ISSN 1798-4769
Journal of Language Teaching and Research, Vol. 14, No. 3, pp. 780-788, May 2023
DOI: https://doi.org/10.17507/jltr.1403.26

The Effect of Android Application on EFL Students' Mastery of Research Method for Applied Linguistics Course

Sugeng Hariyanto*
English for Tourism Industry Study Program, State Polytechnic of Malang, Indonesia

Siti Rohani
English for Business and Professional Communication, State Polytechnic of Malang, Indonesia

Pritantina Yuni Lestari
English for Tourism Industry Study Program, State Polytechnic of Malang, Indonesia

***Abstract*—Covid-19 pandemic has forced online classes to be conducted mostly without proper introduction and preparation. This shift also made teachers and students gradually accustomed to independent learning. Several mobile applications have been developed for foreign language learning. However, only few Android applications were developed for non-linguistic courses offered by foreign language departments at the university level. The effectiveness of such an application to improve students' learning in universities, therefore, has not been conducted. This article reports the finding of a quasi-experimental research on the effect of using an Android application tailored for Research Method for Applied Linguistics students at an English department on their mastery of the course. The research data were collected through tests and a documentary study and calculated using ANCOVA statistical calculation. With the course mastery as the dependent variable, the use of Android application as the independent variable, and reading skills as covariates, the research revealed that the use of Android Learning Application significantly improves the EFL students' mastery of Research Methods for Applied Linguistics course. Further researchers are suggested to study the effect of the use of Android learning application on EFL students' mastery of a non-language course with significantly different students' levels of reading skills.**

***Index Terms*—mobile learning, autonomous learning, android learning application, learning mastery, EFL students**

I. Introduction

Covid-19 pandemic has affected various aspects of education. Many countries, including Indonesia, have implemented lockdown policy in 2020-2021. Consequently, many classrooms were closed. According to UNESCO (2021), 1.6 billion students and youth were affected by the pandemic. University learning has also been impacted by the pandemic (Ghazal et al., 2022). This situation required a solution. As one of the solutions, universities have switched to online learning to avoid direct contact between students and teachers, thereby preventing the spread of COVID-19. Online learning is an umbrella term for several concepts, including the use of learning management system (LMS) which is useful to maintain students' involvement in education (Alturki & Aldraiweesh, 2021). LMS makes students more flexible during the pandemic and in the future (Raza et al., 2021). LMS requires teachers' and students' familiarity with the environment. Those who are not ready would also use virtual meeting applications, such as Zoom and Google Meet (Wiyono et al., 2021).

However, such a platform causes zoom fatigue or mental and physical exhaustion after virtual meetings (Fosslien & Duffy, 2020). Prolonged intense stare at the monitor caused this exhaustion (Bailenson, 2020) and the occasional inappropriate size of the shared materials (Morris, 2020). In addition, objects visible and improper words in the chat box may become a distraction (Fosslien & Duffy, 2020; Wiederhold, 2020). In such a situation, a supplemental application, which is more practical than LMS and virtual class meetings, needs to be developed, and its effectiveness assessed.

One more flexible supplemental application is the mobile phone application. Many studies have been conducted to study or develop a single medium for learning English using a mobile phone (e.g., Ally & Samaka, 2013; Cavus & Ibrahim, 2009; Rohani et al., 2019; Thornton & Houser, 2005). Research by Oz (2015) also proved English teachers' high interest in using cellphones or tablets for English learning. At the institutional level (Polinema), research by Rohani et al. (2019) resulted in an output of self-learning Android applications for Polinema students, which has also been proven effective. The effectiveness of mobile phones as a medium for learning English as a foreign language has

* Corresponding Author.

been widely proven by Sandberg et al. (2011). Hamdani (2013) mentions the benefits of using mobile devices to improve higher-order thinking skills.

Android phones are among the most popular types of mobile phone. Profit companies have developed several learning applications for Android. Such applications include Duolingo, Busuu, Rosetta Store, and Memrise. They have been proven to be beneficial for English language learning during the pandemic. The applications are said to improve students' language skills, motivation, and confidence (Mubarok et al., 2021). Yudhiantara (2017) found that students had positive perceptions and attitudes toward using mobile phones to support classroom activities, including reading e-books, playing audio and video, and opening offline dictionaries. Although such an application is interesting, one drawback for the students is that it has been developed without considering their course contents.

The use of a mobile learning tool and online learning means partially or wholly activating independent learning. The use of technology for self-learning has been studied and proven effective. Benson (2007) and Smith (2009) have mentioned the effectiveness of independent or autonomous learning. Previous research in Indonesia by Kweldju (1998) also found the same result.

Some research has also revealed that online learning is useful for elementary school-to-university teaching programs. For example, Ghazal et al. (2022) found that university students prefer online learning, especially for remedial and free materials. Suparjan and Ismiyani (2002) revealed that Google Classroom improves elementary schoolteachers' motivation to teach.

The use of mobile phones for language learning has attracted the attention of many researchers. Thornton and Houser (2005) and Cavus and Ibrahim (2009) provide two examples of research in this field. Mobile phones with various features can be used to enhance learning. Automatic speech recognition (ASR) is beneficial for foreign language learners to improve their pronunciation and intonation, as studied by Bain et al. (2002), Chiu et al. (2007), Golonka et al. (2014), and Shadiev et al. (2016). The last is a study conducted by Rohani et al. (2018) in designing a mobile learning application for independent English learning using mobile phones and applying ASR.

None of the studies reviewed above examined the use of a mobile phone application to improve students' mastery of non-linguistic topics, such as research method topics, discussed in a foreign language program. This study aimed to find empirical proof of whether an Android application specifically designed as a tool to learn extra learning material can help university students majoring in English improve their mastery of Research Method for Applied Linguistics course content. As the review of the literature suggests that reading affects learning, this study also includes reading skill as a covariant. Thus, this research is to answer whether the use of an android application significantly improves students' mastery of Research Method for Applied Linguistics course.

The present study attempts to address a gap in research on the effect of Android applications on EFL students' mastery of non-English courses. In doing so, it contributes importantly. First, it extends the limited research on the understanding of the effect of Android applications containing texts and video files in English, on EFL Students' mastery of non-English courses. This study was among the first to examine the use of an Android application by English students to support non-English courses.

The rest of this article is organized as follows: the review of related literature is presented in Section 2, and the research method is outlined in Section 3. Section 4 describes the findings, including the ANCOVA statistical analysis of the effect of using the Android application on the Research Method for Applied Linguistics score improvement of the English Department students of the State Polytechnic of Malang, Indonesia. The next section discusses the findings. Finally, the conclusions are presented in Section 6.

II. Literature Review

A. Self-Learning (Autonomous Learning)

Learning using a mobile Android application involves independent learning. Independent learning, also called self-learning and autonomous learning, was promoted first in 1975 by Disick (1975). Autonomous learning is a learning approach that offers students a free choice for four dimensions: goals, time, methods, and learning content (Disick, 1975). This level of learning independence varies and does not have to cover all dimensions; it can also be adjusted according to students' condition.

In line with Disick, Benson (2007) defines autonomy as the capacity to take charge of, take responsibility for, or control over, students' learning. Autonomy also includes the abilities and attitudes of the learners who adjust to the degree of autonomy. Likewise, Holec in Smith (2008) highlights learners' autonomy as their ability to control or organize their learning, including goals, materials, syllabi, methods or techniques, time and place, and evaluation procedures. This is directed more towards the learning circuit. This is known as the total application of self-learning. However, self-learning does not have to be total because it can be adjusted to the conditions and needs of learners.

Benson (2007) and Smith (2009) have mentioned the effectiveness of independent or autonomous learning. Previous research in Indonesia by Kweldju (1998) found the same. However, cultural constraints are obstacles to the implementation of autonomous learning in Indonesia (Dardjowidjojo, 2001). Thus, it is necessary to adjust the application of independent learning.

Some studies have shown that autonomous learning has a significant positive impact on learning. Hockings et al. (2018) demonstrated an increase in higher levels of extending and applying skills, where students' skills in using learned knowledge and exploration skills are increasing. Cukurova et al. (2017) also proved the effectiveness of independent learning in improving students' ability to understand and apply the learned knowledge in everyday life.

B. Mobile Learning

Learning using mobile application can be categorized into mobile learning. Mobile learning itself can be interpreted as learning using mobile media or learning done by mobile learners (Kukulska-Hulme, 2009). Qiu (2019) summarizes that mobile learning is an extension of digital learning where students independently get information and learning resources and learn anytime and anywhere using a miniature of mobile computer and mobile internet technology.

The development of learning media based on mobile learning is rapid and the use of mobile learning media should accommodate learners' interests. Mobile phones are the most practical and cost effective (Molnar, 2014). Mobile phones are widely used for many purposes, especially for independent and self-directed learning.

The widespread use of mobile devices in recent years has given rise to the acronym MALL (Mobile -assisted language learning). This term reminds ones of CALL (computer assisted language learning). MALL and CALL share common feature of using information technology tools. However, in MALL continuity or spontaneity of access is better accommodated students can use their mobile gadgets across various contexts of time and place and, therefore, enable new ways of learning (Kukulska-Hulme & Shields, 2008).

Learners' mobility impacts the ever-changing learning environment. However, mobile technology is only one of the learning technologies. Therefore, how to fit this technology into educational interaction is important (Kukulska-Hulme et al., 2009). Self-learning tailored to the needs of students must accommodate their needs, including the need to improve the four components of language: vocabulary, grammar, pronunciation, and cultural understanding. Thus, the developed mobile learning media can use updated features, such as automatic speech recognition (ASR) to display the pronunciation of one word or phrase, correct the intonation of one sentence, and assess learners' recorded voice results. The effectiveness of ASR has also been proven in numerous studies (e.g., Bain et al., 2002; Neri et al., 2003).

New learning methods have been made possible by mobile technologies. The efficiency of concept mapping combined with Short Message Service (SMS) for EFL learners' vocabulary learning was examined by the researcher. The test scores showed that the idea mapping group greatly outperformed the random group on the translation portion after receiving English vocabulary courses through SMS (Chen & Chung, 2008).

C. Android Learning Application

Publications on Android learning applications can be seen in journals starting at least in 2010-s. Around the time, it was still a new field (Li et al., 2014). The development of the use of learning media based on mobile learning is rapid, and the use of mobile learning media should accommodate the interests of learners, including visually impaired students (Azmi et al., 2017).

Hanafi and Samsudin (2012) found that mobile learning application was useful and inexpensive for undergraduate students and at the time Internet connection was still a problem in Malaysia. Mobile phone learning applications are the most practical, in addition to their cost-effective nature (Molnar, 2014). Therefore, many applications have been developed for various formal learning levels and fields.

Reports on Android application for university students of foreign language department have been published. Some applications are commercially built, while others are developed by individual universities or study programs for their students' needs. Currently, there are over fifty commercial mobile phone applications available on the market. Heil et al. (2016) reviewed 55 mobile applications for language learnings and found that they tended to teach isolated vocabulary units, with minimal adaptation to address students' individual skills, and they also did not provide corrective feedback.

Gangaiamaran and Pasupathi (2017) reviewed 28 mobile applications for second language learning developed for primary, secondary, and tertiary levels. They classified the mobile application into applications for primary school learners, secondary school learners and tertiary level learners. This classification should help students in choosing the appropriate applications.

To get a better suited mobile learning application, some developers or institutions have developed their own mobile applications. Android learning applications have been developed for the learning of English and other languages, for examples, for Japanese language (Kurniawan & Novita, 2019) for Germany (Friedl et al., 2020), and for Arabic (Suheri, 2021). However, no foreign language department has developed an Android Learning Application for non-language courses taught in the department. This research is to fill the blank.

D. Mobile Learning Application Effectiveness

Mobile android applications have been reported to help improve students' scores and skills. There has been some research on the effect of using android application to improve university students' scores. Ningsih and Adesti (2020) found that Android application can improve the students' scores of Learning Strategy course. A study by Ulfa et al. (2017) revealed that mobile based learning application use improves senior school students' creativity and cognitive achievement.

Mobile applications are also reported to have been able to improve students' language skills or mastery. Gangaiamaran and Pasupathi (2017) reported that integration of mobile learning application materials into the second language reading course affected positively the students' reading skills at low-level of the learning process. Further, they found that the applications improve listening skills better than other language skills. Al-Jarf (2022), for example, found that mobile application can help improve students' reading comprehension, literary appreciation, and text analysis skills.

Nalliveettil and Alenazi (2016) found that all English teachers and most of undergraduate students thought that mobile phones could improve students' ability to learn English language. In addition, students generally also have positive attitudes towards mobile English language learning applications (Cheng & Kim, 2019). However, it is necessary to realize that mobile applications are relatively new learning foreign language format, and it is good as an additional way of learning (Kruchinin & Bagrova, 2020). Arifin et al. (2020) also conducted the research, and the result showed that the use of Android-based application devices can improve students 'ability to pronounce words using English in the category of Enough, Good, as for the factors that can increase students' abilities because Android-based applications can practice more often and can distinguish each word, Students can understand words and can find out errors in pronunciation. Abbas and Fathira (2021) also stated that android mobile application improves students' pronunciation. The students' difficulty pronouncing words with the -ed ending inspired the conduct of this study. The researchers attempted to integrate the application on learning media in the modern technological age to address the issue. The goal of the study is to identify the factors that contribute to improvement in students' pronunciation issues by using an Android application.

III. Method

A. Research Design

The design of this study was a control group pre-test post-test quasi-experimental research with samples comprising two intact classes taking the Research Method for Applied Linguistic course at the English Department of State Polytechnic of Malang in the second semester of 2021. The English Department comprises English for Business and Professional Communication Study Program and English for Tourism Industry Study Program which teach the same course content for Research Method for Applied Linguistics. The first class was from the first study program, assigned to the treatment as the experimental group. The other class, from the second study program, was the control group. Both groups joined online classes via Zoom cloud meeting platform. The experimental group was assigned to study the additional course material using the RM Android application. The control group was assigned to study the PDF materials provided.

A pre-test was administered before the treatment and a post-test, the same as the pre-test, was administered after the treatment. The score difference between the post-test and pre-test scores was the mastery improvement.

Before the experiment was conducted, the researchers obtained the subjects' reading skills scores from the available documents (records of students' scores of the previous semesters). Then, the means of the experimental and control groups' mastery improvement were compared by considering the scores in reading skills.

In this research, the use of an android application is not the only activity. The main activity is the regular teaching and learning program. The use of an application cannot substitute the ordinary learning (Kruchinin & Bagrova, 2021).

B. Research Variables

Following the description above, the research variables were identified as follows. The use of supplementary learning materials is the treatment or independent variable. The RM Android application was used for the experimental group and PDF learning materials were used for the control group. The data type was nominal or categorical. This was also known as a factor. The Research Method for Applied Linguistics mastery improvement was the dependent variable, of which the data type was quantitative (continuous). Students' reading skills were the control variable, quantitative or continuous in terms of data type. The inclusion of reading skills as a mediating variable was motivated by previous research findings, which revealed that reading skills may affect learning (Imran, 2016; Anggraini, 2017).

C. Research Subjects

The research subjects were two intact classes taking the Research Method for Applied Linguistic course at the English Department of State Polytechnic of Malang in the second semester of 2021. The first class was assigned to the treatment as the experimental group, and the other class was the control group.

D. Data Collection

A test was used as an instrument to collect the mastery improvement data. The test was a mastery test for the research method course content administered at the beginning of the research period (pre-test) and the end of the research period (post-test). This test was developed primarily based on the course content, considering content validity. The test comprised 24 items, of which 21 were multiple-choice items and three were short answer types. Considering the types, the test set was reliable as it was an objective test. For the reading skill scores, the researchers obtained the subjects' scores of the course from the previous semester.

Data collection and analysis were carried out as follows. First, a pre-test was administered. Then, the treatment was given to the subjects. The experimental group attended regular class meetings and was given a treatment, namely an assignment of learning independently using the android mobile learning application that has been designed. The control group also attended regular class sessions and was assigned to learning independently using conventional handouts, which were converted into PDF documents. The materials given to the control group were the same as the materials in the android application, but no video materials were given. After that, post-tests were administered to the two groups. The pre-test and post-test were the same tests.

The post-test result was taken as the students' mastery of the materials. And the mastery improvement was the difference between the post-test scores and the pre-test scores. In addition, another variable, namely reading skills, was controlled to ensure that the mastery improvement, if any, was the effect of the Android learning application.

The android application was developed in the previous semester. It could be accessed and downloaded from https://bit.ly/aplikasiresearchmethodologyforappliedlinguistic. When launched, it shows the topics of the course from which subjects can select to study. The learning material and exercise options are presented when students click each topic. Accessible materials in the application are also supplied as video clips, PDF documents, and Microsoft Office PowerPoint files.

In 'Learning Materials' section, the pdf files and links to YouTube are visible. In 'Practices' section, subjects can work on the exercises in multiple-choice, true-false, and matching exercises. After working on the activity, they can directly get information if their answers are right or wrong. It is important to note, however, that not all topics provide exercises because some topics only explain and give practical tips.

If the subjects reach the last question and have completed all the items, they should touch the 'FINISH' button. After that, an information box will pop up to confirm whether the students agree to submit all answers. After selecting the 'CONFIRM' button, the students will see their exercise scores. To exit the question practice session, students select the 'BACK TO HOME' button to return them to the Home Page.

The Android application 'Research Method for Applied Linguistic' could be managed by lecturers who teach courses or an administrator. The contents can be adjusted and changed. The settings can be accessed through https://polinema-english-club.com/research-methodology.

E. Data Analysis

From the description in 3.1, the variables and the data type were recognized. It can be summarized in Table 1 below.

TABLE 1
RESEARCH VARIABLES AND DATA TYPES

Variables	Name	Data type
Y – dependent variable (response variable)	Research Method mastery improvement	Quantitative/continuous
X1 – independent variable (treatment/factor)	The use of the RM Android application	Categorical
X2– independent variable (covariate)	Reading skills	Quantitative/continuous

Based on the nature of the variables above and the purpose of the research, i.e. to see the difference in the group means, the statistical analysis suitable for the calculation was ANCOVA. It combines the mean difference test and regression. It is used to see whether a treatment to an independent variable affects the dependent variable by considering the covariate variable (or also known control variable). The data for the dependent and control variables are quantitative and the data for the independent are nominal qualitative ones.

Essentially, ANCOVA adjusts the mastery improvement for the initial difference in students' reading skills and compares the adjusted values for differences in reading skills. Thus, it is used to see whether the first independent variable (X1) affects the dependent variable when the covariate (X2) is constant. Concerning the present research where intact groups were used, analysis of covariance can still be used, but the result must be interpreted with caution (Gay, 1992). The data of this research were statistically analyzed using SPSS Ver 26.

IV. RESULTS

The following presents the finding of the study and discussion.

A. Finding

The descriptive statistic can be seen in Table 2 below.

TABLE 2
DESCRIPTIVE STATISTIC

Descriptive Statistics

Group	*Mean*	*Std. Deviation*	*N*
Android	27.9642	15.10261	38
Control	18.9409	6.61901	33
Total	23.7703	12.69380	71

The table above shows that the mean of the mastery improvement achieved by the experimental group (Android group) is 27.96 with a standard variation of 15.10. The mean of the mastery improvement for the control group is 18.94, with the standard deviation being 6.62. The mastery improvement of the first group is more varied than the second group. In terms of the standard deviation, it seems the control group is better since the subjects' mastery is more evenly distributed. In terms of the means, the experimental group is higher than the control group. This calculation, however, is not adjusted with the reading skills. As mentioned above, some studies have proved that reading skills influence score improvement. It might be true, especially for this current experiment, as the treatment required students to read the material outside the class meeting. To see whether the means of the experimental group are significantly higher after their reading skills are considered, see Table 3 below.

TABLE 3
TESTS OF BETWEEN-SUBJECTS EFFECTS
DEPENDENT VARIABLE: SCORE IMPROVEMENT

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Corrected Model	1438.822[a]	2	719.411	4.971	.010	.128
Intercept	938.048	1	938.048	6.482	.013	.087
Reading Skills	.785	1	.785	.005	.941	.000
Use of Android App	1210.472	1	1210.472	8.365	.005	.110
Error	9840.463	68	144.713			
Total	51396.152	71				
Corrected Total	11279.285	70				

a. R Squared = .128 (Adjusted R Squared = .102)

The above table shows that the reading score means of the two groups are not significantly different (with the significant level of 0.941 or higher than 0.05). It can be said that in this study the group has the same level of reading skills. Therefore, as they are the same, this variable can be seen as a control variable. It means that the subjects' reading skills do not affect their score improvement in this study.

Further, the mean of score improvement of the experimental group is significantly higher than that of the control group with a significance level of 0.005. Thus, it can be stated that the use of the RM Android application can improve the subjects' score improvement in Research Method for Applied Linguistic course. However, it only accounts for 11% of the variability of the score improvement. The rest was influenced by other factors that were not observed.

B. Discussion

From the finding presented above, it is known that the score improvement in the Research Method for Applied Linguistics course of the experimental group using the RM Android application is significantly high. This difference is not caused by reading skills but influenced by the android application use. However, this finding should be interpreted with caution regarding the influence of reading skills. Based on the literature reviewed, reading skills influence score improvement. It cannot be stated here that reading skills do not affect score improvement in Research Method for Applied Linguistics course because the reading skill scores of the samples do not vary. As intact classes, the two groups cannot be randomized. As they sit in the same semester, they have passed the Reading Skills course, which might cause them to have similar reading skill levels. Using subjects with more varied their reading skills would clarify whether reading skills variability influences the variability of the Research Method for Applied Linguistics score improvement.

The finding revealed that the use of Research Method Android application improves Research Method score, and this aligns with several claims and previous research. The first, it is in line with the claim by Dale (1969) stating that learning with more realistic media, like audio-visual and interesting images, will make learning materials easier to understand and the result stays longer.

The current research observes the impact of using a mobile application on the EFL students' mastery of non-English content. The finding, thus, also supports previous research findings, e.g., the one by Qiu (2019), stating that mobile application can improve students' mastery of learning materials of non-language contents. Finally, this study answers Rosidah et al. (2021) calling for research on the development of Android-based mobile learning media to improve students' scientific literacy. The finding proves that android-based mobile learning media can improve student's scientific literacy.

V. CONCLUSION AND SUGGESTION

In concluding this research finding, it is necessary to take some caution as the subject groups are intact groups with no randomization. This may make the subjects' reading skills are not significantly different between the experimental group and control group.

The first research question can be answered that the use of an android application can improve students' score improvement in Research Method for Applied Linguistics course. This conclusion can be drawn confidently since the control variable, i.e., reading skills, are kept constant across the groups. The second question can be answered that students' reading skills do not affect score improvement significantly. However, this conclusion is valid only for this

research as the groups are not randomized. Randomization would give possibility for the groups to have varied reading skills.

Based on the above findings, one suggestion is offered to the next researchers with a similar topic. First, the researchers are suggested to have true experimental research to see whether reading skills significantly influence the score improvement of the students when they use Android application for their Research Method for Applied Linguistics course.

ACKNOWLEDGEMENTS

The researchers are indebted to Hilda Cahyani, Ph.D. for his invaluable suggestion during the analysis of the research findings.

FUNDING

This research was funded by State Polytechnic of Malang, Indonesia.

REFERENCES

[1] Abbas, M. F. F., & Fathira, V. (2020). Implementation of Android application to solve the students' pronunciation of ending -ed. *English Review: Journal of English Education, 8*(2), 265-272. https://doi.org/10.25134/erjee.v8i2.2648.

[2] Al-Jarf, R. (2022). Enhancing EFL Students' Reading and Appreciation Skills with Mobile Fiction Apps. *International Journal of Linguistics Studies*. *2*(2), 15-23. https://doi.org/10.32996/ijls.2022.2.2.3

[3] Ally, M., & Samaka, M. (2013). Open Education Resources and Mobile Technology to Narrow the Learning Divide. *The International Review of Research in Open and Distance Learning*. *14*(2), 14. Retrieved July 18, 2022, from https://files.eric.ed.gov/fulltext/EJ1008090.pdf.

[4] Alturki, U., & Aldraiweesh, A. (2021) Application of Learning Management System (LMS) during the COVID-19 Pandemic: A Sustainable Acceptance Model of the Expansion Technology Approach. *Sustainability 13*(19), 1-16, https://doi.org/10.3390/su131910991

[5] Arifin, A., Rakhman, A., Fermadani, F., Setianto, A. Y., Trinova, Z., Sinlae, A. A. J., & Sartika, D., (2021) Improve Students' Speaking Ability Using Android-Based Learning Applications, *Proceedings of the First International Conference on Economics, Business and Social Humanities, ICONEBS 2020*, November 4-5, 2020, Madiun, Indonesia. http://dx.doi.org/10.4108/eai.4-11-2020.2304654

[6] Azmi, N., Maryono, D., & Yuana, R. A., (2017). Development of an Android-based Learning Media Application for Visually Impaired Students. *Indonesian Journal of Informatics Education. Vol 1*, No 1 UNS. http://dx.doi.org/10.20961/ijie.v1i1.11796

[7] Bailenson, J. (2020). Why Zoom Meetings Can Exhaust Us; being Gazed at by Giant Heads Can Take a Mental Toll. New technologies may remedy that problem. *Wall Street Journal*. Retrieved May 23, 2022, from https://www.wsj.com/articles/why-zoom-meetings-can-exhaust-us-11585953336.

[8] Bain, K., Basson, S. H., & Wald, M. (2002). Speech Recognition in University Classrooms: Liberated Learning Project. *Paper presented at the Proceedings of the fifth international ACM conference on Assistive technologies*, Edinburgh, Scotland. Retrieved August 15, 2022, from https://core.ac.uk/download/pdf/1503524.pdf.

[9] Benson, P. (2007). Autonomy in language teaching and learning. *Language Teaching, 40*(01), 21-40. https://doi.org//10.1017/S0261444806003958

[10] Cavus, N., & Ibrahim, D. (2009). M-Learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology, 40*(1), 78-91. https://doi.org/10.1111/j.1467- 8535.2007.00801.x

[11] Chen, C. M., & Chung, C. J. (2008). Personalized Mobile English Vocabulary Learning System Based on Item Response Theory and Learning Memory Cycle. *Computers & Education, 51*(2), 624-645. https://doi.org/10.1016/j.compedu.2007.06.011

[12] Cheng, J., & Kim, H. (2019). Attitudes towards English Language Learning Apps from Korean and Chinese EFL Students. *English Teaching, 74*(4), 205-224. Retrieved September 1, 2022, from https://files.eric.ed.gov/fulltext/EJ1284735.pdf.

[13] Chiu, T. L., Liou, H. C., & Yeh, Y. (2007). A Study of web-based oral activities enhanced by Automatic Speech Recognition for EFL college learning. *Computer Assisted Language Learning, 20*(3), 209- 233. https://doi.org/10.1080/09588220701489374

[14] Dale, E. (1969). *Audio-Visual Methods in Teaching* (3rd ed., p. 108). New York: Dryden Press.

[15] Dardjowidjojo, S. (2001). Cultural constraints in the implementation of learner autonomy: The case in Indonesia. *Journal of Southeast Asian Education, 2*(2), 309-322.

[16] Disick, R. S. (1975). *Individualizing Language Instruction: Strategies & Methods*. New York: Harcourt Brace Jovanovich Inc.

[17] Fosslien, L., & Duffy, M. W. (2020). How to combat Zoom fatigue. *Harvard Business Review*. Retrieved January 23, 2022, from https://hbr.org/2020/04/how-to-combat-zoom-fatigue.

[18] Friedl, M., Ebner, M., & Ebner, M. (2020). Mobile Learning Applications for Android und iOS for German Language Acquisition Based on Learning Analytics Measurements. *International Journal of Learning Analytics and Artificial Intelligence for Education* (IJAI), *2*(1), 4–13., https://doi.org/10.3991/ijai.v2i1.12317

[19] Gangaiamaran, R., & Pasupathi, M. (2017). Review on use of mobile apps for language learning. *International Journal of Applied Engineering Research, 12*(21), 11242-11251. Retrieved 25 February 2022, from https://www.ripublication.com/ijaer17/ijaerv12n21_102.pdf.

[20] Ghazal, G., Alian, M., & Alkawaldeh, E. (2022). E- Learning and Blended Learning Methodologies Used in Universities During and After COVID-19. *International Journal of Interactive Mobile Technologies. 16*(18). 19-43. https://doi.org/10.3991/ijim.v16i18.32721

[21] Golonka, S., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: a review of technology types and their effectiveness. *Computer Assisted Language Learning, 27*(1), 70-105. https://doi.org/10.1080/09588221.2012.700315
[22] Hanafi, H. F., & Samsudin, K. (2012). Mobile Learning Environment System (MLES): The Case of Android-based Learning Application on Undergraduates' Learning. *International Journal of Advanced Computer Science and Applications* (IJACSA), *3*(3). http://dx.doi.org/10.14569/IJACSA.2012.030311
[23] Kruchinin, S., & Bagrova, E. (2021). Quality of Mobile Apps for Language Learning. *3rd International Scientific Conference on New Industrialization and Digitalization (NID 2020). SHS Web of Conferences 93*(1). https://doi.org/10.1051/shsconf/20219301009
[24] Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL, 21*(2), 157-165. https://doi.org/10.1017/S0958344009000202
[25] Kukulska-Hulme, A. & Shield, L., (2008). "An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction," *ReCALL, 20*(3), 271-289. https://doi.org/10.1017/S0958344008000335
[26] Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sanchez, I., & Vavoula, G. (2009). Innovation in Mobile Learning: A European Perspective. *International Journal of Mobile and Blended Learning, 1*(1), 13-35. https://doi.org/10.4018/jmbl.2009010102
[27] Kurniawan, B., & Novita, A. (2019). Developing Application Android Based for Japanese Language Learning. *Proceedings of the 1st International Conference on Informatics, Engineering, Science and Technology, INCITEST 2019, 18 July 2019, Bandung, Indonesia.* https://doi.org/10.4108/eai.18-7-2019.2287807
[28] Li, C. M., Hang, L., & Wang, R. (2014). The Design and Implementation of Android-Based Mobile Learning Platform. *Applied Mechanics and Materials*, 672–674, 1981–1984. https://doi.org/10.4028/www.scientific.net/amm.672-674.1981
[29] Morris, B. (2020, May 28). Why does Zoom exhaust you? Science has an answer. *Wall Street Journal*. Retrieved March 2, 2022, from https://www.wsj.com/articles/why-does-zoom-exhaust-you-science-has-an-answer-11590600269.
[30] Motlik, S. (2008). *Mobile Learning in Developing Nations. 2008, 9*(2). https://doi.org/10.19173/irrodl.v9i2.564
[31] Mubarok, F.U., & Asri, A. N. *(2021)* The Benefits of Android Applications for an Independent Learning in English Language. *Journal of Language, Literature, and English Teaching* (JULIET), *2*(1). 43-50. https://doi.org/10.31629/juliet.v2i2.3692
[32] Nalliveettil, G.M., & Alenazi, T. H. K. (2016) The Impact of Mobile Phones on English Language Learning: Perceptions of EFL Undergraduates. *Journal of Language Teaching and Research, 7*(2), 264-272, https://dx.doi.org/10.17507/jltr.0702.04
[33] Neri, A., Cucchiarini, C., & Strik, W. (2003). Automatic Speech Recognition for second language learning: How and why it actually works. Paper presented at *the 15th ICPhS Barcelona*, Barcelona. 1157-1160. Retrieved 7 May 2002, from
[34] Ningsih, S. and Adesti, A. (2020). Pengembangan Mobile Learning Berbasis Android Pada Mata Kuliah Strategi Pembelajaran. *Edcomtec*, *Jurnal Kajian Teknologi Pendidikan. Vol. 4*/2. pp. 163-172. Accessed from http://hstrik.ruhosting.nl/wordpress/wp-content/uploads/2013/03/a102.pdf http://journal2.um.ac.id/index.php/edcomtech/article/view/9005/4446, 19 December 2022.
[35] Ningsih, S., & Adesti, A. (2019). Android-Based Mobile Learning: Its Effect on Students' Learning Achievement. *Proceedings of the International Conference on Progressive Education* (ICOPE 2019). Atlantis Press. https://doi.org/10.2991/assehr.k.200323.099
[36] Oxford, R. L. (1990). *Language Learning Strategies: What Every Teacher Should Know*. New York: Newbury House Publishers.
[37] Oz, Huseyin. (2015). An Investigation of Pre-service English Teachers' Perceptions of Mobile Assisted Language Learning. *English Language Teaching. 8*. 22-34. 10.5539/elt.v8n2p22.
[38] Qiu, J. (2019) A Review of Mobile Learning Research at Home and Abroad in Recent 20 Years. *Journal of Language Teaching and Research, 10*(5), 1097-1102. http://dx.doi.org/10.17507/jltr.1005.24
[39] Raza, S. A., Qazi, W., Khan, K. A., & Salam, J. (2021). Social Isolation and Acceptance of the Learning Management System (LMS) in the time of COVID-19 Pandemic: An Expansion of the UTAUT Model. *Journal of Educational Computing Research*. *59*(2), 183–208. https://journals.sagepub.com/doi/10.1177/0735633120960421
[40] Rohani, S., Suyono, A., & Fahrurozi, I. (2018). *Application Development. Mobile Learning for Self-English Learning*. Unpublished Research Report. State Polytechnic of Malang.
[41] Rohani, S., Suyono, A., & Fahrurozi, I. (2019). Designing a Mobile Application for Autonomous Learning of English. *First International Conference on Advances in Education, Humanities, and Language, ICEL 2019*, Malang, Indonesia, 23-24 March 2019. http://dx.doi.org/10.4108/eai.23-3-2019.2284960
[42] Rosidah, U., Marwoto, P., & Subali, B. (2021). Analysis of the Need for Android Based Mobile Learning Development to Improve Student Science Literations. *Jurnal Penelitian Pendidikan IPA, 7*(4), 601-606. Doi: https://doi.org/10.29303/jppipa.v7i4.805
[43] Shadiev, R., Hwang, W. Y., Huang, Y. M., & Liu, C. J. (2016). Investigating applications of speech-to-text recognition technology for a face-to-face seminar to assist learning of non-native English-speaking participants. *Technology, Pedagogy and Education, 25*(1), 119-134. doi:10.1080/1475939X.2014.988744
[44] Suheri (2021). Design a Mobile Learning Application to Learn Hijaiyah Letters Based on Android. *International Journal of Research and Review, 8*(10). https://doi.org/10.52403/ijrr.20211028
[45] Suparjan & Ismiyani, (2022) N. Google Classroom Amidst Covid-19 Pandemic in Indonesian Elementary Schools: Teachers' Perceptions and Motivation. *International Journal of Interactive Mobile Technologies. 16*(18), 133-148. https://doi.org/10.3991/ijim.v16i18.32657
[46] Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning, 21*(3), 217-228. doi:10.1111/j.1365-2729. 2005.00129.x
[47] Ulfa, A. M., Sugiyarto, K., & Ikhsan, J. (2017). The effect of the use of android-based application in learning together to improve students' academic performance. May 2017. *AIP Conference Proceedings_1847(1):050008. Proceedings of the International Conference on Education, Mathematics and Science 2016* (Icems2016) In Conjunction With 4th International Postgraduate Conference On Science And Mathematics 2016 (IPCSM2016). https://doi.org/10.1063/1.4983910.

[48] UNESCO. (2021). *When Schools Shut: Gendered Impacts of COVID-19 School Closures*. Paris: United Nations Educational, Scientific and Cultural Organization, Retrieved 28 December 2021, from https://unesdoc.unesco.org/ark:/48223/pf0000379270.
[49] Wiederhold, B. K. (2020). Connecting through technology during the Coronavirus disease 2019 pandemic: Avoiding "Zoom fatigue." *Cyberpsychology, Behavior, and Social Networking, 23*(7), 437–438. https://doi.org/10.1089/cyber.2020.29188.bkw
[50] Wiyono, B. B., Kusumaningrum, D. E., & Prestiadi, D, (2021). The Utilization of Information and Communication Technology in School Management, in Relation to the Characteristics of Principals", *2021 International Conference on Technological Advancements and Innovations* (ICTAI), 251-256. Retrieved July 17, 2022, from https://ieeexplore.ieee.org/document/9673408.
[51] Yudhiantara, R., A., & Nasir, I., A. (2017). Toward Mobile-Assisted Language Learning (MALL): Reaping Mobile Phone Benefits in Classroom Activities. *Register Journal, Language & Language Teaching Journals Vol. 10*(1), 12-28. Retrieved April 25, 2022, from https://journalregister.iainsalatiga.ac.id/index.php/register/article/view/813.

Sugeng Hariyanto, born on March 8, 1968, is a lecturer at the Department of English Department for Tourism Industry, State Polytechnic of Malang, Indonesia. He received his Ph.D. in English from Malang State University, Indonesia. His research interests include teaching research methods, EFL teaching and translation teaching. Dr. Hariyanto is a member of TEFLIN (Teacher of English as a Foreign Language) and Indonesian Translators' Association, where he is a member of Competency and Certification Board.

Siti Rohani is a lecturer at the Department of English for Business and Professional Communication of the State Polytechnic of Malang, Indonesia. She received her PhD in English Teaching from Monash University, Australia. Her research interests include teaching research methods and cross-cultural understandings. Ms. Rohani is a member of TEFLIN (Teacher of English as a Foreign Language).

Pritantina Yuni Lestari was born in Kediri, 15th June 1990. She got a master's degree in English language teaching from the Islamic University of Malang (Unisma), Indonesia. She earned it in 2015.

She is now a lecturer at the English for Tourism Industry Study Program of the State Polytechnic of Malang, Indonesia. Her research interests include teaching English for foreign learners and English education. Ms. Lestari is a member of TEFLIN (Teacher of English as a Foreign Language).