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The effectiveness of mobile-based teaching materials for academic writing in hybrid learning on students' academic writing ability

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KEYWORD

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ABSTRACT

Mobile-based teaching materials for academic writing are flexible to be implemented in various learning models. Therefore, this study aims to investigate which is more effective between mobile-based teaching materials in hybrid learning and teaching materials in form of handouts in direct instruction to produce students' academic writing ability. This study is quasi experimental design in which the population is all of students in second semester at Indonesian language and literature department of IKIP PGRI Bojonegoro. They are consisted of 72 students. Research samples are taken using simple random sampling. Test is utilized to obtain the data. Moreover, its hypothesis is tested using t-test. Result of study shows that in the significance level of 0,05, it equals 1,6992. While the value of $t_{0,05;70}$ = 1,6669. Based on t table, the value of $DK = \{t|t > 1{,}6669\}$. $t_{obs} \notin DK$. In other words, H_0 is rejected. It can be concluded that mobile-based teaching material of academic writing skill in hybrid learning is more effective to produce students' academic writing ability than the teaching materials in form of handouts in direct instruction.

Introduction

In 21st century, critical thinking needs to be developed. Academic writing ability is an effort to develop critical thinking skill and becomes a basic element for various fields of science (Borglin, 2012). It provides a learning environment for students to practice writing and obtain materials efficiently (Cilliers, 2012). This condition makes academic writing ability is very needed as an introduction to learning (Tarrant et al., 2008) especially in the beginning of

education (Keck, 2014) which becomes one of determinants of graduation in university level (Hudaa, 2018). However, it cannot be denied that it is one of challenging skills and most difficult for students (Esma, 2018) because it involves many obstacle factors, ranging from less effective learning to unprepared of innovative teaching materials (Chokwe, 2013). Based on those ideas, academic writing ability facilitates in obtaining materials efficiently and improving critical thinking skill; it has been difficult for students because of less innovation for teaching materials.

Teaching materials can be said to be printed or non-printed materials to support teaching and learning process. The use of teaching material in educational innovation is supposed to improve learning competence (Li et al., 2020), create fun learning which is easy to be accepted (Awang et al., 2022), optimize students' creative thinking skill (Widyaningrum et al., 2022), and be a solution for learning problems (Suryani et al., 2022). The implementation of innovative teaching materials will provide more positive impacts such as raising motivation to learn, creating sense of enjoyment in learning process, and receiving more comprehensive knowledge (Hasanudin & Fitrianingsih, 2018). Therefore, learning without teaching material innovation is going to drive students to get bored and difficult in teaching and learning process (Baki & Güveli, 2008).

Innovation of teaching material can be designed in various ways. One of it is by using technology that can be implemented in mobile learning. Mobile learning is a new trend in education that can help students in accessing data, communication, and joining learning activities through wireless technology (Wu et al., 2012). It can support students in responding their environment and optimizing interactive between students and teachers (Motiwalla, 2007). It makes the implementation of mobile learning is able to facilitate students to be more active in competitions and collaborations (Al-Emran et al., 2016). It also enables students to join learning process anytime and anywhere (Martin & Ertzberger, 2013; Khan et al., 2015; Hwang & Chang, 2011).

In recent years, reviews on the use of mobile learning have been conducted by researchers to provide information related to educational settings and the use of mobile devices (Crompton & Burke, 2018). According to Fulantelli et al. (2015), the use of mobile learning in education is closely related to students' mobility to reach data and information which has been provided by technology. Furthermore, Liaw et al. (2010) state that mobile learning as teaching system and material can be accepted positively, so it is able to improve students' satisfaction with the teaching and learning process. Therefore, the use of mobile learning as teaching material is appropriate to be implemented because it provides significant impact.

Several teaching materials combined with mobile learning have been successfully developed in previous research. A research conducted by Prasetyo et al. (2019) becomes one of studies that adopted mobile learning as teaching material for senior high school students which obtained satisfactory result. Teaching material which was designed using mobile learning media was effective to increase students' achievement for 83,92%. However, that research had not been implemented in hybrid learning. This study implements hybrid learning. Moreover, that research object was aimed at sport physical education learning. This study is aimed at academic writing ability. Another research conducted by Bai (2022) utilized mobile-based teaching material as basic component in hybrid learning with quite limited result. It showed students' responses. However, this study is focused on the effectiveness of that teaching material. Bai (2022) also added recommendation for further researchers to design teaching material using mobile learning to obtain better results in hybrid learning. It becomes a basis to conduct this study.

Hybrid learning is included in the learning method offered by many universities to develop traditional learning and online learning (Chen & Chiou, 2014). It provides more advantages than other learning method, so it is able to improve students' learning qualities (Lin, 2014). Furthermore, Olapiriyakul & Scher (2006) argue that its advantages are to save the time, reduce expenses, and increase flexibility in traditional classroom. In other words, hybrid learning can be said as a method that is implemented in the teaching and learning process because it provides more advantages for students.

A research conducted by Bennett et al. (2020) implemented hybrid learning to increase students' competence in higher education level. This learning obtained good responses because it provided more time for students to develop themselves. However, the scope of learning is still broad, so it needs to be focused on a main learning objective to achieve more relevant results. Moreover, Kazu & Yalçın (2022) obtained satisfactory results in examining the benefits of hybrid learning to improve students' achievements. It was focused more specifically on learning biology and science. Meanwhile, this study is focused on learning academic writing. Kazu & Yalçın (2022) provided recommendations for future researchers to support learning facilities such as teaching materials in hybrid learning. Several researchs on hybrid learning are more focused on students' responses and the benefits of hybrid learning in increasing their achievements. There has been no research that utilizes hybrid learning in teaching academic writing and designs an innovation of mobile-based teaching materials.

Based on theoretical studies, existing problems, and recommendations from previous researchers, the main goal of this study is to investigate the effectiveness of mobile-based

teaching materials for academic writing in hybrid learning on students' academic writing ability.

Method

This study is quasi experimental design because it is impossible to control everything which influences the students' academic writing abilities. The researchers have limited it to two variables. This study will examine the cause and effect relationship from the use of treatment in experimental class. It will be compared with control class as viewed in Table 1.

Table 1. Relationship between variables

Class	***Treatment***	***Test results***
A (experimental)	X	Y_1
B (control)	-	Y_2

Explanations:
X : Utilizing mobile-based teaching materials for academic writing in hybrid learning
- : Utilizing handouts as teaching materials in direct instruction
Y_1 : Students' academic writing abilities in experimental class which implements mobile-based teaching materials for academic writing in hybrid learning
Y_2 : Students' academic writing abilities in control class which implements handouts as teaching materials in direct instruction

Population of this study are all of second semester students in Indonesian language and literature education of IKIP PGRI Bojonegoro. The samples are 72 students taken using simple random sampling. Furthermore, two classes are taken randomly as experimental class and control class. Before being given treatment, Class A (32 students) is stated as experimental class. Class B (40 students) is stated as control class in a balanced state. Control class implements handouts as teaching materials in direct instruction. Experimental class implements mobile-based teaching materials for academic writing in hybrid learning.

Research data are in form of students' writing results that have been collected using test method. Test is conducted twice, namely pre-test and post-test using the same questions. The assessment aspects of academic writing test can be viewed in Table 2.

Students' scores are adjusted to the following value categories.

86 – 100 = very good
70 – 85 = good
60 – 69 = sufficient
50 – 59 = poor
0 – 49 = very poor (Sugiyono, 2015).

Table 2. Assessment aspects of academic writing test

No.	Assessment aspects	Score scale					Value weight	Score
		1	2	3	4	5		
1	Making decision on the problem that will be used as topic of writing						2	10
2	Finding writing ideas that are original creation						2	10
3	Making the flow of writing to be more effective						2	10
4	Making writing subchapters to be more effective						2	10
5	Utilizing qualified and latest references						2	10
6	Reinforcing ideas with references						4	20
7	Fixing writing typos based on internal capabilities						2	10
8	Adding and improving writing based on readers (colleagues/advisors/lecturers) suggestions						2	10
9	Providing benefits for others through publication of work						2	10
Total							**20**	**100**

Explanations:
1. Score scale for each aspect is fulfilled using checklist mark in the appropriate column
2. Score = score scale X value weight
3. Final score = total scores

Students' scores will be compared between those who are taught using mobile-based teaching materials for academic writing in hybrid learning (experimental class) with those who are taught using handouts in direct instruction (control class).

Normality test of initial ability is tested using Lilliefors method. Homogeneity test is tested using F test. When the prerequisites for normality and homogeneity of data have been met, data analysis can be carried out using the t-test with a significance level of 5%.

Results and Discussion

Pre-Test Scores of Both Classes Before Being Given Treatment

Pre-test scores of both classes before being given treatment is important stage in this study. Before treatment is implemented, pre-test scores provide initial information about students' academic writing abilities. Furthermore, its normality, homogeneity, and balance need to be tested. Normality test is used to examine that both classes are in the normal conditions. Homogeneity test is utilized to ensure that both classes are in the homogeneous conditions. Balance test is used to investigate that both classes are in balance conditions.

Pre-test scores are used as critical initial evaluation to determine the effectiveness of

mobile-based teaching materials for academic writing in hybrid learning. It facilitates the researchers in determining more focused and responsive stages for effectiveness test in experimental class and control class. Students' initial academic writing abilities in both classes before being given treatment can be viewed in Table 3.

Table 3. Normality test of pre-test scores in control and experimental classes

Normality Test	Control Class	Experimental Class
L_{Obs}	1,2687	0,6368
L_{table}	0,1401	0,1566
Conclusion	Normal	Normal

In table 3, it can be viewed that the value of L_{obs} in control class is 1,2687 and L_{table} is 0,1401. It can be explained that the value of L_{obs} is lower than L_{table}, so it can be concluded that students' pre-test scores in control class have normal distribution. In experimental class, the value of L_{obs} is 0,6368 and L_{table} is 0,1566. It can be said that the value of L_{obs} is lower than L_{table}, so it can be concluded that students' pre-test scores in experimental class have normal distribution in Table 4.

Table 4. Homogenity test of pre-test scores in control and experimental classes

Homogenity Test	Control Class	Experimental Class
n	40	32
$\overline{X}$	70,3500	73
Sd	9,3138	8,3470
Variance	86,7461	69,673
F_{count}	0,8031	
F_{table}	1,7828	

In addition, homogeneity test is carried out. In control class, the value of variance is 86,7461. In experimental class, it is 69,6733, with the value of F_{count} is 0,8031 and F_{table} is 1,7828. Based on homogeneity test results in both classes, it can be said that the value of F_{count} is lower than F_{table}, so H_0 is accepted with a conclusion that both classes are homogeneous.

Moreover, balance test is carried out in both classes. It can be viewed in table 5.

Table 5. Balance test of pre-test scores in control and experimental classes

Balance Test	Control Class	Experimental Class
$\overline{X}$	70	73
Standard Deviation	9,3137	8,3470
Variance	86,7461	69,6733
T_{count}	-1,266	
t_{table}	1,9944	

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In table 5, the value of sp (the pooled test statistic) is 8,8986; the value of t_{count} is -1,266; and the value of t_{table} is 1,9944. Based on those values, it can be concluded that the value of t_{count} is lower than t_{tabel}, so both classes are balance.

Implementation of Mobile-based Teaching Materials for Academic Writing in Hybrid Learning at Experimental Class

Syntax of teaching in experimental class is consisted into three stages, namely 1) before teaching, 2) whilst teaching, and 3) after teaching. It can be explained as follows:

1. Before teaching
   a) Lecturer asks students to download the application for academic writing in Google Play by clicking the link https://play.google.com/store/apps/details?id=io.kodular.a710180016.BahanAjar with an icon as viewed in Fig 1.

Fig 1. Icon of academic writing application

   b) Students are able to utilize the application in their android smartphones. They are also able to install it in computer or laptop using emulator to read it.
   c) When the application has been installed, students are asked to review the content of application, make notes, and prepare questions.
2. Whilst teaching
   a) Online learning is carried out using Zoom meeting. The lecturer organizes small groups in breakout rooms. They conduct discussion and present its result in the main room.
   b) Offline (face-to-face) learning is carried out by sharing teaching materials using slides. The lecturer creates small groups to have discussion. They present its result in front of the class.
3. After teaching
   a) The lecturer provides assignment for students to write scientific articles. It can be submitted using the application of academic writing in the menu of upload assignment.

Teaching syntax in experimental class can be narrated as viewed in Fig 2.

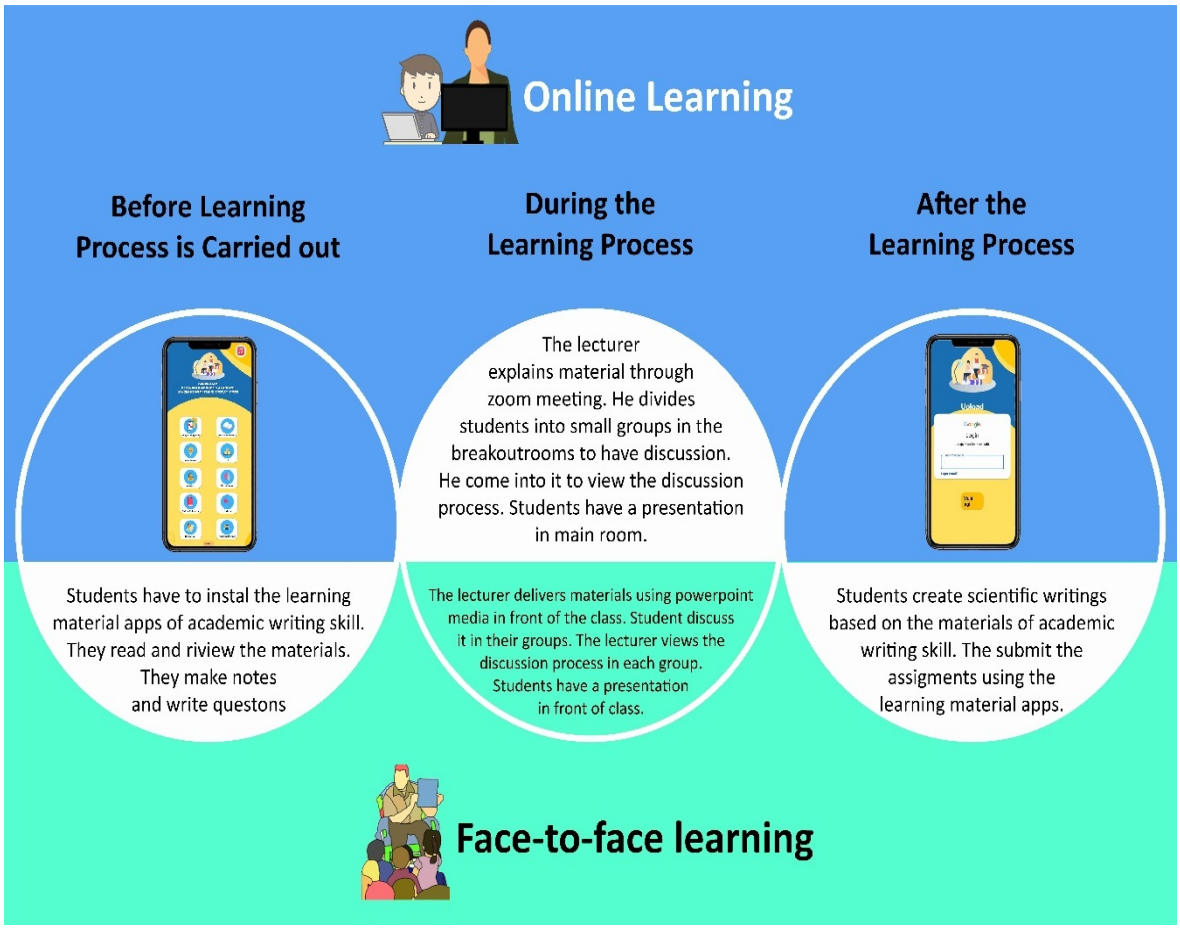

Fig 2. Teaching syntax in experimental class

Post-test scores of both classes after being given treatment

After treatment is given, both classes are conducted post-test to investigate the effectiveness of mobile-based teaching material for academic writing in hybrid learning. Its results have to be tested its normality, homogeneity, and hypothesis.

The final academic writing abilities of students in both classes after being given treatment can be viewed in Table 6.

Table 6. Normality test of post-test scores in control and experimental classes

Normality Test	Control Class	Experimental Class
L_{Obs}	1,3501	0,6528
L_{table}	0,1401	0,1566
Conclusion	Normal	Normal

In table 6, it can be viewed that the value of L_{obs} in control class is 1,3501 and L_{table} is 0,1401. It can be explained that the value of L_{obs} is lower than L_{table} , it can be concluded that students'

post-test scores in control class have normal distribution. In experimental class, the value of L_{obs} is 0,6528 and the value of L_{table} is 0,1566. It shows that the value of L_{obs} is lower than L_{table}, it can be concluded that students' post-test scores in experimental class have normal distribution. Homogenity test of post-test scores in control and experimental classes can be viewed in Table 7.

Table 7. Homogenity test of post-test scores in control and experimental classes

Homogenity Test	Control Class	Experimental Class
n	40	32
$\overline{X}$	72	76
Sd	9,1506	8,6509
Variance	83, 7333	74,8387
F_{count}	0,8937	
F_{table}	1,7828	

Moreover, homogeneity test in control class has the variance value of 83,7333. The variance value in experimental class is 74,8387 in which F_{count} is 0,8937 and F_{table} is 1,7828. Based on results of homogeneity test in both classes, the value of F_{count} is lower than F_{table}. It can be decided that H_0 is accepted, so both classes are homogenous.

In addition, hypothesis test is also conducted in both classes. It can be viewed in Table 8.

Table 8. Hypothesis test of post-test scores in control and experimental classes

Balance test	Control Class	Experimental Class
$\overline{X}$	72	76
Standard Deviation	9,1505	8,6509
Variance	83,7333	74,8387
T_{count}	1,6992	
t_{table}	1,6669	

In table 8, the value of sp (the pooled test statistic) is 8,9327 ; t_{count} is 1,6992 ; and t_{table} is 1,6669. It achieves t-test of 1,6992 with significance level of 0,05. While the value of $t_{0,05;70}$ = 1,6669, based on t table, it obtains $DK = \{t|t > 1{,}6669\}$. $t_{obs} \notin DK$. Therefore, H_0 is rejected, so it can be concluded that compared with the use of handouts as teaching materials in direct instruction, mobile-based teaching material for academic writing in hybrid learning is more effective in producing students' academic writing abilities. It is because teaching materials of academic writing can be studied by students anytime and anywhere, so it is able to support hybrid learning which drives students to have maximum academic writing abilities.

In line with Prasetyo et al. (2019) who stated that mobile-based teaching material was effective to support learning process and able to improve students' understanding. However,

it has not reviewed the learning method that is implemented in it. Therefore, this study provides more explanation about the results on the use of mobile-based teaching material in hybrid learning.

On the other hand, Bennett et al. (2020) explained that hybrid learning was able to provide positive circle and increase students' learning competences. Nevertheless, it still focuses on students' responses and assessments of hybrid learning. There is no further explanation about the success of hybrid learning compared to another learning model. In this way, this study is able to show the calculation about the effectiveness of hybrid learning compared to direct instruction.

Moreover, result of research conducted by Hiasa et al. (2023) revealed that mobile-based teaching material had more benefits because it was easy to be understood and be implemented in learning process because it could be more effectively accessed anytime and anywhere. Furthermore, the use of mobile-based learning combined with appropriate method such as hybrid learning would effectively improve students' learning intentions (Criollo-C et al., 2022). Hybrid learning was a learning method that could be significantly implemented for students with various learning styles (Hung et al., 2016). Based on the advantages of mobile-based teaching material and hybrid learning, its combination can increase students' academic writing abilities as viewed in previous data. It is the value of novelty in this study.

Conclusion

Results of study show that compared with the use of handouts in direct instruction, mobile-based teaching material for academic writing in hybrid learning is more effective in producing students' academic writing abilities. It is because teaching materials of academic writing can be studied by students anytime and anywhere, so it is able to support hybrid learning which drives students to have maximum academic writing abilities. It implies that the lecturer of academic writing utilizes mobile-based teaching materials in hybrid learning. This study suggests future researchers to conduct a study on the implementation of application as teaching material in hybrid learning.

Declarations

Author contribution : Cahyo Hasanudin is as the initiator of research concept. He also compiles results of this study. Aida Azizah facilitates in compiling research results and discussion. Ayu Fitrianingsih is an English translator. Nofia Fitriyana plays role in compiling research background and the citations using Mendeley Application. Abather Saadoon examines the validity of statistical data

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