The Effect of Blended Learning and Digital Literacy on Students' Reading Comprehension

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Abstract: Blended learning model and digital literacy is an interesting theme these days. There has recently been a lot of research done on this theme, but not in relation to reading comprehension. It has a purpose to discover the impact of the blended learning model and digital literacy on students' for English reading comprehension skill. The experimental method of a 2x2 ANOVA factorial design was based on second-year students in the academic year of 2021-2022. Two instruments were used to collect data: a reading comprehension test (multiple choice) and a digital literacy questionnaire. The data analysis used a two-way ANOVA with the F test at a significance level of 0.05. The discoveries of this study are: 1) There was no significant difference on reading comprehension between students who are taught using the flipped classroom and a la carte; 2) There were significant differences between students with high digital literacy and students with low digital literacy; and 3) There was no interaction effect between the blended learning model and digital literacy on reading comprehension ability.

1 INTRODUCTION

Based on preliminary observations and the author's experience in examining assignments and several exam sheets of English education study programme students at PGRI University of West Sumatra, some problems are still worth reviewing both from the level of reading comprehension and understanding of the topic of the text being read. One of the results of the reading comprehension test test found that out of a total of 30 students who took the Advanced Reading course obtained an average score of 62.4. Where the average score obtained by students ranges from 60-70.

The main difficulty experienced by students in mastering reading comprehension skills is within the students themselves. They have low enthusiasm and motivation when faced with a lot of text. In line with (Nanda & Azmi, 2020), conducting in-class research at the University of Dharmas Indonesia, which states that motivation is the main factor that becomes a hurdle in learning reading comprehension so that students are not interested in reading and concentrating on analysing the text. Furthermore, low knowledge of the topic of the text being read. This is in line with the findings of (Kikas, Silinskas, Mädamürk, & Soodla, 2021) who stated that the texts given were not familiar to students so they struggled and spent a long time to understand one text that was more than 10 sentences.

Continuing from the previous paragraph, the researcher assumes that the blended learning can be used as a solution in improving learners' English reading comprehension skills. Where blended learning is able to actively engage learners to think creatively, self-learn and interactively which is the key to learning itself. Apart from these reasons, effective and efficient factors are one of the reasons why this learning model was chosen. This is in line with (Geng, Law, & Niu, 2019) which states that learning with any kind of model and model will not have a good and maximum impact if it is not used appropriately and efficiently.

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As a study material, this research is based on 5 primary reference sources that are used as a benchmark. Research conducted by: 1. (Muharlisiani, 2015) with the title "The Usage of Skype Messenger on Blended Learning, Weblog and E-learning to Improve Student's Writing Ability of the Fourth Semester in English Education Department, Faculty of Language and Science" Wijaya Kusuma University, 2. (Tang & Chaw, 2016) with the title "Digital Literacy: A Prerequisite for Effective Learning in a Blended Learning Environment", 3. (Broadbent, 2017) with the title

"Comparing Online and Blended Learner's self-regulated Learning strategies and Academic performance", and 4. (Kheirzadeh & Birgani, 2018) with the title "Exploring the Effectiveness of Blended Learning in Improving Reading Comprehension among Iranian EFL Students", and 5. (Alqahtani, 2019) with the title "The Usage of Edmodo: The Impact on Learning and Students' response". The variables studied by the researcher in order are about 1) blended learning, 2) digital literacy, 3) reading comprehension. Furthermore, these three research objects are included in the variables that will be studied next.

So the researchers in this study conducted experimental research to examine the effect of the blended learning model using two classes (Experiment class and control class) where each class received different treatments. The experimental class was treated with the flipped classroom model and the control class was treated with the a la carte model, although both types of models are contained in blended learning.

Formulation problems of the research were posed with these following research questions (Research Question):

Is there a difference in reading comprehension of students taught using the flipped classroom model compared to students taught using the a la carte model?

Is there a difference in reading comprehension between students who have high digital literacy skills and students who have low digital literacy skills?

Is there an interaction effect between the blended learning model and digital literacy on students' reading comprehension?

1.1 Theoretical Study

1.1.1 Reading Comprehension

Reading comprehension is a complex process of shaping the meaning in the text by interacting with it through a combination of prior knowledge, past experience, information in the text, the reader's own stance (Pardo, 2004). In gaining good comprehension it is possible for readers to question, interpret, and evaluate what they read so that through reading they can have the ability to build knowledge, improve understanding, and ultimately change thinking (Harvey & Goudvis, 2007).

There are various factors that play a role in reading comprehension, namely; one of them is social motivation so that readers not only think about what they read but about what they learn and how it is formed so that they are able to develop insights and think more deeply and critically about the topic at hand and the world around them.

In addition, culture can also play a role in understanding a text based on the extent to which the writer and reader match the culture embraced in the text (Erten & Razi, 2009). The reader's cognitive development can play a role in his/her ability to understand the text by influencing his/her ability to evaluate it in different ways. Not only do readers use their skills, knowledge and cognition to comprehend the text but the culture, goals and motivations they bring to the text can also have an impact on their comprehension. In addition, readers need a variety of skills such as basic language skills, decoding skills, and higher-order thinking skills to be able to connect and understand texts. They also need to have different types of knowledge including background knowledge and content knowledge.

Readers need to be able to connect known information with new information to learn and create meaning.

Furthermore, the purpose of reading can also influence or change the way readers understand a particular text (Aarnoutse & Schellings, 2004). Motivation can also influence the interest, purpose, emotion or perseverance with which a reader comprehends a text. More motivated readers will try harder to understand and construct meaning from a text by applying a wider range of strategies while less motivated individuals tend to put in less effort and are rarely able to create meaning as strongly as highly motivated readers (Pardo, 2004). In line with Pardo, skilful readers use thinking-while-reading strategies to help them understand what they are reading (Aarnoutse & Schellings, 2004).

Connecting what readers know with new information is at the heart of learning and comprehension. Skilled readers ask questions about themselves, the author, and the text they are reading. They do this before, during, and after reading the text. They also draw conclusions during and after reading

and distinguish important from less important ideas in the text.

Skilled readers can synthesise information within and across texts to create meaning. They can monitor the adequacy of their understanding and correct incomplete understanding (Harvey & Goudvis, 2007). Therefore, both young and adult readers alike can benefit from comprehension strategy instruction (Guthrie, 2004). However, proficient readers are able to adapt strategies to suit their reading goals (Aarnoutse & Schellings, 2004; Harvey & Goudvis, 2007).

Online Percentage	Learning Type	Description
0%	Tradisional (TatapMuka)	Learning with On-line posted content notdelivered in writing or verbally
1 sampai 29%	*Facilitated Web*	Learning to use web facilities to facilitatesomething very important in face-to-face learning. By using Learning Management System (LMS) or web pages, for example: to upload syllabus, materials quizzes, exams.

1.1.2 Blended Learning

Blended learning is a combination of two learning models consisting of face to face classes and information technology (e-learning) as written by (Garrison & Kanuka, 2004). Added by (Jachin & Usagawa, 2017), blended learning refers to learning activities that combine aspects of on-line and face-to-face learning. Furthermore, there are several aspects of information technology such as web-based learning, mobile learning, video streaming, asynchronous and synchronous audio communication combined with face-to-face learning (Graham, 2005). (Bonk & Graham, 2009) added that blended learning is a combination of different training media (technologies, activities, types of activities) used to form an optimum training programme for specific learners. The term blended means that training is delivered in a traditional educator-led manner supplemented by other electronic formats.

The difference between blended learning and e learning is the percentage of online media used in the learning or training. (Allen & Seaman, 2011) formulated the percentage of the learning model based on the use of online media used as follows:

30 sampai 79%	Pembelajaran bauran *(Blended Learning)*	Learning with a face-to-face system. The proportion of online content and substance using online and face-to-face discussions is balanced.
80+%	*Online Learning*	It is learning that is mostly or even entirely online. This type of learning does not utilise face-to-face meetings at all.

1.1.3 Digital Literacy

The term digital literacy was first expressed by (Gilster, 1997) in his book entitled Digital Literacy, where digital literacy is defined as an attitude to understand and use information in various forms from a very wide range of sources accessed through computer devices. Later, the term developed as stated by (Bawden, 2001) who stated that digital literacy is rooted in computer literacy and information literacy. Furthermore, (Hague & Payton, 2010) explains digital literacy as an attitude to create and share information in different modes and formats; which aims to create, collaborate and communicate effectively and understand how and when digital technology should be used to support the process. Then (Paul, 2017) explains the definition of Digital Literacy as an attitude towards the field of science to use remote technological devices for various purposes.

In line with the description above, the American Library Association adds that digital literacy is an attitude of using information and communication technology to search, evaluate, create, and communicate information, which requires both cognitive and technical skills. Finally, according to (Culture, 2017) digital literacy is the knowledge and skills to use digital media, communication tools, or networks to find, evaluate, use, create information, and utilise it in a healthy, wise, intelligent, careful, appropriate, and law-abiding manner in order to foster communication and interaction in everyday life. In conclusion, from some of the definitions above, it can be concluded that digital literacy is the ability to find, understand, evaluate, create and communicate digital information in various formats from various sources when presented through information technology.

2 METHODOLOGY

The research based on an experimental method with a 2X2 factorial design to test the hypothesis to prove the existence of a causal relationship between the two. The design can be seen in the following table:

Table 1: Factorial Design 2x2.

Treatment Attribute		Blended Learning Model (A)	
		Experimental Group (*Flipped Classroom*)A1	Control Group (*A La Carte*)A2
Digital Literacy (B)	High Digital Letacy (B1)	A1B1	A2B1
	Low Digital Letacy (B2)	A1B2	A2B2

The population of this study were students of the English education study programme who took Advanced Reading courses in the odd semester of the 2021-2022 academic year consisting of classes A, B and C. Two (2) classes consisting of 30 students for each class were taken deliberately to represent the population. Later two (2) classes consisting of 30 students for each class were taken deliberately to represent the population. Then these two classes will be divided into experimental classes and control classes using coins. The experimental class will get treatment where students in the group are taught using the flipped classroom model and the control class will get treatment by being taught using the a la carte model.

Data Collection Technique Researchers used 2 (two) instruments, namely reading comprehension tests and digital literacy questionnaires that had gone through validity and reliability tests first. Completion of the instrument in the form of a questionnaire is carried out at a time before the implementation of the treatment, then the reading comprehension test is given after the students get treatment. The data collected were then statistically analysed using a two-way analysis of variance (ANOVA)

technique with a significance level of 0.05. However, before the data from the hypothesis test results are carried out, normality test and homogeneity test are carried out as prerequisite tests.

3 RESEARCH RESULTS AND DISCUSSION

3.1 Data Description

The data obtained from the results of the research design include students' ability to understand reading texts in English after being taught using the flipped classroom and a la carte models that have high digital literacy.

Table 2: Summary of Group Description Data.

	MPB (A1)	MPT (A2)	SLDT (B1)	SLDR (B2)
N Valid	16	16	16	16
Missing	0	0	0	0
Mean	21	17,44	18,88	19,56
Median	21	17,5	21	20
Std Deviation	3,33	3,69	4,20	4,53
Variance	11,07	13,6	17,65	20,55
Mode	21	22	21	20
Highest	27	22	23	27
Lowest	14	8	8	13

The following table also shown the sub-group's descriptive data summary.

Table 3: Summary of Sub-Group Description Data.

	MPB-SLDT (A1B1)	MPT-SLDT (A2B1)	MPB-SLDR (A1B2)	MPT-SLDR (A2B2)
N Valid	8	8	8	8
Missing	0	0	0	0
Mean	20,25	17,50	21,75	17,38
Median	21	17,5	21	17,5
Lowest 14 Std Deviation	2,76	4,60	5,95	2,83
Variance	7,64	21,14	35,43	8,00
Mode	21	22	21	18
Highest	23	22	27	22

This test is conducted to determine whether the data from each group comes from a normally distributed population or not. It is expected that the sample of 60 people consisting of 2groups of students must be normally distributed.

A summary of the results of the normality test calculation is in the table below.

Table 4: Summary of Normality Test Calculation Results.

Group	N	Lcount	Ltable	Keterangan
A1	14	0,1635	0,227	Normally Distributed
A2	14	0,1239	0,227	Normally Distributed
B1	14	0,1590	0,227	Normally Distributed
B2	14	0,0924	0,227	Normally Distributed
A1 B1	7	0,1679	0,300	Normally Distributed
A2 B1	7	0,1861	0,300	Normally Distributed
A1 B2	7	0,2143	0,300	Normally Distributed
A2 B2	7	0,1214	0,300	Normally Distributed

From the table above, it is known that tested for normality that the reading comprehensionscores of all groups of students tested for normality by the Liliefors test give the value of L0 or theobservation value of Liliefors is smaller than the Ltabel or the critical value of L at the significancelevel α = 0.05 with n = 7, the value of Lt = 0.300 and n = 14, the value of Lt = 0.227. Thus it can be concluded that all reading comprehension scores of all sub-populations in this study come froma normally distributed population. In the appendix, it can be seen from the detail regarding of the results from the normality test.

Homogeneity Test

F-test

From the calculation, the value of Fcount = 1.89 and the value of Ftable = 2.58 at the significance level α = 0.05 and dk1 = 13 and dk2 = 13 so that H0 is accepted

Table 5: Summary of Homogeneity Test Results.

Group	Variance	Joint Variance	X^2count	X^2tabel	Conclusion
A1B1	4,57				
A1B2	4,95	6,64	3,15	7,82	Homogen
A2B1	3,90				
A2B2	13,14				

3.2 Research Hypothesis Testing

By using the two-way ANOVA table, the analysis results are obtained as in the table below:

Table 6: Analysis of Variance Result Using SPSS. Tests of Between-Subjects Effects Dependent Variable : Reading Comprehension.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	72.000a	3	24.000	1.756	.182	.180
Intercept	10.108.000	1	10108.000	739.610	.000	.969
Learning Model	.571	1	.571	.042	.840	.002
Digital Literacy	69.143	1	69.143	5.059	.034	.174
Learning Model & Digital Literacy	2.286	1	2.286	.167	.686	.007
Error	328.000	24	13.667			
Total	10.508.000	28				
Corrected Total	400.000	27				

R Squared = ,180 (Adjusted R Squared = ,078)

Tests of Between-Subjects Effects
Dependent Variable: Reading Comprehension

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	110.594a	3	36.865	2.860	.055
Intercept	11819.531	1	11819.531	917.068	.000
Learning Model	101.531	1	101.531	7.878	.009
Digital Literacy	3.781	1	3.781	.293	.592
Learning Model & Digital Literacy	5.281	1	5.281	.410	.527
Error	360.875	28	12.888		
Total	12291.000	32			
Corrected Total	471.469	31			

R Squared = ,235 (Adjusted R Squared = ,153)

Figure 1: Interaction Test Plot.

Further discussion of the results of testing the research hypothesis is as follows:

First Hypothesis: There is no difference in students' ability in reading comprehension using English between those who learn with the flipped classroom model and those who learn with the a la carte model.

Second Hypothesis: There is a difference in reading comprehension between students that have a decent digital literacy skill and students with the low digital literacy skill.

Third Hypothesis: Lack of acknowledgement between learning model and digital literacy on students' reading comprehension.

4 CONCLUSION

The findings that have been stated in the results of data processing can be summarised that the reading comprehension of English texts in the group of students taught using the flipped classroom model is not significantly better than the group of students taught using the a la carte model. Then the results of the English text reading comprehension test for students who have different digital literacy taught using the same model have different results. Finally, there was no interaction between the blended learning model (flipped classroom model, a la carte model) and digital literacy (high digital literacy, low digital literacy) on reading comprehension.

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