Pre-test	Control	56	10.91	2.227	.364	123	.716
		Experimental	69	10.75	2.771			
	Post-test	Control	56	12.02	2.410	-2.200	123	.030
		Experimental	69	12.97	2.369			

Second, independent samples *t*-test was conducted for ‘Fluency and Coherence’ and ‘Lexical Resource’ of comprehensibility to investigate the effects of MABL, as shown in Table 7. The mean scores of pre-test in the control group were 15.65 and 10.34, while the scores in the control group were 15.10 and 10.18 in terms of ‘Fluency and Coherence’ and ‘Lexical Resource.’

Once again, the control group achieved slightly higher scores for both elements than the experimental group. But there were no significant differences between the two groups for both elements of comprehensibility. The post-test mean scores of the experimental group (18.70 and 12.20 respectively) were also higher than the control group (16.71 and 10.85). The independent samples *t*-test analyses indicated statistically significant differences between the two groups for both elements of comprehensibility ($t = -3.156, p = 0.002$ for ‘Fluency and Coherence’ and $t = -3.465, p = 0.001$ for ‘Lexical Resource’).

TABLE 7
Independent Samples t-test for Comprehensibility

Elements	Test	Group	N	Mean	SD	<i>t</i>	<i>df</i>	<i>Sig.</i>
Fluency and Coherence	Pre-test	Control	56	15.65	3.187	.850	123	.397
		Experimental	69	15.10	3.897			
	Post-test	Control	56	16.71	3.410	-3.156	123	.002
		Experimental	69	18.70	3.580			
Lexical Resource	Pre-test	Control	56	10.34	1.962	.405	123	.686
		Experimental	69	10.18	2.524			
	Post-test	Control	56	10.85	2.092	-3.465	123	.001
		Experimental	69	12.20	2.221			

The results showed that the MABL implementation improved all the elements of intelligibility and comprehensibility than traditional instruction. Interestingly, MABL improved both elements with a slight difference (5.48 and 5.62 respectively in total). The lessons in the experiment were designed to maximize the students’ spoken interactions, and the MABL activities were centered on collaborative and communicative activities. The differences in their environments meant that the experimental group students had more exposure to the target language and practiced speaking English.

Third, the paired samples *t*-test in Table 8 revealed that both groups significantly improved their intelligibility and comprehensibility. The experimental group managed to improve their ‘Grammatical Range and Accuracy’ by 3.26, ‘Segmental Accuracy’ by 2.22, ‘Fluency and Coherence’ by 3.60, and ‘Lexical Resource’ by 2.02, which are a lot higher improvements than the students in the control group (1.20, 1.11, 1.06, and 0.51 respectively).

TABLE 8
Paired-samples t-test for Intelligibility and Comprehensibility

Elements	Group	Test	N	Mean	SD	<i>t</i>	<i>df</i>	<i>Sig.</i>
Grammatical Range and Accuracy	Control	Pre-test	56	15.67	3.239	-5.221	55	.000
		Post-test	56	16.87	3.165			
	Experimental	Pre-test	69	15.36	4.239	-5.582	68	.000
		Post-test	69	18.62	3.416			
Segmental Accuracy	Control	Pre-test	56	10.91	2.227	-6.581	55	.000
		Post-test	56	12.02	2.410			
	Experimental	Pre-test	69	10.75	2.771	-5.730	68	.000
		Post-test	69	12.97	2.369			
Fluency and Coherence	Control	Pre-test	56	15.65	3.187	-3.688	55	.001
		Post-test	56	16.71	3.410			
	Experimental	Pre-test	69	15.10	3.897	-6.662	68	.000
		Post-test	69	18.70	3.580			
Lexical Resource	Control	Pre-test	56	10.34	1.962	-3.202	55	.002
		Post-test	56	10.85	2.092			
	Experimental	Pre-test	69	10.18	2.524	-5.777	68	.000
		Post-test	69	12.20	2.221			

In other words, the MABL model was designed to provide substantially more opportunities for speaking practice. It also means that there were more opportunities for students to observe, practice, and correct their pronunciation. There seems to exist a mismatch between the amount of practice students were exposed to and their scores. A possible reason for this could have alluded from excerpt 1, where the student informs that they felt the lack of accuracy in pronunciation did not necessarily lead to an apprehension of communication. An interview data in excerpt 5 reinforces this concept.

Excerpt 5 (Interview – s7)

I was nervous before because I always tried to speak correctly. I thought I would sound silly if I made simple mistakes. I realized that my speech does not have to be perfect. As long as I can be consistent and make clear meanings, people will understand.

The above excerpt indicates that the student overcame the anxiety of negative evaluation and illustrates that he became aware that comprehensibility, consistency, and precise meaning in his words were more important than his speech’s accuracy (intelligibility). Similar insights could be drawn from other interview data and reflective journals. These can be thought of as students from the experimental group focusing more on their comprehensibility. Therefore, the results returned show slight improvements in the elements of comprehensibility.

Notable results emerged from the reflective journals, which could be suggestions for awareness and concern when implementing MABL into a classroom environment. The activity participation of the students appears to have had quite an effect on their post-test scores. As mentioned previously, a few groups appeared to maintain friendly environments in the experimental group and those that did not. The groups that did not have welcoming or conversation-inducing atmospheres failed to improve as much. It could have been due to students who could not overcome their shyness even in mobile environments. Excerpts 6 below is from a reflective journal entry from a student in such groups. Question 2 of the reflective journal asked about their participation in group activities.

Excerpt 6 (Answer to question 2 – s81 from reflective journal)

I couldn't participate as much as I liked because my group members only gave short answers. I think my group members are very shy and nervous when speaking English.

Additionally, although most students found the topics of the lessons quite interesting, the opposite was also true for some. These students voiced their opinions on the topics for discussion and collaboration because they did not participate much in their reflective journals.

Excerpt 7 (Answer to question 2 – s62 from reflective journal)

Two of our members had a part-time job, so it made choosing a time very difficult. Sometimes we just gave up, didn't do the discussion, and gave short answers individually.

More prominent were the scheduling issues. Some students had part-time jobs, so they could not participate in the mobile environments for a set period. This is evident in excerpt 7, which again illustrates the group atmosphere hindering potential practice. Among the students who had busy schedules, some were still able to participate because of the helpful nature of their groups.

Excerpt 8 (Interview – s3)

I wasn't able to do the activities during the time my group agreed on because of my job. But I don't think it mattered because when I wanted to do the activity, my friends helped me and told me what they said when I wasn't there.

The student group in excerpt 8 accepted that she could not do the activities with them, so they would finish first and help when this student was available. Without such helpful group members, this student would have had less practice and exposure, affecting his post-test scores. It reinforces the importance of the atmosphere among the students since the scheduling issue prominent in MABL implementation was lessened by the students' helpful atmosphere.

As for answering the second research question, it is arguable to claim MABL improved one aspect of speaking proficiency more than the other due to the minuscule differences in their improvements. Nevertheless, qualitative data revealed students regarding the elements of comprehensibility higher than those of intelligibility were observed, resulting in a reduction of anxiety stemming from the negative evaluation. Such phenomenon is also well attested in existing literature (Baek & Lee, 2018; Demouy & Kukulska-Hulme, 2010; Kessler, 2010; Kukulska-Hulme & Shield, 2008; Lee, 2021 Lee & Cho, 2019), although whether it influenced the students' scores remain unclear.

Conclusion

The study examines the effects of MABL on university students' English speaking proficiency, including intelligibility and comprehensibility. The main findings of the study are as follows. First, the experimental (MABL) group improved the students' speaking proficiency more effectively than the control group. There is a significant difference between the groups, showing that the mean score of the experimental group was 6.04 points higher than that of the control group.

Second, the MABL group was more effective than the control group in terms of both aspects of intelligibility and comprehensibility, indicating statistically significant differences between the two groups. Meanwhile, the MABL group improved comprehensibility more than intelligibility. Of the aspects, 'Fluency and Coherence' improved the most, then 'Grammatical Range and Accuracy,' then 'Segmental Accuracy,' and 'Lexical Resource' improved the least. Due to the slight difference in the scores, it is arguable to assert which aspect of speaking proficiency MABL improved more. The qualitative data from reflective journals and interviews revealed that students' participation and engagement in MABL activities were crucial in its

success. Amicable atmospheres and interactions among the students encourage autonomy, extended exposure, and practice and diminish scheduling issues.

The implications of the study include a proper model of MABL that allows students to benefit from ubiquitous feedback and increased amounts of exposure and practice. Others stem from the various phenomena that occurred during the experiment. The differences in the students' scores appear to have been caused by the differences in participation rates of the students. Teachers will have to pay close attention to how students behave in their mobile environments; encouraging and close monitoring should raise students' participation. Another significant implication is related to the evolving use of mobile devices by students' current generation. The students in this study were already accustomed to using their smartphones to achieve educational goals through mobile SNS platforms or learning apps. Including such functionalities in the language classroom in a simple but meaningful way may prove highly beneficial.

This study pertains to only focusing on the effectiveness of MABL implementations on English speaking proficiency and its aspects with a relatively small number of students. It is recommended to conduct larger-scale experimental studies based on the MABL model used in the study, modifying it to fit the different classroom contexts if necessary. Measuring the students' participation rates and engagement levels would have helped identify the extent to which they affected the students' post-test scores. A study that investigates students' affective factors exposed to MABL environments would also be recommended. Additionally, from more interviews with more participants and classroom observation data, there appear to be many interesting factors regarding how students interacted in MABL environments. Classroom observations extensively exploring students' affective factors and behaviors in MABL environments strongly suggest further studies.

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