



The Influence of the Blended Learning Model on Students Digital Learning : Meta-Analysis

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Receive: 10/07/2023

Accepted: 19/08/2023

Published: 01/10/2023

Abstrak

Penelitian model Blended learning sudah banyak dilakukan dalam dunia pendidikan akan tetapi belum ditemukan meta-analisis model blended learning terhadap literasi digital siswa. Penelitian ini bertujuan untuk mengetahui pengaruh model blended learning terhadap literasi digital siswa. Penelitian ini merupakan jenis penelitian meta-analisis. Penelitian ini menganalisis 11 effect size yang bersumber dari Google Scholar, ERIC, ScienceDirect dan Wiley dari tahun 2019-2023 yang mencakup 220 siswa. Analisis data dengan bantuan aplikasi JSAP. Penelitian ini menyimpulkan bahwa nilai summary effect size yang diperoleh dari random effect model sebesar 0.793 dengan kriteria sedang. Temuan ini menunjukkan model blended learning dapat berpengaruh signifikan terhadap literasi digital siswa.

Kata Kunci: Blended Learning, Effect Size, Literasi Digita, Meta-analisis

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Abstract

Blended learning model research has been widely carried out in the world of education, but no meta-analysis of blended learning models has been found on students' digital literacy. This research aims to determine the effect of the blended learning model on students' digital literacy. This research is a type of meta-analysis research. This research analyzes 11 effect sizes sourced from Google Scholar, ERIC, ScienceDirect and Wiley from 2019-2023 which includes 220 students. Data analysis with the help of the JSAP application. This research concludes that the summary effect size value obtained from the random effect model is 0.793 with medium criteria. These findings show that the blended learning model can have a significant influence on students' digital literacy.

Keywords: Blended Learning, Effect Size, Digital Literacy, Meta-analysis

Introduction

Digital literacy is an ability that students must have in facing the industrial revolution 4.0 towards 5.0 society (Yildirim & Öztürk, 2022; Muh et al., 2023). Digital literacy plays an important role in supporting the quality of student learning (Faridah, 2022). According to Suwanto et al., (2022) that digital literacy helps students more easily access information, technology, and knowledge that can support the learning process. Moreover, Digital literacy forms a more critical and creative mindset of students in finding solutions in problem solving (Putra et al., 2023; Prachagool, 2022; Cuban, 2022). Digital literacy trains students more easily in carrying out learning activities by utilizing technology (Rahman & Ristiana, 2020; Sulistyarini et al., 2022; Rahman et al., 2023; Elfira et al., 2023; Munawar et al., 2021). So, digital literacy is a major factor for students and teachers in facing the 21st century.

But in reality, the digital literacy of Indonesian students is still relatively low (Wirdayani et al., 1844). This can be seen from the 2018 PISA-OECD survey stating that the level of science literacy of Indonesian students is relatively low, only obtaining a score of 393, ranked 71 out of 78 countries (Suharyat et al., 2022; Zulkifli et al., 2022; Ichsan et al., 2023; Oktarina et al., 2021; Luciana et al., 2023). Learning activities that do not involve students to be active so that the learning process is centered on the teacher (Nurtamam et al., 2023; Zulyusri et al., 2023; Rahman et al., 2023; Suryono et al., 2023). Teachers do not use technology-based media that can help students more easily understand the subject matter (Khoiroh et al., 2017; Hamzah et al., 2022; Mursid et al., 2022). Furthermore, the selection of inappropriate learning models and methods to encourage students' digital

literacy (Ichsan et al., 2022; Sofianora et al., 2023; Zulkifli et al., 2022).

Blended learning is a learning model that can encourage students' digital literacy skills (Rahmasiwi et al., 2023). The blended learning model is a learning model that combines online learning and face-to-face learning (Rahmi et al., 2022; Nida et al., 2020; Yapici & Akbayin, 2012). The *blended learning* model helps students learn by utilizing technology (Fazal & Bryant, 2019; Santosa et al., 2021; Rahman et al., 2023). Furthermore, the blended learning model combines teaching materials, media, and learning resources that can be utilized in the learning process (Setiadi et al., 2022). Research results (Setiawan et al., 2022; Khoiroh et al., 2017) The *blended learning* model can foster student interest and motivation in learning. Not only that, *the blended learning* model can increase students' understanding in mastering the subject matter (Wuxue, 2023; Radulović et al., 2023).

Previous research explained that *blended learning* models have a significant influence on students' digital literacy (Kade et al., 2019; Fitriani et al., 2023). The results of research by Li et al., (2022) that the blended learning model can train students to be more creative and innovative in learning. As for the gap in this study, many studies related to blended learning did not find meta-analysis of blended learning models on students' digital literacy. This study aims to determine the effect of blended learning models on students' digital literacy.

Methods

This study is a type of meta-analysis research. Meta-analysis is a type of research that analyzes previous research using statistics (Suharyat et al., 2022; Suparman et al., 2021; Chamdani et al., 2022; Suhaimi et al., 2022); Ichsan et al.,

2022; Bernard et al., 2014; Santosa et al., 2021). The meta-analysis aims to determine the effect of blended learning models on students' digital literacy. According to (Cohen et al., 2007; Borenstein & Hedges, 2009) The steps in meta-analysis research are: 1) determining inclusion criteria, 2) collecting data and coding data and 3) conducting data analysis with statistics.

The inclusion criteria in this meta-analysis are that the research must come from journals indexed by SINTA and Scopus, the research has an experimental class with a blended learning model and a conventional model control class, journal publications in 2019-2023, the study must report complete data for *effect* size analysis and a large sample size of 20 students. The keywords for searching data sources are the "blended learning" model, the influence of the blended learning model on digital literacy", "implementation of the blended learning model". The data analysis technique is quantitative statistical analysis with the help of JSAP application. Data analysis calculated the value of summary effect size or mean average effect size of the entire study. The criteria for effect size values can be seen in Table 1.

Table 1. Effect Size Value Criteria

<i>Effect Size</i>	<i>Criterion</i>
0.0 < d < 0.20	Low
0.20 < < 0.80	Medium
d > 0.80	High

Source :(Ramdhayani et al.,2019; Putra et al., 2023; Karim et al., 2023)

Result and Discussion

From searching 217 studies through the Google Scholar database, Eric, ScienceDirect, Wiley and ProQuest obtained 11 journals that met the inclusion criteria. Research that has met the

inclusion criteria is calculated effect size value which can be seen in table 2.

Table 2. *Effect Size* 11 Research Based on Inclusion Criteria

Journal Code	Year	Effect Size	Criterion
A1	2022	0.97	High
A2	2022	0.68	Medium
A3	2021	1.20	Hight
A4	2019	0.72	High
A5	2023	2.10	High
A6	2023	0.73	Medium
A7	2023	0.78	Medium
A8	2019	1.07	High
A9	2020	0.45	Low
A10	2022	0.82	High
A11	2021	0.63	Medium

Based on Table 2. Showing one article that has an effect size of 0.45 small criteria, four studies have an effect size ranging from 0.63-0.78 medium criteria and five studies have *an effect size* ranging from 0.82-2.10 high criteria. Next, calculate the summary effect size or mean effect size of the entire study. The results of the calculation of *summary* effect size or mean effect size using the *random effect model* can be seen in Table 3.

Table 3. *Summary Effect or Mean Effect Size*

	Q	Df	P
<i>Omnibus test of Coefficients Model</i>	62.551	1	< 0.001
<i>Test of Residual Heterogeneity</i>	197.320	10	< 0.001

Table 3. shows a value of Q = 197.320 greater than 62.551 with a confidence level of 95 . Furthermore, the value (p < 0.001) means that the distribution of effect size in this study is heterogeneously distributed. So, *a random effect model* was more effectively used to analyze 11 studies.

Next, it calculated the publication bias of the 11 studies that had been analyzed. Calculation of publication bias in this study with *funnel plot* and *Rosenthal Fail Safe* (FSN) (Chamdani et al., 2022; Zhang et al., 2015; Hidayah, 2023; Taşdemir, 2022). The results of the calculation of publication bias with funnel plot can be seen in figure 1.

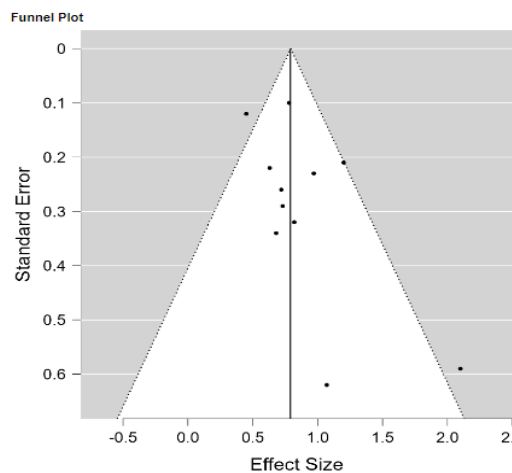


Figure 1. Funnel Plot

Based on figure 1. Showing that the *distribution of effect size in the funnel plot* is not yet known whether symmetric or asymmetric, it is necessary to do the *Rosenthal Fasil Safe N* (FSN) test. The results of publication bias analysis with *Rosenthal Fasil Safe N* (FSN) can be seen in Table 4.

Table 4. Rosenthal Fasil Safe N (FSN) Test Results

File Drawer Analysis	Fail: Safe-N	Target Significanc e	Observed Significanc e
Rosentha l	566.00 0	0.050	< 0.001

Table 4. Shows that *Rosenthal Fail Safe* (FSN) value is 566 with a significance

value of 0.50 and observed significance of < 0.001. Furthermore, the FSN value is calculated $556 / (5.11) +10 = 8.70 > 1$ meaning that in this meta-analysis no publication bias was found from the 11 studies that have been analyzed. The next step is to calculate the summary effect size or mean effect size of 11 studies. The results of the summary effect size or mean effect size analysis can be seen in the table.

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Table 5. Summary or mean effect size

Effect Size	ICE	Z	P	95 % Confidence Interval		
				Low er	Upp er	
Interc ept	0.79 3	0.1 5	8.7 17	< 0.0 01	0.61 4	0.97 1

Based on table 5, explain the value of *summary effect size* or *mean effect size* (ES = 0.793 ;SE = 0.15; Z = 8.717) medium criterion. Furthermore, the value of 95% *confindence interval lower* is 0.614 and *upper* is 0.971. These results show that there is an influence of blended learning models on students' digital literacy compared to conventional models.

The results of Tang & Chaw's (2016) research on the blended learning model have a significant influence on students' digital literacy. The blended learning model helps students be more active and innovative in utilizing technology in learning (Soeprijanto, 2022; Mcguinness, 2019). Radulović et al., (2023) stated that blended learning models can encourage interest and motivation that help students cultivate digital literacy. Digital literacy is needed by students in facing the 21st century. Students who have digital literacy will find it easier to find and open big data that can be used in education (Katsarou, 2021; Southaboualy et al., 2021). So, *the*

blended learning model helps students learn more independently.

Learning blended learning models can help the student learning process without time limits. The *blended learning* model allows students to learn online through learning platforms accessed through the internet network (Mphahlele et al., 2021), so as to improve students' digital literacy skills. Not only that, the blended learning model of students is more confident in learning and creative (Katasila & Poonpon, 2022). Furthermore, the blended learning model allows students to access information quickly to increase student knowledge (Gault et al., 2022). Knowledge is all information that can be accessed through various sources (Ferry et al., 2019). So, the *blended learning* model really supports the quality of student learning in growing digital literacy today.

Conclusion

From the meta-analysis research, it can be concluded that the summary effect size value obtained from the random effect model is 0.793 with medium criteria. These findings show that blended learning models can have a significant effect on students' digital literacy. The blended learning model trains students to learn more independently and creatively. Furthermore, the blended learning model helps students and teachers more easily carry out the learning process indefinitely

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