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A Model for Optimizing Blended Learning Success: The Roles of Learning Object, Learning Strategies, and Perception of Acceptance

Un Modelo para optimizar el éxito del aprendizaje combinado: los roles del Objeto de Aprendizaje, las estrategias de aprendizaje y la percepción de la aceptación

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ABSTRACT

Learning objects, albeit small, play a significant role in conveying the learning objectives that align with learning strategies. Integrating these elements fosters positive perceptions of blended learning, which is expected to impact learning outcomes. However, there is a gap in the research on the relationship between learning objects, learning strategies, perceptions, and learning outcomes. This study aimed to develop and validate models and factors that influence the implementation of blended learning in higher education. A quantitative survey was conducted with 449 participants. The instruments used had undergone validity and reliability testing, and the data were analyzed using SEM. The results indicate that there is a model of factors influencing learning outcomes in the context of blended learning. This model includes nine dimensions of learning objects, six dimensions of learning strategies, and five dimensions of perception of acceptance, all of which significantly affect learning outcomes. The findings highlight the importance of considering the following factors in blended learning: a) learning objects, including presentation design, interaction usability, accessibility, reusability, feedback, and adaptation; b) learning strategies, such as rehearsal, elaboration, organization, critical thinking, learning time and environment, and peer learning; and c) perception of acceptance, including levels of use, attitudes, and technology adoption.

RESUMEN

Los objetos de aprendizaje, aunque pequeños, desempeñan un papel importante en la transmisión de los objetivos de aprendizaje que se alinean con las estrategias de aprendizaje. Este estudio pretendía desarrollar y validar modelos y factores que influyen en la implantación del aprendizaje combinado en la enseñanza superior. Se llevó a cabo una encuesta cuantitativa con 449 participantes. Los instrumentos utilizados se sometieron a pruebas de validez y fiabilidad, y los datos se analizaron mediante SEM. Los resultados indican que existe un modelo de factores que influyen en los resultados del aprendizaje en el contexto del aprendizaje combinado. Los resultados ponen de relieve la importancia de tener en cuenta los siguientes factores en el aprendizaje combinado: a) objetos de aprendizaje, incluidos el diseño de la presentación, la usabilidad de la interacción, la accesibilidad, la reutilización, la retroalimentación y la adaptación; b) estrategias de aprendizaje, como el ensayo, la elaboración, la organización, el pensamiento crítico, el tiempo y el entorno de aprendizaje, y el aprendizaje entre iguales; y c) percepción de la aceptación, incluidos los niveles de uso, las actitudes y la adopción de la tecnología.

KEYWORDS - *PALABRAS CLAVE*

Learning object, learning strategy, learning outcome, perception, blended learning

Objeto de aprendizaje, estrategia de aprendizaje, resultado del aprendizaje, percepción, aprendizaje combinado

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1. INTRODUCTION

Learning objects play a crucial role in digital learning due to their flexibility, personalization, interactivity, and high accessibility, which are essential for meeting diverse learners' needs (Aljawarneh, 2020). They are one of the main components that support a variety of learning strategies, helping to create a dynamic, interactive, and effective learning environment (Kühn, 2017). The key to successful learning mainly depends on the construction and organization of these resources, which enhances learning outcomes at different levels (Schmoker, 2018). Thus, to achieve specific learning objectives, it is important to identify the necessary competencies. In this context, learning objects serve as one of the most effective tools for delivering knowledge and ensuring that these objectives are met (Alarcón et al., 2015).

Learning objects are specifically designed to achieve targeted educational outcomes or goals (Nash, 2005). Defined as the smallest units of learning materials, each learning object is centered around a specific learning objective. Much like puzzle pieces, these objects can be combined to create a comprehensive and cohesive learning experience (Kusnandar, 2013). They serve as focal points that are intrinsically linked to the learning strategies being implemented (Olander & Sandberg, 2013). Furthermore, studies consistently recommend the use of interactive digital learning objects as a means to enhance student engagement and improve learning outcomes (McGuinness & Fulton, 2019).

Moreover, research indicates that learning objects are often delivered through Learning Management Systems (LMS) (Kasim & Khalid, 2016). The learning object model facilitates the exchange of data between different LMS platforms, ensuring that structured and interactive learning objects can be shared seamlessly across various systems (Apoki et al., 2019). A diverse array of learning objects—including textbooks, test questions, and presentation slides—can be accessed through an LMS (Alarcón et al., 2015; Lau et al., 2018). This approach not only enhances accessibility but also provides equal opportunities for all students to engage with these learning materials (Migunani, 2023).

The relationship between learning objects and learning strategies is a critical component of effective learning activities. Optimizing this relationship is essential for maximizing learning outcomes (Pérez-Álvarez et al., 2018). Learning strategies encompass various dimensions, including cognitive strategies, learning support strategies, and learning habits (Assis et al., 2022). These strategies are influenced by numerous factors, such as motivation, learning styles, and student autonomy (Shi, 2017a). Understanding how learning objects and learning strategies interact can lead to a personalized learning experience tailored to each student's individual needs (Shemshack & Spector, 2020), which in turn fosters a positive perception of learning activities.

A positive relationship between perceived acceptance of strategies, facilitation, satisfaction, and learning achievement has been demonstrated (Wang et al., 2021). This perception develops through the process that students experienced while using learning objects and learning strategies, which actively engage them in learning. The connection between student perceptions of learning objects and their acceptance is a critical aspect of educational research. Student perceptions significantly influence learning outcomes and overall educational experiences (S. B. Eom & Ashill, 2016), while positive perceptions can boost motivation and engagement, ultimately leading to better learning outcomes (Martin et al., 2018).

Research indicates that students' perceptions of their learning environment—whether traditional or online—affect their engagement and acceptance of the educational mode being used (Oliveras-Ortiz & Hickey, 2020). Adopting appropriate learning strategies plays a crucial role in shaping student acceptance of both learning objects and the strategies applied (Huang, 2019). In blended learning, the combination of online and face-to-face learning modes enhances the overall learning experience and improves access to education (Sudarman & Sugeng, 2018).

In addition, various types of learning objects can significantly enhance student understanding and engagement, which ultimately leads to improved learning outcomes (Syarifuddin et al., 2023). To achieve effective learning outcomes, instructional design must align with appropriate learning strategies. On the other hand, one method of assessing the successful implementation of learning objects is by evaluating learning outcomes, particularly cognitive outcomes such as understanding (C2), applying (C3), and analysing (C4) (Suprapto et al., 2024). Thus, aligning learning objects with learning strategies is essential for enhancing student understanding and engagement, which ultimately leads to improved learning outcomes.

Given this context, it is essential to examine how learning objects influence learning strategies and their consequent impact on learning outcomes. Besides, understanding students' perceptions of learning objects and strategies is equally important, as these perceptions play a significant role in shaping learning outcomes. This area of research requires further exploration, as there is still limited understanding on how learning objects and learning strategies affect the effectiveness of blended learning. The novelty of this research is that learning objects, learning strategies, and perception of acceptance are explored more deeply to build a model that influences the success of blended learning.

The objective of this study is to examine the direct relationship between learning objects and learning strategies, as well as their indirect relationship to learning outcomes. The research questions addressed in this study are as follows:

1. What is the relationship between learning objects and students' perceptions of blended learning acceptance?
2. What is the relationship between learning strategies and students' perceptions of blended learning acceptance?
3. How do students' perceptions of blended learning acceptance relate to learning outcomes after participating in blended learning?
4. What is the relationship between learning objects and learning outcomes in a blended learning environment?
5. What is the relationship between learning strategies and learning outcomes in a blended learning environment?

2. LITERATURE REVIEW

2.1. Learning objects

Learning objects are the smallest units of learning. The analysis of educators' responses, based on their experiences, shows that learning objects serve as reference tools—both digital and non-digital—that facilitate learning by guiding, motivating, and helping students make abstract concepts more tangible (Alizadeh et al., 2019). Digital-based learning objects are commonly used in web-based interactive e-learning and are designed to focus on a single learning objective (Kusnandar, 2013). Learning objects encompass more than just digital materials; they include any learning element that enhances the learning process. The learning object approach is rooted in a digital perspective with two key characteristics: "reusable" and "digital" (Arslan & Yildirim, 2016). However, learning objects differ from digital resources. A digital asset can only be considered a learning object when placed within a specific learning context considering the quality of the content (Muñoz et al. 2012), meaning anything can become a learning object if it is used to facilitate learning.

2.2. Learning strategy

Learning strategies are the steps students take to enhance their learning experiences (Shi, 2017b). These strategies empower students to take control of their own learning processes. In the context of blended learning, In the context of Blended Learning, learning strategies refer to students' self-regulation strategies, including cognitive, metacognitive, motivational, and management strategies, which are important for students to navigate the complexities of the Blended Learning environment (Eggers et al., 2021)

2.3. Perception

Perception is defined as forming opinions about objects based on evidence or previous experiences. In the context of blended learning environments, it is important to consider students' preferences and perceptions to make learning more effective and productive (Muthuprasad et al., 2021). Students' perceptions have also been found to significantly influence learning outcomes in higher education (Akareem and Hossain 2016).

2.4. Learning Outcome

Learning outcomes are indicators used to measure students' learning achievements and are the key items for assessing the quality of teaching (Lin & Chen, 2017). They are strongly influenced by factors such as learning models, curriculum design, and teaching methods. Research indicates that digital learning and learning motivation greatly enhance learning outcomes (Lin et al., 2017). Thus, by combining the strengths of blended learning to develop effective learning strategies, it is possible to further enhance learning outcomes.

3. METHOD

3.1. Participants

This study aims to explore the relationship between learning objects, learning strategies, and their impact on learning outcomes, as well as to review students' perceptions of these factors. The participants were first-year students from the Education Study Program at Padang State University, Indonesia. Specifically, the study focused on students enrolled in the Basics of Education Science course, with a sample size of 449 students.

The research instruments included variables related to learning objects, such as Presentation Design, Usage Interaction, Interaction Usability, Accessibility, Reusability, Feedback, and Adaptation. For the learning strategy questionnaire, indicators were adapted from Kim (2019) and included rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, learning time and environment, effort management, peer learning, and help-seeking, which were incorporated into the strategic learning instruments.

Perception of acceptance was measured through three main indicators: 1) Level of Use, with sub-indicators including Frequency of Use, Duration of Use, and Features Used; 2) Attitude, comprising sub-indicators of Positive Attributes and Perception of Value; and 3) Level of Technology Adoption.

3.2. Data Collection

Data were collected following the feasibility testing of the instruments. Students taking the DDIP course were invited to participate. Each participant came from different study programs or departments within several faculties at Padang State University, totalling 449 students from the Education Study Program. The questionnaire was distributed electronically via a Google Form link. Students were given one week to complete and submit the form.

3.3. Data Analysis

The data analysis process involves two stages. The first stage focuses on measuring the model by testing the validity and reliability of the instrument before moving on to the model test. Validity testing begins with an assessment of convergent validity, where each indicator is deemed valid if its loading factor exceeds 0.5 (Hair et al., 2019). Next, discriminant validity is tested to ensure that each statement item remains independent of the others, and is assessed using the Average Variance Extracted (AVE) value. An indicator meets discriminant validity criteria if its AVE value is higher than the correlation between latent variables (Fornell & Larcker, 1981; Kock, 2023).

Following this, a multicollinearity test is performed to check for equality of variance and residuals within the regression model, using the Variance Inflation Factor (VIF), which should remain below 5. Finally, a reliability test is conducted using composite reliability, where indicators are considered reliable if their composite reliability value exceeds 0.7 (Ghozali & Latan, 2012; Nunnally & Bernstein, 1994).

The second stage of data analysis involves conducting a Structural Equation Modeling (SEM) test to identify relationships between learning objects, learning strategies, perceptions, and learning outcomes. Data were analysed using SmartPLS 3.0 software (Hair et al., 2019), a tool designed to facilitate the analysis of complex relationships between variables in a model. The significance of factors that directly impact access and equity in blended learning is then assessed. A relationship is considered significant if the T statistic or t-value exceeds the critical value of 1.96.

3.4. Ethical Statement

This research has been carried out by paying attention to the ethical principles that apply in the research. All research procedures conducted follow research ethics guidelines to ensure the protection of respondents. Respondents in this study are students who have voluntarily given consent to participate in data collection and student participation is anonymous and confidential.

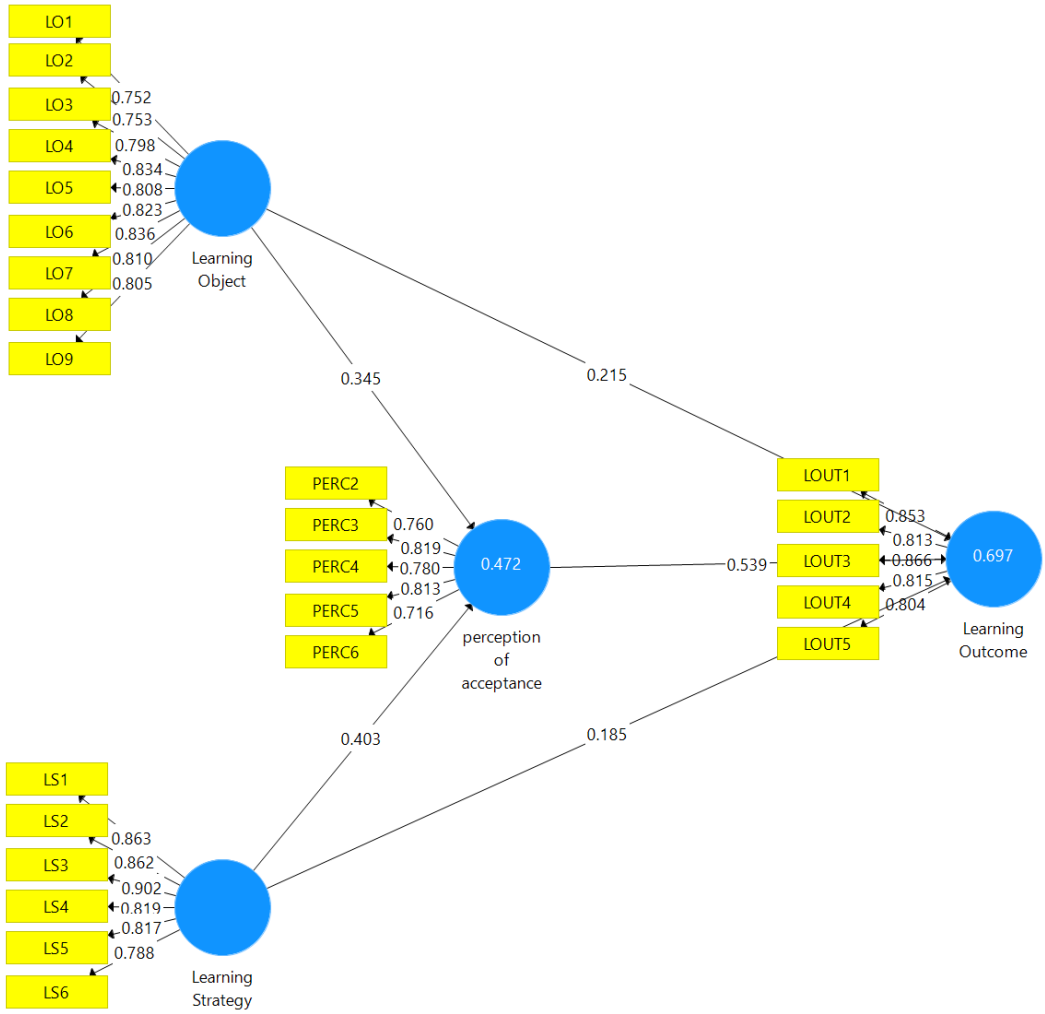
The researcher is committed to maintaining the confidentiality of respondents' personal information and will only use the data obtained for the purpose of this research. All data collected will be processed objectively and will not be used for any purpose other than those that have been previously approved.

4. RESULTS

Based on the correlation test between reflective indicator scores and latent variable scores estimated using SmartPLS 3 (Figure 1), an individual reflective measure is considered high if it has a loading factor value greater than 0.7 and an Average Variance Extracted (AVE) value greater than 0.5 (Ghozali & Latan, 2012; Hair et al., 2019).

Figure 1

Measurement Model Estimated Using SmartPLS3



In this study, the criterion for the loading factor value was set at 0.7. This means that the indicator is deemed to have passed the validity test if its loading factor value exceeds 0.7. The estimation results using SmartPLS are summarized in Table 1:

Table 1

Loading Factor Value of Variables

	Learning Object	Learning Outcome	Learning Strategy	Perception_
LO1	0.752			
LO2	0.753			
LO3	0.798			
LO4	0.834			
LO5	0.808			
LO6	0.823			
LO7	0.836			
LO8	0.810			
LO9	0.805			
LOUT1		0.853		
LOUT2		0.813		
LOUT3		0.866		
LOUT4		0.815		
LOUT5		0.804		
LS1			0.863	
LS2			0.862	
LS3			0.902	
LS4			0.819	
LS5			0.817	
LS6			0.788	
PERC2				0.760
PERC3				0.819
PERC4				0.780
PERC5				0.813
PERC6				0.716

4.1. Reliability Test

Reliability testing is conducted to assess the accuracy, consistency, and precision of the research instrument in measuring the constructs within the research model. In this study, reliability was tested using both composite reliability and Cronbach's Alpha. Composite reliability is considered adequate if the value exceeds 0.7, indicating a good level of reliability. Cronbach's Alpha uses a minimum criterion of 0.7, where values range from 0 to 1. The results of the reliability testing in this study are as follows:

Table 2

Results of the Reliability Test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Learning Object	0.931	0.935	0.942	0.645
Learning Outcome	0.887	0.888	0.917	0.690
Learning Strategy	0.918	0.920	0.936	0.710
Perception	0.837	0.841	0.885	0.606

Based on Table 2, all indicators for each variable in the research model are shown to be reliable. The *Cronbach's* Alpha values for each variable exceed the reliability criterion of 0.7. Similarly, the composite reliability *values* are above the criterion of 0.7 for each variable. Therefore, the research instruments used are deemed both valid and reliable.

4.2. Goodness *of Fit for the Inner Model*

The goodness of fit for the inner model assesses the relationships between constructs and evaluates the R-squared value of the research model. This process involves analyzing the path coefficient values to determine the significance of relationships between variables and examining the R-squared value to gauge the extent to which independent latent variables influence dependent latent variables.

4.3. Path Coefficient Analysis

The path coefficient test evaluates the strength of the relationship or the influence that independent latent construct variables have on dependent latent variables. A strong relationship is indicated by a path coefficient with a p-value less than 0.05. The significance of the relationship between variables is assessed by comparing the T statistic value to the critical value of 1.96 at the 5% significance level (0.05). If the T statistic value exceeds 1.96, the relationship between the variables is considered significant. The direction of the relationship is indicated by the original sample coefficient (O): if the coefficient is positive (greater than 0), the relationship is considered positive. The path coefficient values for this study are detailed below on Table 3.

Table 3

Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Learning Object → Learning Outcome	0.215	0.221	0.055	3.896	0.000
Learning Object → Perception	0.345	0.345	0.064	5.355	0.000
Learning Strategy → Learning Outcome	0.185	0.180	0.057	3.228	0.001
Learning Strategy → Perception	0.403	0.403	0.065	6.245	0.000
Perception → Learning Outcome	0.539	0.539	0.060	9.013	0.000

Based on Table 3, the T statistic value for each variable is greater than 1.96, indicating significant relationships: learning object → learning outcome (3.896), learning object → perception of learning (5.355), strategy → learning outcome (3.228), learning strategy → perception (6.245), and perception → learning outcome (9.013). This suggests that all relationships between the variables are statistically significant.

Furthermore, Table 3 shows that the original sample coefficient (O) values for all variables are positive: learning object → learning outcome (0.215), learning object → perception of learning (0.345), strategy → learning outcome (0.185), learning strategy → perception (0.403), and perception → learning outcome (0.539). These positive coefficients indicate that all relationships between the variables are positive. Therefore, optimizing learning objects and learning strategies can enhance learning outcomes, which further emphasizes the need to focus on the blended learning support system as it improves learning outcomes and maximizes the effectiveness of blended learning implementation.

4.4. Effect of Latent Variables on Dependent Latent Variables Based on R-Square Value

The R-square value indicates how much the dependent variable is explained by the independent variable. It reflects the strength of the relationship between the variables in the model. An R-square value of ≥ 0.67 signifies a strong relationship (Table 4).

Table 4

R-square

	R Square	R Square Adjusted
Learning Outcome	0.697	0.693
perception of acceptance	0.472	0.467

According to the data presented in Table 4, there is a strong relationship between learning outcomes and the variables of learning objects, learning strategies, and perceptions. The R-square value for learning outcomes is 0.697, indicating that the independent variables (learning objects, learning strategies, and perceptions) explain 69% of the variance in the dependent variable (learning outcomes). The remaining 31% is influenced by other factors not examined in this study.

On the other hand, Table 4 also shows that the R-square value for the perception of acceptance is less than 0.67, with a value of 0.472. This suggests a moderate relationship between the dependent variable (perception of acceptance) and the independent variables, indicating that the relationship is not as strong.

5. DISCUSSION AND CONCLUSIONS

Based on the results of this study, it was found that the relationship between learning objects and student perceptions of blended learning is both positive and significant. These findings align with previous research, which shows that variations in the use of learning objects in blended learning positively impact student achievement (Lim et al., 2020). The availability of diverse learning objects, such as interactive multimedia, learning videos, and animations, also enhances student engagement and interaction (Barut Tugtekin & Dursun, 2022). These resources are not only flexible and reusable but also easily stored, contributing to their effectiveness (Gil-Flores et al., 2017).

Learning objects can significantly improve the quality of education through several key features: (a) Structured Materials: Well-designed learning objects present material in a structured and logical manner, making it easier for students to understand; (b) Attractive Visualization: The use of images, animations, and videos helps students visualize abstract concepts, enhancing comprehension; and (c) Accessibility: Learning objects can be accessed anytime and anywhere, allowing students to learn flexibly. These attributes collectively improve learning quality and positively influence students' perceptions of blended learning.

Second, the relationship between learning strategies and students' perceptions of blended learning has been proven to be both positive and significant. The selection of appropriate learning strategies has a significant impact on the quality of learning (Rahmi et al., 2024), as it involves applying various learning models such as project-based learning, group investigation, and other methods (Joyce et al., 2015). Choosing the right strategy is also crucial for the successful implementation of blended learning. Therefore, fostering a positive perception of both learning objects and the chosen learning strategies is essential to creating a meaningful learning experience (Koh, 2017). While previous research indicates that students generally hold a positive view of blended learning (Kintu et al., 2017; López-Pérez et al., 2011), Jaya & Akhirudin (2021) found contrasting results, noting negative perceptions due to limited learning facilities and insufficient technological understanding. This suggests that the quality of the learning objects and strategies employed influence the students' perceptions of blended learning.

Third, there is a significant relationship between student perceptions of blended learning acceptance and learning outcomes. Blended learning, as a technologically advanced method,

is tailored to meet student needs and involves several factors influencing learning outcomes, such as resources, strategies, support, and administration. This study's findings align with prior research, which indicates that positive perceptions of blended learning can lead to enhanced skills, increased interest in courses, and greater career opportunities (López-Pérez et al., 2011). Other studies also suggest that blended learning models improve outcomes like independent learning (Chen et al., 2020). This implies that the perceived usefulness, motivation, and satisfaction derived from blended learning contribute to a positive attitude toward learning. Furthermore, this highlights that blended learning enhances students' understanding of the subject, improves the learning process, and supports independent work (Lei, 2010). Thus, it is crucial to integrate both learning objects and strategies in face-to-face and online activities to positively influence students' independent learning.

Fourth, the relationship between learning objects and learning outcomes in a blended learning environment is both positive and significant. Learning objects that are designed to support specific learning objectives have been found to enhance the learning process (Özkök & Yilmaz, 2020). Digital learning objects, in particular, have proven to be more effective in improving learning outcomes—both in terms of student performance and skill development—compared to traditional methods. These objects help students focus on specific concepts, thereby deepening their understanding of the material (Koh, 2017). In addition, research indicates that learning objects with high interactivity can boost student engagement and make the learning process more enjoyable (Onofrei & Ferry, 2020). This suggests that learning objects positively impact learning outcomes because they can be tailored to match each student's pace and learning style.

Finally, the fifth research question confirms that the relationship between learning strategies and learning outcomes in a blended learning environment is positive and significant. The findings indicate that designing activities based on learning strategies and aligning them with learning needs are crucial for achieving successful learning outcomes (Albeta et al., 2023; Nguyen, 2017). Similar results have been observed in other studies, highlighting that the balance between support systems in blended learning, such as content and strategy, significantly impacts students (Rahmi et al., 2022, 2024). Not only do these strategies affect learning outcomes, but they also influence the skills students acquire. For instance, a meta-analysis of 55 studies found a positive effect of implementing flipped classroom models within blended learning (Cheng et al., 2019). Therefore, selecting appropriate learning strategies is vital in blended learning to ensure that activities provide direct, active, enjoyable, and meaningful learning experiences.

This study demonstrates a positive and significant relationship between learning objects, learning strategies, perceptions, and learning outcomes. Learning objects—digital resources designed to enhance learning—and learning strategies—methods used by students to improve their learning outcomes—are both critical in achieving successful learning. The combination of these variables is necessary to optimize learning outcomes. Perception also plays a key role, significantly influencing blended learning. However, the strength of the relationship between learning objects, learning strategies, and learning outcomes with perception is moderate rather than strong. This suggests that while perception is important, it is not the only factor determining learning outcomes.

For future research, it is recommended to investigate additional variables that build the success of blended learning. By considering these additional factors, blended learning can be further optimized, resulting in more effective teaching and learning outcomes.

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7. AUTHORS' CONTRIBUTIONS

Conceptualization, S.S., U.R.; data curation, S.S.; formal analysis, S.S., U.R.; methodology, S.S., U.R.; project administration, A.A,, L.F.D.P.; resources, A.A,, L.F.D.P.; software, A.A,; supervision, S.S., U.R.; validation, U.R.; A.A,, L.F.D.P.; visualization, L.F.D.P.; writing-original draft preparation, S.S., U.R.; writing review and editing, A.A,, L.F.D.P.;

8. REFERENCES

Akareem, H. S., & Hossain, S. S. (2016). Determinants of education quality: what makes students' perception different? *Open Review of Educational Research*, 3(1), 52–67. https://doi.org/10.1080/23265507.2016.1155167

Alarcón, F., Alemany, M. M. E., Boza, A., Cuenca, L., Gordo, M. L., Fernández-Diego, M., & Ruiz, L. (2015). Learning Object. Definition and Classification. *EDULEARN15 Proceedings*, 4479–4488. https://riunet.upv.es/bitstream/handle/10251/95287/Learning%20object.%20Definition%20and%20classification.pdf?sequence=1

Albeta, S. W., Islami, N., Copriady, J., & Alimin, M. (2023). Blended learning: Learning outcomes, class dynamics, and perceptions of students and teachers-a systematic literature review. *Educational Administration: Theory and Practice*, 29(1), 43–57. http://dx.doi.org/10.21831/jpv.v13i1.51287

Alizadeh, A., Dyck, S. M., & Karimi-Abdolrezaee, S. (2019). Traumatic spinal cord injury: an overview of pathophysiology, models and acute injury mechanisms. *Frontiers in Neurology*, 10, 441408. https://doi.org/10.3389/fneur.2019.00282

Assis, L., Rodrigues, A. C., Andrade, A. V, Pitangui, C. G., Silva, C. M., & Dorça, F. (2022). Relationship Between Learning Styles and Learning Objects. *International Journal of Distance Education Technologies*, 20(1), 1–18. https://doi.org/10.4018/ijdet.296698

Barut Tugtekin, E., & Dursun, O. O. (2022). Effect of animated and interactive video variations on learners' motivation in distance Education. *Education and Information Technologies*, 27(3), 3247–3276. https://doi.org/10.1007/s10639-021-10735-5

Chang, Y.-C., Li, J.-W., & Huang, D.-Y. (2022). A personalized learning service compatible with moodle e-learning management system. *Applied Sciences*, 12(7), 3562. https://doi.org/10.3390/app12073562

Chen, J., Zhou, J., Wang, Y., Qi, G., Xia, C., Mo, G., & Zhang, Z. (2020). Blended learning in basic medical laboratory courses improves medical students' abilities in self-learning, understanding, and problem solving. *Advances in Physiology Education*, 44(1), 9–14. https://doi.org/10.1152/advan.00076.2019

Cheng, L., Ritzhaupt, A. D., & Antonenko, P. (2019). Effects of the flipped classroom instructional strategy on students' learning outcomes: A meta-analysis. *Educational Technology Research and Development*, 67, 793–824. https://doi.org/10.1007/s11423-018-9633-7

Eckersley, C., Richards, C., & Schofield, N. (2004). Evaluation of a learning object. *EdMedia+ Innovate Learning*, 2364–2370.

Eom, S. B., & Ashill, N. (2016). The determinants of students' perceived learning outcomes and satisfaction in university online education: An update. *Decision Sciences Journal of Innovative Education*, 14(2), 185–215. https://doi.org/10.1111/j.1540-4609.2006.00114.x

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. https://doi.org/10.2307/3151312

Ghozali, I., & Latan, H. (2012). *Partial least square: Konsep, teknik dan aplikasi SmartPLS 2.0 M3*. Semarang: Badan Penerbit Universitas Diponegoro, 115–126.

Gil-Flores, J., Rodríguez-Santero, J., & Torres-Gordillo, J.-J. (2017). Factors that explain the use of ICT in secondary-education classrooms: The role of teacher characteristics and school infrastructure. *Computers in Human Behavior*, 68, 441–449.https://doi.org/10.1016/j.chb.2016.11.057

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Huang, Y.-M. (2019). Exploring students' acceptance of educational computer games from the perspective of learning strategy. *Australasian Journal of Educational Technology*, 35(3). https://doi.org/10.14742/ajet.3330

Joyce, B., Weil, M., & Calhoun, E. (2015). *Models of Teaching* (9th Editio). Person Education. Inc.

Kim, K. T. (2019). The Structural Relationship among Digital Literacy, Learning Strategies, and Core Competencies among South Korean College Students. *Educational Sciences: Theory and Practice*, 19(2), 3–21.

Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *International Journal of Educational Technology in Higher Education*, 14, 1–20. https://www.doi.org/10.1186/s41239-017-0043-4

Kock, N. (2023). Using logistic regression in PLS-SEM: Dichotomous endogenous variables. *Data Analysis Perspectives Journal*, 4(4), 1–6. https://scriptwarp.com/dapj/2023_DAPJ_4_4/Kock_2023_DAPJ_4_4_LogRegrDichotEndog.pdf

Koh, J. H. L. (2017). Designing and integrating reusable learning objects for meaningful learning: Cases from a graduate programme. *Australasian Journal of Educational Technology*, 33(5). https://doi.org/10.14742/ajet.3072

Kusnandar, K. (2013). Pengembangan bahan belajar digital learning object. *Jurnal Teknodik*, 583–595. https://doi.org/10.32550/teknodik.v0i0.69

Lapitan Jr, L. D. S., Tiangco, C. E., Sumalinog, D. A. G., Sabarillo, N. S., & Diaz, J. M. (2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. *Education for Chemical Engineers*, 35, 116–131. https://doi.org/10.1016/j.ece.2021.01.012

Lei, J. (2010). Quantity versus quality: A new approach to examine the relationship between technology use and student outcomes. *British Journal of Educational Technology*, 41(3), 455–472. https://doi.org/10.1111/j.1467-8535.2009.00961.x

Lim, C., Ab Jalil, H., Ma'rof, A., & Saad, W. (2020). Peer learning, self-regulated learning and academic achievement in blended learning courses: A structural equation modeling approach. *International Journal of Emerging Technologies in Learning* (IJET), 15(3), 110–125. https://www.learntechlib.org/p/217022/

Lin, M.-H., & Chen, H. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(7), 3553–3564. https://doi.org/10.12973/eurasia.2017.00744a

Liu, Z.-Y., Lomovtseva, N., & Korobeynikova, E. (2020). Online learning platforms: Reconstructing modern higher education. *International Journal of Emerging Technologies in Learning* (IJET), 15(13), 4–21. https://www.learntechlib.org/p/217605/

López-Pérez, M. V., Pérez-López, M. C., & Rodríguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education*, 56(3), 818–826. https://doi.org/10.1016/j.compedu.2010.10.023

Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning in online courses. *The Internet and Higher Education*, 37, 52–65. https://doi.org/10.1016/j.iheduc.2018.01.003

McGuinness, C., & Fulton, C. (2019). Digital literacy in higher education: A case study of student engagement with e-tutorials using blended learning. *Journal of Information Technology Education: Innovations in Practice*, 18, 1–28. https://doi.org/10.28945/4190

Migunani, M. (2023). Digital Asset Analysis, Design, Develop And Deliver For LMS According To Scorm Standard, Case Study: Vocational High School Of Software Engineering. *Journal of Engineering, Electrical and Informatics*, 3(3), 1–18. https://doi.org/10.55606/jeei.v3i3.2216

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences & Humanities Open*, 3(1), 100101. https://doi.org/10.1016/j.ssaho.2020.100101

Nash, S. (2005). Learning objects, learning object repositories, and learning theory: Preliminary best practices for online courses. *Interdisciplinary Journal of E-Learning and Learning Objects*, 1(1), 217–228. https://www.learntechlib.org/p/44877/

Nguyen, V. A. (2017). The impact of online learning activities on student learning outcome in blended learning course. *Journal of Information & Knowledge Management*, 16(04), 1750040. https://doi.org/10.1142/S021964921750040X

Nunnally, J., & Bernstein 3rd, I. (1994). *Psychometric Theory* (3rd ed.). McGrawHill.

Oliveras-Ortiz, Y., & Hickey, W. D. (2020). Educational leadership in a Mayan village in Southern Belize: Challenges faced by a Mayan woman principal. *Journal of Cases in Educational Leadership*, 23(1), 40–60. https://doi.org/10.1177/1555458919874420

Onofrei, G., & Ferry, P. (2020). Reusable learning objects: a blended learning tool in teaching computer-aided design to engineering undergraduates. *International Journal of Educational Management*, 34(10), 1559–1575. https://doi.org/10.1108/IJEM-12-2019-0418

Parrish, P. E. (2004). The trouble with learning objects. *Educational Technology Research and Development*, 52(1), 49–67. https://doi.org/10.1007/BF02504772

Rahmi, U., Azrul, A., & Mahande, R. D. (2022). The Prototype of Blended Learning's Support System to Improve the Pre-Service Teacher's Digital Literacy. *The Journal of Educators Online*, 19(3). https://doi.org/10.9743/JEO.2022.19.3.5

Rahmi, U., Mahande, R. D., & Azrul, A. (2024). The Role of Support System, Digital Literacy and Learning Strategy on Learning Outcome Among Students of Pre-Service Teacher in Blended Learning Environment. *The Journal of Educators Online*, 21(3). https://doi.org/10.9743/JEO.2024.21.3.12

Shemshack, A., & Spector, J. M. (2020). A systematic literature review of personalized learning terms. *Smart Learning Environments*, 7(1), 33. https://doi.org/10.1186/s40561-020-00140-9

Shi, H. (2017a). Learning strategies and classification in education. *Institute for Learning Styles Journal*, 1(1), 24–36. https://www.auburn.edu/academic/cla/ilsrj//Journal%20Volumes/Fall%202017%20Vol%201%20PDFs/Learning%20Strategies%20Hong%20Shi.pdf

Shi, H. (2017b). Learning strategies and classification in education. *Institute for Learning Styles Journal*, 1(1), 24–36. https://www.auburn.edu/academic/cla/ilsrj//Journal%20Volumes/Fall%202017%20Vol%201%20PDFs/Learning%20Strategies%20Hong%20Shi.pdf

Sudarman, S., & Sugeng, S. (2018). Analysis of Need Development of Blended Learning Model Based Nine Event Instructional. https://doi.org/10.2991/icedutech-17.2018.22

Suprapto, S., Widodo, S. T., Suwandi, S., Wardani, N. E., Hanun, F., Mukodi, M., Nurlina, L., & Pamungkas, O. Y. (2024). Reflections on social dimensions, symbolic politics, and educational values: A case of Javanese poetry. *International Journal of Society, Culture & Language*, 12(1), 15–26. https://doi.org/10.22034/ijscl.2023.2006953.3095

Syarifuddin, S., Sair, A., Safitri, S., Abidin, N. F., Sinta, S., & Oktaviani, R. R. (2023). Developing Mobile Learning Activity Based on Multiple Learning Objects for the South Sumatra Local Wisdom Course. *Asian Journal of University Education*, 19(1), 12–27. https://myjms.mohe.gov.my/index.php/AJUE/article/view/21225

Tahir, S., Hafeez, Y., Abbas, M. A., Nawaz, A., & Hamid, B. (2022). Smart learning objects retrieval for E-Learning with contextual recommendation based on collaborative filtering. *Education and Information Technologies*, 27(6), 8631–8668. https://doi.org/10.1007/s10639-022-10966-0

Wang, Y.-T., Lin, K.-Y., & Huang, T. (2021). An analysis of learners' intentions toward virtual reality online learning systems: a case study in Taiwan. https://aisel.aisnet.org/hicss-54/da/learning_analytics/3/

Yu, S., Yang, X., Cheng, G., & Wang, M. (2015). From learning object to learning cell: A resource organization model for ubiquitous learning. *Journal of Educational Technology & Society*, 18(2), 206–224. https://www.jstor.org/stable/jeductechsoci.18.2.206

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