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Mohammad Fauziddin

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Effectiveness of Blended Learning Model Assisted By Scholology to Improve Language Skills of Early Childhood Education Teachers

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Abstract

This study aims to determine the influence of the Scholology-assisted blended learning model on improving language skills in prospective early childhood education teachers. This study is a quantitative research with a meta-analysis approach. The inclusion criteria in this study include a) research obtained through the Google Scholar database; DOAJ, ScienceDirect; Wos and Wiley, b) research must be indexed by the Science Technology and Index (SINTA), Web of Science or Scopus; c) the research topic must be relevant; d) the research was published in the 2021-2024 range; e) Research sample > 30 students. Analyze data with the help of JSAP applications. The results of this study concluded that the 23 studies analyzed obtained an effect size value ($d = 1,081$; $Z = 9.685$; $p < 0.001$) is included in the very high effect size category. These findings show that the Scholology-assisted blended learning model greatly affects language skills in early childhood education students. In addition, the application of the blended learning model assisted by schology is effective in helping to develop students' language skills in learning. This research is expected to contribute to the world of education and research in the future.

Keywords: *Blended Learning; Scholology; Critical Thinking; Meta-analysis*

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Introduction

Language competence for early childhood education teachers is an important foundation in the learning process, because this ability not only supports effective communication, but also affects children's language development at an early age (Li & Li, 2024; Miftah et al., 2024). Early childhood education teachers who have good language skills are able to convey learning concepts more clearly, provide easy-to-understand directions, and adjust the language used according to the child's comprehension ability. Additionally, strong language skills allow teachers to respond appropriately to a child's every expression and language need (Sim et al., 2024), thus creating an environment that supports their language

development. This is very important because early childhood is a critical period in the formation of children's language and communication skills, which will later become the basis for their academic and social development (Asnur et al., 2024; Oktarina et al., 2021).

Good language skills also allow teachers to be effective role models for children in using correct and vocabulary-rich language. Early childhood education teachers who are competent in language can introduce a variety of sentence structures and new vocabulary through daily activities, stories, and discussions, which encourage children to think, imagine, and develop speaking skills (Bangkom & Sukavatee, 2021; Meier, 2020). Thus, the language competence possessed by teachers not only improves the quality of interaction in the classroom, but also plays an important role in shaping children's early literacy skills. The development of these competencies in early childhood education teachers will help create more meaningful learning experiences, increase children's involvement in the learning process, and build a solid foundation of language skills for the next stage of education (Mulyono et al., 2007).

Language competence for Early Childhood Education (PAUD) teachers is an important foundation in the learning process, because this ability not only supports effective communication, but also affects children's language development at an early age (Öztop, 2023; Gobena, 2020). Early childhood education teachers who have good language skills are able to convey learning concepts more clearly, provide easy-to-understand directions, and adjust the language used according to the child's comprehension ability (Fauzi et al., 2021). Additionally, strong language skills allow teachers to respond appropriately to a child's every expression and language need, thus creating an environment that supports their language development. This is very important because early childhood is a critical period in the formation of children's language and communication skills, which will later become the basis for their academic and social development (Herut, 2024; Zhovnir et al., 2023).

Technological developments in education are further expanding opportunities for early childhood education teachers to improve their language competence. Technology, such as digital learning platforms and interactive apps, offers access to a wider range of learning resources and more varied teaching methods (Sudarma et al., 2024). Through these platforms, teachers can enrich the way they communicate and interact with children, for example through multimedia-based activities that are more interesting and easy for early children to understand. Technology also allows teachers to collaborate and access language training materials from various sources, improving their language competence through practices and methods tailored to children's learning needs in the digital age (Miftah et al., 2024; Mulyono et al., 2007). Thus, the integration of technology becomes a tool that supports the development of teachers' language skills, as well as strengthens their role in creating innovative and meaningful learning experiences for children.

The limitation of language skills in Early Childhood Education (PAUD) teachers is still a challenge in improving the quality of learning at this level of education. Many PAUD teachers do not have adequate language skills, making it difficult to convey material in a way that is appropriate for early childhood development (Nasution et al., 2022). This is often due to a lack of training and access to the development of language competencies on an ongoing basis. As a consequence, classroom interactions become less effective, as teachers may have difficulty adjusting the language used or are unable to explain concepts in a simple and interesting way. These limitations can have a direct impact on children's involvement in learning and reduce their opportunities to develop language skills from an early age (Asrizal et al., 2022; Gonen & Akbarov, 2016).

Conventional learning methods that are widely used today also have limitations in helping early childhood education teachers improve their language skills. Traditional approaches are often one-way, with teachers focusing solely on delivering material without involving interactive practice or deep reflection on language use (Irawan et al., 2017). In addition, conventional methods do not facilitate the use of technology that can open access to

more varied and effective language resources (Gobena, 2020; Fauzi et al., 2021). As a result, teachers do not get enough experience to hone their language skills directly and contextually. Without innovation in learning methods, PAUD teachers will continue to face difficulties in improving their language competence, which ultimately has an impact on the quality of communication and interaction in the classroom (Herut, 2024). Therefore, it is necessary to have a technology-based learning model that can develop the language skills of early childhood education students, one of which is the blended learning model.

Blended learning is a learning model that combines face-to-face learning with online learning, offering greater flexibility and access for learners at different levels of education (Sulisworo et al., 2020). This model allows students to take advantage of the advantages of technology in accessing various learning resources online, such as videos, interactive modules, and discussion forums, while gaining hands-on experience through face-to-face interactions (Sh & Landry, 2008). In the context of education, blended learning provides an easy way to manage the time and place of study, making it especially beneficial for those with limited time, such as professionals or teachers who want to develop competencies without disrupting their work schedules. This method also allows for a more adaptive learning process, where the material can be adapted to the needs and ability level of each participant (Dermawan et al., 2023; Irawan et al., 2017; Darma et al., 2020). Through this more varied approach, blended learning not only increases learning engagement and motivation, but also facilitates the development of 21st-century skills, such as critical thinking, collaboration, and digital literacy.

Blended learning offers an effective approach to teacher education, especially for Early Childhood Education (PAUD) teachers who need flexible access to improve their language competence (Park & Doo, 2024). This learning model combines face-to-face and online learning, allowing teachers to learn anytime and anywhere according to their schedule. With blended learning, PAUD teachers can access a wide range of learning resources, such as interactive videos, practice modules, and discussion forums that support the sustainable development of language skills (Mdletye & Usadolo, 2024). This flexibility is very helpful for early childhood education teachers who have limited time to attend in-person training, so they can still develop language competencies without disrupting their teaching schedules (Shurygin et al., 2024).

In addition to flexibility of time and place, blended learning also enriches the teacher's learning experience through more varied and adaptive learning methods. Early childhood education teachers can choose materials that suit their needs and level of language proficiency, and practice these skills through simulations and online collaborative activities (Bangkom & Sukavatee, 2021). Blended learning also allows them to receive real-time feedback from teachers or fellow participants, which speeds up the process of improving language skills. These benefits are especially relevant in the digital age, where the ability to adapt to technology will also improve the overall professional competence of early childhood education teachers, especially in creating a more interactive and meaningful learning experience for children (Sulisworo et al., 2020). The blended learning model can be used in learning through the Schology application.

Schology is a digital learning platform designed to support effective and interactive learning, especially in the application of blended learning models. With a user-friendly interface, Schology makes it easy for teachers and students to communicate, access materials, and carry out various online learning activities (Nugraha Kholid & Hastomo, 2022). The platform offers excellent features such as discussion forums, interactive quizzes, and grading systems that allow teachers to monitor student progress in real-time. In addition, Schology also allows integration with various other educational tools, so that teachers can present learning materials in a more varied and interesting way (Suryati & Suryana, 2019; Shavab, 2018; Zulkifli et al., 2022). Schology's comprehensive classroom management features also make it easier for teachers to set schedules, assign assignments, and provide direct feedback, making the teaching-learning process more dynamic and structured. These advantages make Schology an ideal platform to support the implementation of blended learning, where

students and teachers can collaborate flexibly and effectively according to modern learning needs (Park & Doo, 2024; Ichsan et al., 2023a).

Several studies have analyzed and discussed the influence of blended learning assisted by schology on students' thinking skills (Dermawan et al., 2023; Firdaus & Mayasari, 2022); Dwianto et al., 2017; Irawan et al., 2017; Darma et al., 2020; Sulisworo et al., 2020). However, there has not been a single study that analyzes and discusses the effect of blended learning assisted by schology on the language ability of early childhood education students. This meta-analysis study analyzes the influence of the Schology-assisted blended learning model on the education level of students and various countries, so that it can conclude comprehensive and valid results. This study aims to influence the Schology-assisted blended learning model to improve language skills in prospective early childhood education teachers.

Methodology

This study uses a meta-analysis approach to determine the effect size Schology-assisted blended learning model to improve language skills in prospective early childhood education teachers. Meta-analysis is a research approach that evaluates previous research statistically to reach a conclusion (Tamur et al., 2020; Badawi et al., 2023; Nurtamam et al., 2023; Zulyusri et al., 2023; Asnur et al., 2024). The meta-analysis research procedure is 1) determining the research inclusion criteria, 2) collecting data and coding, and 3) analyzing the data statistically, as seen in Figure 1.



Figure 1. Prosedure Meta-analysis

Eligibility Criteria

In the process of searching for data through the Google Scholar database; DOAJ; ScienceDirect, Wos and Wiley the research must meet several inclusion criteria, namely) research obtained through the Google Scholar database; DOAJ; ScienceDirect; Wos and Wiley, b) research must be indexed by Science Technology and Index (SINTA), Web of Science, or Scopus; c) research topics must be relevant; d) research published in the 2021-2024 range; e) research samples > 30 students. From the data search, 23 studies were obtained that met the inclusion criteria published in 2021-2024.

Data Collection

To obtain valid research data on ethno-physics-based problem-based learning models to improve students' 21st-century thinking skills collected from Google Scholar, ScienceDirect, Wiley, ERIC, ProQuest, Fronteins, and Web of Science databases and frontends. The keywords for data search are "Blended learning"; "Schology-assisted blended learning model"; "The effect of blended learning assisted by Schnology on the language ability of early childhood education students,"; and "Language Skills."

Statistical Analysis

Data analysis in this study calculates the effect size value of each study analyzed. The effect size value in this study is to calculate the effect of the influence of the Schology-assisted blended learning model to improve language skills in prospective early childhood education teachers. According to (Borenstein et al., 2007) The stages of data analysis in the meta-analysis can be seen in (Figure 2.). Furthermore, the criteria for the effect size value in the study can be seen in Table 1.

Table 1. Category Effect Size Value

Effect Size	Category
$0.0 \leq ES \leq 0.2$	Low
$0.2 \leq ES \leq 0.8$	Medium
$ES \geq 0.8$	High

Source: (Borenstein et al., 2007; Bachtiar et al., 2023; Tamur et al., 2020; Asnur et al., 2024; Bachtiar et al., 2023)

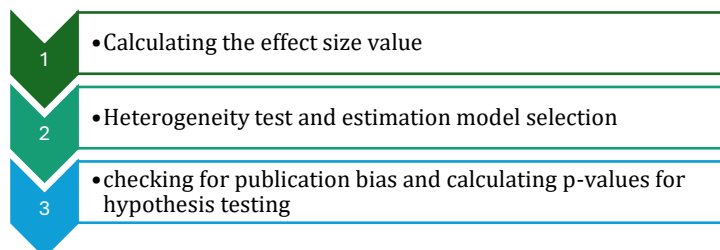


Figure 2. Data analysis procedure in meta-analysis

Result and Discussion

Based on the results of data search through the database, 23 studies/articles met the inclusion criteria. The effect size and error standard can be seen in Table 2.

Table 2. Effect Size and Standard Error Every Research

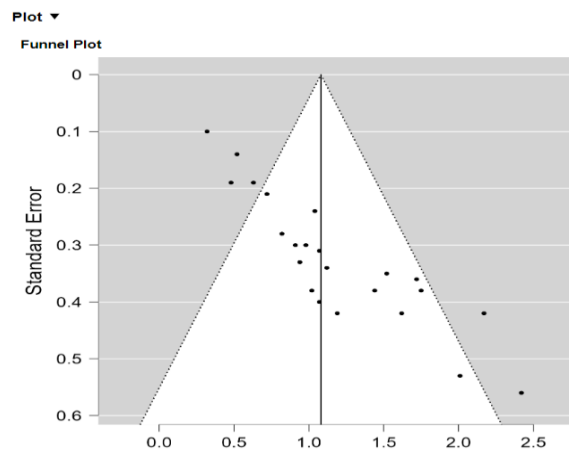
Code Jurnal	Years	Effect Size	Standard Error
R1	2021	1.02	0.38
R2	2024	0.91	0.30
R3	2024	0.72	0.21
R4	2024	2.01	0.53
R5	2021	1.19	0.42
R6	2021	1.52	0.35
R7	2023	0.63	0.19
R8	2023	0.98	0.30
R9	2023	1.62	0.42
R10	2023	1.75	0.38
R11	2021	0.94	0.33
R12	2023	1.72	0.36
R13	2022	0.82	0.28
R14	2022	1.07	0.40
R15	2022	2.42	0.56
R16	2022	1.44	0.38
R17	2021	1.07	0.31
R18	2024	1.12	0.34
R19	2024	0.52	0.14
R20	2022	0.48	0.19
R21	2022	0.32	0.10
R22	2022	1.04	0.24
R23	2024	2.17	0.42

Based on Table 2, the effect size value of the 243 studies ranged from 0.32 to 2.42. According to Borenstein et al., (2007) Of the 24 effect sizes, 5 studies had medium criteria effect sizes and 18 studies had high criteria effect size values. Furthermore, 23 studies were analyzed to determine an estimation model to calculate the mean effect size. The analysis of the fixed and random effect model estimation models can be seen in Table 3.

Table 3. Fixed and Random effect

	Q	df	p
Omnibus test of Coefficients Model	68.952	1	< 0.001
Test of Residual Heterogeneity	110.083	22	< 0.001

Based on Table 3, a Q value of 110,083 was obtained, higher than the value of 68.952 with a coefficient interval of 95% and a p-value of $0.001 <$. The findings can be concluded that the value of 23 effect sizes analyzed is heterogeneously distributed. Therefore, the model used to calculate the mean effect size is a random effect model. Furthermore, checking publication bias through funnel plot analysis and Rosenthal fail-safe N (FSN) test (Tamur et al., 2020; Badawi et al., 2022; Ichsan et al., 2023b; Borenstein et al., 2007; Bachtiar et al., 2023). The results of checking publication bias with a funnel plot can be seen in Figure 3.

**Figure 3. Funnel Plot Standard Error**

Based on Figure 3, the analysis of the funnel plot is not yet known whether it is symmetrical or asymmetrical, so it is necessary to conduct a Rosenthal Fail Safe N (FSN) test. The results of the Rosenthal Fail Safe N calculation can be seen in Table 4.

Table 4. Fail-Safe N

File Drawer Analysis	Fail-Safe N	Target Significance	Observed Significance
Rosenthal	2474	0.050	< 0.001

Based on Table 4, the Fail Safe N value of 2474 is greater than the value of $5k + 10 = 5(23) + 10 = 125$, so it can be concluded that the analysis of 23 effect sizes in this data is not biased by publication and can be scientifically accounted for. Next, calculate the p-value to test the hypothesis through the random effect model. The results of the summary effect model analysis with the random effect model can be seen in Table 5.

Table 5. Summary/ Mean Effect Size

Coefficient	Effect Size	Standard Error	z	p	Coefficient Interval 95%	
					Lower	Upper
Intercept	1.081	0.328	9.865	< 0.01	0.762	1.320

Based on Table 5, the total effect size value is 1,081; The standard error is 0.328 with a 95% confidence level, the lower limit is 0.762 and the upper limit is 1.320. These findings show that the Schoology-assisted blended learning model model has a great influence on language skills in prospective early childhood education teachers. High effect size category. The application of the Schoology-assisted blended learning model model is effective in improving the language skills of early childhood educator students.

This research is in line with Irawan et al., (2017) The Schoology-assisted blended learning model has an effect on students' learning outcomes and language skills. This research is supported by (Roqobih et al., 2019) The application of the Schoology-assisted blended learning model can encourage students to learn creatively, so that they can develop their language skills. Bended learning, which combines face-to-face learning with online technology, has come a long way in modern education. In this study, the blended learning model is combined with the Schoology platform, which provides various interactive features that help the teaching-learning process become more dynamic and flexible (Masyhudianti et al., 2018). The use of blended learning in early childhood education (PAUD) is an important innovation, especially since early childhood teachers often face challenges in maintaining student engagement at a very young age, and must adapt to continuous technological developments. This model aims to improve teachers' language skills, which have an important role in teaching and supporting the language development of their students (Irawan et al., 2017; Wantu et al., 2024).

Schoology, as the e-learning platform used in this study, provides features such as discussion forums, uploading learning materials, online quizzes, and a space to share videos and images (Roqobih et al., 2019). These features facilitate teachers in accessing and practicing material anytime and anywhere, making their learning process more flexible and tailored to individual needs. With discussion forums, teachers can discuss, exchange ideas, and give feedback to each other directly, all of which support interactive language skill improvement (Rose et al., 2021). The use of Schoology also helps to overcome the time and space limitations that are often faced in conventional training.

Teachers' language skills are essential in early childhood education, especially because they serve as models for children's language development. With improved language skills, teachers can teach with more confidence, use a more diverse vocabulary, and apply more effective communication strategies (Sari et al., 2020); . Language learning through blended learning with the help of Schoology allows teachers to explore more diverse language materials as well as get direct feedback that encourages them to continue to improve their language skills. Additionally, this model allows teachers to access language learning materials tailored to specific needs, which is essential for honing their language skills appropriately (Dermawan et al., 2023; Nguyen & Nguyen, 2022).

Schoology-assisted blended learning model, which is measured through improving teachers' language skills. Measurements were made using language skills tests before and after the application of blended learning, which included aspects of speaking, writing, listening, and understanding the language (Salma et al., 2021). Through this approach, the effectiveness of Schoology in supporting the development of teachers' language skills can be objectively measured. In addition, feedback from teachers during the learning process is also collected to evaluate their satisfaction and challenges faced during the use of this platform.

The Schoology-assisted blended learning model significantly improves language skills in early childhood education teachers. Teachers reported that they felt more confident in communicating and better prepared to face the challenges of language teaching in the classroom. In addition, this improvement in language skills also enriches their teaching strategies, thus being able to create a more communicative and interactive classroom atmosphere (Sari et al., 2020). These results show that the use of e-learning platforms such as Schoology has great potential in supporting the development of teacher professionalism through more modern and integrated methods.

In conclusion, the blended learning model with the help of Schoology has proven to be effective in improving the language skills of early childhood education teachers. This study recommends that educational institutions consider using e-learning platforms in teacher development programs, considering their proven benefits in improving skills and learning convenience (Irawan et al., 2017). Further research is also suggested to further explore other aspects of teacher skills that can be improved through blended learning, as well as to evaluate the application of this model to teachers at other levels of education.

Conclusion

From the results of this meta-analysis study, it can be concluded that the 23 studies analyzed obtained effect size values ($d = 1,081$; $Z = 9.865$; $p < 0.001$) is included in the category of very high effect size. These findings show that the Schoology-assisted blended learning model greatly affects language skills in early childhood education students. In addition, the application of the blended learning model assisted by schoology is effective in helping to develop students' language skills in learning. This research is expected to be able to contribute to the world of education and research in the future. The Blended Learning model assisted by Schoology can significantly improve the language skills of Early Childhood Education (PAUD) teachers. These findings provide a new perspective for educational practices that the appropriate use of digital technology can enrich conventional learning methods and support teachers' professional development. In its implementation, continuous training needs to be held so that teachers are more skilled in utilizing platforms such as Schoology. The recommended practical recommendation is that educational institutions and early childhood teacher training institutions should consider integrating Schoology in teacher development programs, as well as providing technical assistance to maximize the benefits of this technology-based learning

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