

## Developing *LearningMu*: A web-based English learning platform to assist students' self-learning

Haiyudi<sup>1</sup>, Suprayuandi Pratama<sup>2</sup>, Anggun Aprilliana<sup>3</sup>, Nadya Listyaningrum Norkhasanah<sup>4</sup>

<sup>1, 4</sup> English Language Study Program, Faculty of Teachers Training and Education, Universitas Muhammadiyah Bangka Belitung, Indonesia

<sup>2, 3</sup> Computer Science Study Program, Faculty of Engineering and Science, Universitas Muhammadiyah Bangka Belitung, Indonesia

Corresponding author

Email: [haiyudi@unmuhbabel.ac.id](mailto:haiyudi@unmuhbabel.ac.id)

### Abstract

English learning requires not only engaging instruction but also meaningful learning experiences. However, some persistent challenges remain, such as a lack of innovative teaching strategies and insufficient opportunities for students to actively use the language. This study aims to develop *LearningMu*, a web-based English learning platform designed to transform teacher-centered instruction into student-centered learning. The platform also aims to improve students' interest, engagement, and language proficiency through an enjoyable and contextualized learning process. This research adopts a Research and Development (R&D) approach using the ADDIE model, although it is currently limited to the trial stage. The trial was conducted through feasibility testing, involving both validation and practicality assessments, carried out at SMA Muhammadiyah Belitung. Data were collected through interviews, document analysis, and questionnaires, and analyzed using a quantitative descriptive approach by comparing the outcomes to existing feasibility standards. The results show that *LearningMu* achieved a validity score of 4.05 and a practicality score of 3.72 (on a 5-point scale), indicating that the product is both valid and practical for classroom implementation. Although the initial results are promising, further development and refinement are still needed to maximize the effectiveness of *LearningMu* and enhance its applicability in broader educational settings.

**Keywords:** web-based learning; English education; learning media; independent learning

### INTRODUCTION

In an increasingly advanced digital era, access to information and technology is increasingly easy to obtain. This has led to the emergence of various innovations in the field of education, including in the learning of foreign languages (Ahmadi, 2018; Van et al., 2021). English, as an international language, has a very important role in various aspects of life. However, not everyone has the same opportunity to take a face-to-face English course. Independent learning at home is an interesting alternative for those who want to improve their English (Hooshyar et al., 2020; Viberg et al., 2020). With the internet, English

learning materials can be accessed anytime and anywhere (Ruipérez-Valiente et al., 2020). One form of effective independent learning is through the English language learning website.

A well-designed English language learning Website can provide an interactive, engaging, and customized learning experience tailored to individual needs (Bashori, 2018; Bashori et al., 2022; Blake, 2011; Chiu et al., 2007). The development of English learning websites has great potential to improve the quality of independent English learning. With the English learning website, students can learn at their own rhythm, repeat material that has not been understood, and get feedback instantly. In addition, English learning websites can also facilitate interaction between students and tutors or fellow students, so that the learning process becomes more fun and effective (Bashori, 2018).

Increasing interest in learning is also a problem in today's classroom. The role of teachers who are increasingly eroded by technology requires teachers to innovate more. However, unfortunately, problems in learning do not only occur in the classroom but anywhere, including in the home with the family environment (Da Silva & Ferreira Da Silva, 2018; Viberg et al., 2020). Therefore, providing a container for them to have self-regulated learning is a method that today must be put forward. Through this study, the English learning website named *LearningMu* is expected to be a media as well as a means of independent student learning through digital technology that can be accessed on each student's mobile phone, but still under monitoring.

Learning website design today is not an option. The learning process that uses technology is a necessity in the current era. Learning that can be accessed from anywhere becomes an inevitable choice. Varied learning resources and interactive learning processes can be done with *LearningMu* today. Therefore *LearningMu* is the right choice to be an alternative learning from Muhammadiyah that can be accessed for all users widely.

Learning websites have revolutionized the way we learn. With easy and flexible access, students can access materials anytime and anywhere (Lu & Shen, 2023; Shahdat et al., 2024). The material presented was diverse, ranging from text, images, videos, to interactive simulations. This allows students to learn in their own style and delve deeper into the material that interests them. In addition, interactive features such as quizzes and discussion forums encourage students to be more actively involved in the learning process (Khan et al., 2017; Zainuddin et al., 2020).

In addition, learning websites are also very useful for teachers. Teachers can easily manage classes, assign assignments, and monitor student progress (Casanova et al., 2020; Nguyen et al., 2022). The Data obtained from the learning website can be used to evaluate the effectiveness of learning and make necessary improvements. Thus, learning websites can be an invaluable tool for improving the quality of classroom learning.

Therefore, the development of this research is aimed at developing a self-employed media of learning named *LearningMu* to assist students self-learning. By effectively developing the website, researchers can transform intricate data of English learning into

reliable insights, ensuring broader comprehension and engagement of the learning independently.

## METHOD

This research is a type of research and Development (Research and Development). The final product in this research development is learning in the form of an English learning website with local content that can be accessed for independent learning for Muhammadiyah schools in Belitung Regency in particular, as well as students in general. As conveyed by Sugiyono (2013) that research development is one way of research to produce certain products in the form of models, media, books, tools and other learning devices (Ismunarti et al., 2020; Sugiyono, 2013).

This development research uses ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model or approach (Arnab et al., 2022; Li & Abidin, 2024). After the development is carried out, the next stage is to conduct a validation test involving three multimedia experts. Further revisions are made based on expert input. The next stage of the test is a feasibility test using the website practicality test. In this test, there are three aspects that become the benchmark, namely the attractiveness of the display and ease of access. The practical test was conducted to students of SMA Muhammadiyah Tanjungpandan Belitung with a total of 10 students and two English teachers. The results obtained are used as material for product improvement in the future. The following are the development stages used in the development of this product.

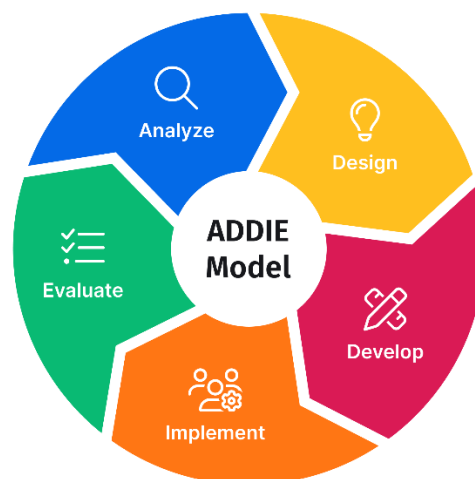


Figure 1. Development procedure using ADDIE development Model.

A sequence of questionnaire was employed to measure its validity consisting of some indicators; design or display, ease of use, appeal and website management. While, to measure its practicality, a two-indicators of questionnaire consisting of display attraction and ease of use was employed both to students and guardians. It is to measure its practicality of the *LearningMu*.

After the score is obtained, the analysis stage was conducted by comparing the values obtained with the comparison scale as explained by Sugiyono (2013). The five comparisons are as follows. 1.00 - 1.80: very impractical / Valid; 1.81 - 2.60: impractical/ Valid, 2.61 - 3.40: quite practical/ Valid, 3.41 - 4.20: practical, and 4.21 - 5.00: very practical

## RESULTS AND DISCUSSION

### Analysis

In the context of this study, the analysis was conducted by conducting a brief interview to the principal. In addition, this analysis was also conducted by looking at the results and interest in teach English students who are considered to need special treatment. Furthermore, this analysis aims to determine the treatment based on the needs and problems that exist in the classroom both on teachers and students (Adhelacahya et al., 2023; Lubis et al., 2022).

Therefore, English language learning websites with local culture-based content inserts are the right problem-solving options seeing the existing needs, namely low interest, experience and student learning outcomes, especially in English subjects (Haiyudi et al., 2023).



Figure 2. Interview and needs analysis to students and teachers

### Design

In this development research, researchers did further design of this learning website by including concepts and materials based on culture and local wisdom. Therefore, the stages of this design are carried out sequentially starting from determining the development goals, choosing a website format, developing a website storyboard. The following are the stages undertaken in product design

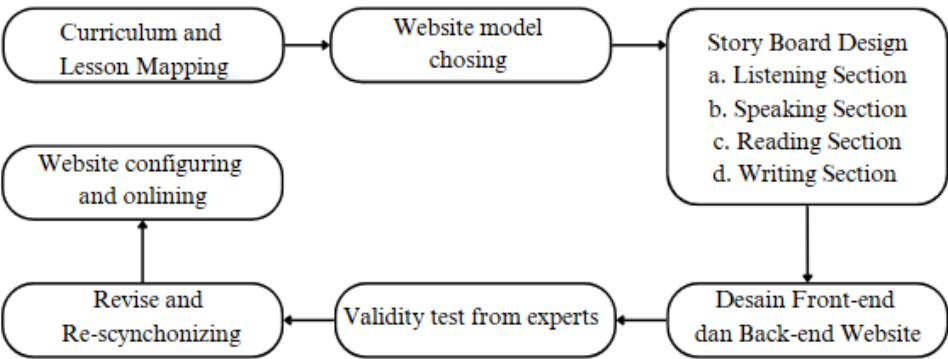


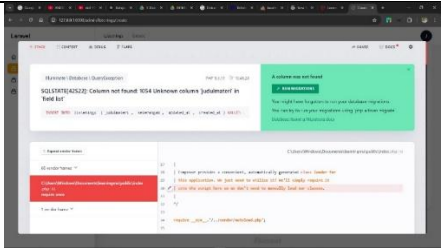
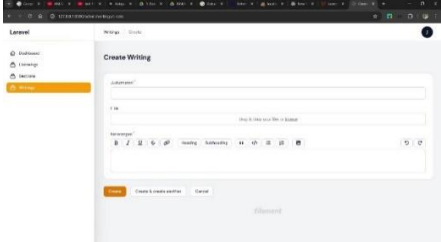
Figure 3. Product Design Stage Flow

Development

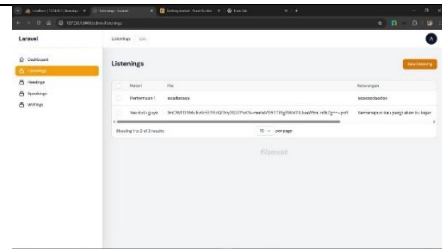
After the design process is done, the researchers conducted the module development process. The Development stage in ADDIE is crucial as it translates the design blueprint into tangible learning materials (Adeoye et al., 2024). It's where the instructional strategies, content, and media outlined in the Design phase are actually created, integrated, and assembled (Wibawa et al., 2025). This stage ensures the learning solution is concrete, functional, and ready for implementation. A robust development process leads to high-quality, engaging, and effective learning experiences that align with the initial learning objectives, setting the foundation for successful training and evaluation.

During the development phase, the following are some views during the development process.

Table 1. Web display during the development process.

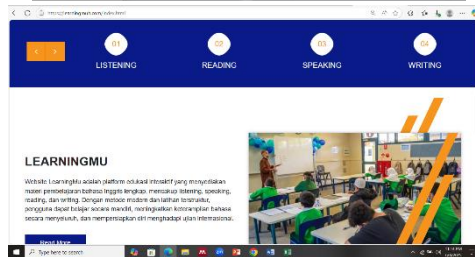
No	Display	Description
1		Web-based backend. Several times experienced errors in the development process..
2		Adding material section to the back-end of the website. This is so that operators / teachers can add learning topics in accordance with lesson planning

3



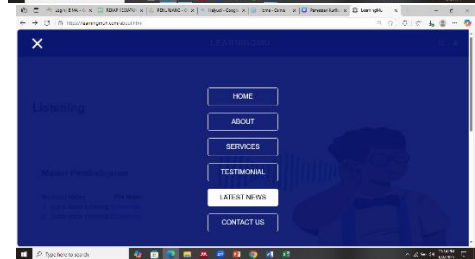
Adding four skills (Sections) and a backend completion process to cover four skills. But this process will be carried out gradually

4



Display sections (skills) in the website with the view of front-end

5



Display front-end or front page of the website for general information

The development of this web-based learning media has undergone a comprehensive feasibility testing phase to ensure its quality and effectiveness in supporting the learning process. This feasibility test involved a series of assessments from experts and potential users, focusing on four main components: Design Appearance, Ease of Use, Appeal, and Website Management.

From the collected assessment results, it is evident that the product performs exceptionally well across all aspects. The product's design appearance is rated as attractive, intuitive, and supportive of the learning process with a clear layout and the use of relevant visual elements. The evaluators appreciated the aesthetics and professionalism of the design, which not only is visually pleasing but also facilitates the understanding of the material.

The aspect of ease of use stands out as one of the main strengths of this media. The simple user interface and logical navigation allow users, both teachers and students, to quickly adapt and utilize the available features without difficulty.

Table 2. The result of the validity test of the website

No.	Components	Measurement Indicators	Average Score (Scale of 1-5)	Category
1.	Design Display	a. Color and typography compatibility	3.6	Eligible/ Valid
		b. Clear and consistent layout		
		c. Attractive visual aesthetics		
		d. Image/graphic quality		
2.	Ease of Use	a. Intuitive navigation	4.3	Very Worthy
		b. Easily accessible features		
		c. Clear instructions for use		

		d. Fast loading time		
3.	Appeal	a. Interactive and relevant content b. Spark curiosity c. Effective multimedia elements d. Potential to increase learning motivation	4.3	Very Worthy
4.	Website Management	a. System stability b. Responsiveness on various devices c. Ease of content updates d. Data security	4.0	Eligible/ Valid
		Average	4.05	Eligible/ Valid

The validity test data from experts for *LearningMu* strongly supports its validity as an effective English learning website. This rigorous expert assessment confirms that the platform's instructional design and content align with pedagogical principles, ensuring its effectiveness for language acquisition (Pinto et al., 2021). Furthermore, the expert feedback on Design Display and Ease of Use affirms that the website is not only engaging but also user-friendly, removing technological barriers and fostering motivation crucial for consistent English practice. This expert-validated design ensures that *LearningMu* is a robust and appealing medium for facilitating effective English language learning.

### Implementation

After the *LearningMu* has been successfully developed and declared fit for use based on feasibility tests conducted by experts, the next stage is application in the classroom and in the family environment to measure its practicality. It is to notice its strength and weakness for recommendation(Dahal et al., 2023). This application is carried out by the class teacher together with the researcher. In addition, this study was also tested on students as a form of feasibility test for use outside the classroom and school. The following is a website practicality test table that was tested on 10 students and 10 representatives of parents and Guardians of students to find out the process and ease of use of *LearningMu*.

Table 3. The result of the practicality test of the website

No.	Components	Measurement Indicators	Average Score (students)	Average Score (Guardian)	Average	Practicality Category
1.	Display Attraction	a. Attractive visual design b. Use of colors and icons c. Neat and clear layout	4.0	3.7	3.85	Practical

2.	Ease of Use	d. Responsive interactive elements				
		a. Intuitive navigation				
		b. Easy feature access				
		c. Clear instructions	3.7	3.5	3.6	Practical
		d. The learning process is easy to follow				
	Average Score		3.85	3.6	3.72	Practical

From the results of the questionnaires that were distributed, *LearningMu* received an unusually positive response from both groups of respondents, confirming that this product is very practical to use. In the aspect of the attractiveness of the display, both students and parents/guardians of students expressed satisfaction. Students appreciate the modern design, the use of bright colors, and the interactive layout, which makes the learning process more enjoyable and less boring (Brom et al., 2018; Plass et al., 2014). Parents / guardians also see *LearningMu* display as professional and interesting, which can motivate their children to learn (Noetel et al., 2022). A high average score on this component indicates that *LearningMu* has created a positive and inviting visual impression.

Furthermore, the Ease-of-use component is one of the main advantages of *LearningMu*. Learners feel that the navigation in the app is very intuitive, the features are easily accessible, and the learning process can be done independently without much help. Similar responses have also come from parents/guardians, who feel that *LearningMu* interface is very simple and easy to understand. It meets the requirement that the platform must be helpful even for those less familiar with technology (Juhary, 2014). This ease allows parents / guardians to easily monitor and support their children's learning process. In short, reflecting to all the data and input collected, it can be concluded that *LearningMu* media is very practical and feasible to use in supporting the teaching and learning process.

## Evaluation

The evaluation stage in the ADDIE development model is a crucial for the effectiveness and efficiency of learning media products are systematically measured (Spatioti et al., 2023). In the context of *LearningMu*, this stage has resulted in very encouraging findings, confirming that this product is very feasible and practical in its use. Careful assessment from various parties, including material experts, learning designers, and most importantly, students and parents/guardians, is needed to provide a clear picture of the power of *LearningMu* as a learning aid (Da Silva & Ferreira Da Silva, 2018).



The feasibility test results show that *LearningMu* meets high quality standards in terms of Website Design and management. Its attractive, intuitive and professional visual design is not only pleasing to the eye, but also supports the learning process without distraction. The clean layout, harmonious use of colors, and relevant visual elements successfully create a conducive learning environment. Furthermore, the stability and responsiveness of *LearningMu* website has been tested, ensuring optimal accessibility and performance across multiple devices, which is an important foundation for a seamless user experience.

On the other hand, the practicality test provides strong evidence regarding the Ease of Use and attractiveness of this product. From a survey involving 10 students and 10 parents/guardians of students, learning you consistently get high scores. Learners find navigation very easy, features accessible without difficulty, and material presented in a way that sparks curiosity. Similar responses came from parents / guardians, who appreciated the simple interface and ease in monitoring their child's learning progress. This shows that learning has successfully bridged the technology gap, making interactive learning accessible and fun for all users (Brom et al., 2018; Plass et al., 2014).

Overall, the evaluation findings indicate that *LearningMu* has achieved its main goal: to provide effective, efficient, and engaging learning media. This product is ready to be implemented and has a positive impact on the teaching and learning process.

Although *LearningMu* has proven to be very feasible and practical, the evaluation stage also underlines the importance of continuous development. Technology and pedagogy are constantly evolving, and to remain relevant and innovative, *LearningMu* must be able to adapt and enrich its features. This development will be gradual, ensuring each feature addition is well integrated and still maintains the core practicality of the product.

Below are some specific suggestions for the future development of *LearningMu*.

- 1) Increased Learning Interactivity
  - a. Adaptive quizzes: develop quiz modules that are able to adjust the difficulty level of questions based on student performance, providing a more personalized and challenging learning experience.
  - b. Interactive Simulations: for specific subjects such as science or math, integrate simple simulations that allow learners to experiment and see concepts visually
  - c. Educational games (Advanced gamification): in addition to points or badges, consider a leaderboard feature between friends or classes, as well as weekly challenges to increase motivation and healthy competitiveness.
- 2) personalization and adaptability features:
  - a. Individualized learning paths: develop features that allow learners (or teachers/parents) to choose a learning path tailored to their learning style or pace.
  - b. Content recommendations: take advantage of a simple algorithm to

recommend additional learning materials or exercises based on a learner's learning history and performance.

This gradual development ensures that learning is not only a good learning medium, but also continues to develop into an innovative, adaptive, and always relevant platform for future educational needs. With a strong foundation, *LearningMu* has great potential to become a leader in the realm of digital Learning media.

Our findings regarding the *LearningMu* platform largely align with established literature on personalized learning and gamification in e-learning (Ahmadi, 2018; Da Silva & Ferreira Da Silva, 2018; Rita, 2020). While previous works often analyze these components in isolation, this study's novelty lies in empirically demonstrating how their integrated synergy within *LearningMu* cultivates a uniquely self-sustaining learning ecosystem. This holistic perspective provides a critical new insight into fostering long-term user commitment and comprehensive skill development in online educational platforms (Bader & Lowenthal, 2021; Rita, 2020; Shahdat et al., 2024).

## CONCLUSION

The comprehensive evaluation phase, meticulously conducted within the ADDIE framework, marks a pivotal moment in the development of *LearningMu*. The findings unequivocally affirm that this interactive learning medium has not only met but exceeded its initial objectives, establishing itself as a truly valid and practical educational tool. This rigorous assessment, incorporating insights from both expert validators and real-world users – including students and their parents/guardians – provides a robust testament to *LearningMu*'s quality and potential impact.

From the perspective of validity, *LearningMu* has demonstrated exceptional performance across its core components. Expert reviews consistently praised the Design Appearance, highlighting its intuitive layout, harmonious color schemes, professional aesthetics, and the thoughtful integration of relevant visual elements. This meticulous design ensures that *LearningMu* is not merely visually appealing but also pedagogically sound, facilitating clear understanding and engagement without unnecessary cognitive load. Furthermore, the robust Website Management aspect received high marks, confirming the platform's stability, responsiveness across diverse devices, and inherent security. This strong technical foundation ensures that *LearningMu* is a reliable and accessible resource, capable of delivering consistent performance as users navigate through its rich educational content.

## ACKNOWLEDGEMENTS

The authors express their sincere gratitude to RisetMu for the invaluable financial support, which made this research possible. Their generous funding was absolutely crucial in acquiring necessary resources, conducting experiments, and facilitating the comprehensive analysis presented in this paper.

## REFERENCES

- Adeoye, M. A., Wirawan, K. A. S. I., Pradnyani, M. S. S., & Septiarini, N. I. (2024). Revolutionizing Education: Unleashing the Power of the ADDIE Model for Effective Teaching and Learning. *JPI (Jurnal Pendidikan Indonesia)*, 13(1), 202–209. <https://doi.org/10.23887/JPIUNDIKSHA.V13I1.68624>
- Adhelacahya, K., Sukarmin, S., & Sarwanto, S. (2023). The Impact of Problem-Based Learning Electronics Module Integrated with STEM on Students' Critical Thinking Skills. *Jurnal Penelitian Pendidikan IPA*, 9(7), 4869–4878. <https://doi.org/10.29303/JPPIPA.V9I7.3931>
- Ahmadi, D. M. R. (2018). The Use of Technology in English Language Learning: A Literature Review. *International Journal of Research in English Education*, 3(2), 115–125. <https://doi.org/10.29252/IJREE.3.2.115>
- Arnab, S., Petridis, P., Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A Comparative Study of the ADDIE Instructional Design Model in Distance Education. *Information 2022*, Vol. 13, Page 402, 13(9), 402. <https://doi.org/10.3390/INFO13090402>
- Bader, J. D., & Lowenthal, P. R. (2021). Using Visual Design to Improve the Online Learning Experience: A Synthesis of Research on Aesthetics. <https://Services.Igi-Global.Com/Resolvedoi/Resolve.aspx?Doi=10.4018/978-1-7998-8047-9.Cho88>, 1750–1785. <https://doi.org/10.4018/978-1-7998-8047-9.CH088>
- Bashori, M. (2018). I love Indonesia: EFL learners' perceptions on web-facilitated language learning. *The JALT CALL Journal*, 14(2), 157–189. <https://doi.org/10.29140/JALTCALL.V14N2.229>
- Bashori, M., van Hout, R., Strik, H., & Cucchiarini, C. (2022). Web-based language learning and speaking anxiety. *Computer Assisted Language Learning*, 35(5–6), 1058–1089. <https://doi.org/10.1080/09588221.2020.1770293>
- Blake, R. J. (2011). Current trends in online language learning. *Annual Review of Applied Linguistics*, 31, 19–35. <https://doi.org/10.1017/S026719051100002X>
- Brom, C., Stárková, T., & D'Mello, S. K. (2018). How effective is emotional design? A meta-analysis on facial anthropomorphisms and pleasant colors during multimedia learning. *Educational Research Review*, 25, 100–119. <https://doi.org/10.1016/J.EDUREV.2018.09.004>
- Casanova, D., Huet, I., Garcia, F., & Pessoa, T. (2020). Role of technology in the design of learning environments. *Learning Environments Research*, 23(3), 413–427. <https://doi.org/10.1007/S10984-020-09314-1>
- Chiu, T. L., Liou, H. C., & Yeh, Y. (2007). A Study of web-based oral activities enhanced by Automatic Speech Recognition for EFL college learning. *Computer Assisted Language Learning*, 20(3), 209–233. <https://doi.org/10.1080/09588220701489374>
- Da Silva, Y. C. A., & Ferreira Da Silva, M. (2018). Technological tools as a facilitator for parental/guardian participation in early childhood education. *Nuevas Ideas En Informática Educativa*, 14, 385–390.

- Dahal, N., Pant, B. P., Luitel, B. C., Khadka, J., Shrestha, I. M., Manandhar, N. K., & Rajbanshi, R. (2023). Development and Evaluation of E-Learning Courses: Validity, Practicality, and Effectiveness. *International Journal of Interactive Mobile Technologies*, 17(12), 40. <https://doi.org/10.3991/IJIM.V17I12.40317>
- Haiyudi, H., Tohir, M., Agil, S. A., Safira, T. P., Budiawan, H., Andini, A., & Art-in, S. (2023). Developing Local-based English Module with Scavenger Hunts to Foster Pancasila Learners Profile. *IJECA (International Journal of Education and Curriculum Application)*, 6(3), 236–247. <https://doi.org/10.31764/IJECA.V6I3.19436>
- Hooshyar, D., Pedaste, M., Saks, K., Leijen, Ä., Bardone, E., & Wang, M. (2020). Open learner models in supporting self-regulated learning in higher education: A systematic literature review. *Computers & Education*, 154, 103878. <https://doi.org/10.1016/J.COMPEDU.2020.103878>
- Ismunarti, D. H., Zainuri, M., Sugianto, D. N., & Saputra, S. W. (2020). Pengujian Reliabilitas Instrumen Terhadap Variabel Kontinu Untuk Pengukuran Konsentrasi Klorofil- A Perairan. *Buletin Oseanografi Marina*, 9(1), 1–8. <https://doi.org/10.14710/buloma.v9i1.23924>
- Juhary, J. (2014). Perceived Usefulness and Ease of Use of the Learning Management System as a Learning Tool. *International Education Studies*, 7(8), 23–34. <https://doi.org/10.5539/ies.v7n8p23>
- Khan, A., Egbue, O., Palkie, B., & Madden, J. (2017). Active Learning: Engaging Students To Maximize Learning In An Online Course. *Electronic Journal of E-Learning*, 15(2), pp107-115-pp107-115. <https://academic-publishing.org/index.php/ejel/article/view/1824>
- Li, C. L., & Abidin, M. J. B. Z. (2024). Instructional Design of Classroom Instructional Skills Based on the ADDIE Model. *Technium Social Sciences Journal*, 55. <https://heinonline.org/HOL/Page?handle=hein.journals/techssj55&id=168&div=&collection=>
- Lu, L., & Shen, P. (2023). The Development History and Future Trend of Computer-Assisted Teaching. *Highlights in Science, Engineering and Technology*, 72, 423–428. <https://doi.org/10.54097/MN007H87>
- Lubis, S. P. W., Suryadarma, I. G. P., Paidi, & Yanto, B. E. (2022). The Effectiveness of Problem-based learning with Local Wisdom oriented to Socio-Scientific Issues. *International Journal of Instruction*, 15(2), 455–472. <https://e-iji.net/ats/index.php/pub/article/view/393>
- Nguyen, L. T., Kanjug, I., Lowatcharin, G., Manakul, T., Poonpon, K., Sarakorn, W., Somabut, A., Srisawasdi, N., Traiyarach, S., & Tuamsuk, K. (2022). How teachers manage their classroom in the digital learning environment – experiences from the University Smart Learning Project. *Heliyon*, 8(10), e10817. <https://doi.org/10.1016/j.heliyon.2022.e10817>
- Noetel, M., Griffith, S., Delaney, O., Harris, N. R., Sanders, T., Parker, P., del Pozo Cruz, B., & Lonsdale, C. (2022). Multimedia Design for Learning: An Overview of Reviews

- With Meta-Meta-Analysis. *Review of Educational Research*, 92(3), 413–454. <https://doi.org/10.3102/00346543211052329>
- Pinto, R. D., Peixoto, B., Melo, M., Cabral, L., & Bessa, M. (2021). Foreign Language Learning Gamification Using Virtual Reality—A Systematic Review of Empirical Research. *Education Sciences* 2021, Vol. 11, Page 222, 11(5), 222. <https://doi.org/10.3390/EDUCSCI11050222>
- Plass, J. L., Heidig, S., Hayward, E. O., Homer, B. D., & Um, E. (2014). Emotional design in multimedia learning: Effects of shape and color on affect and learning. *Learning and Instruction*, 29, 128–140. <https://doi.org/10.1016/J.LEARNINSTRUC.2013.02.006>
- Rita, J. (2020). Virtual Distance Learning: How Teachers and Parents/Guardians Can Help Increase Elementary School Students' Engagement. *School of Education and Leadership Student Capstone Projects*. [https://digitalcommons.hamline.edu/hse\\_cp/608](https://digitalcommons.hamline.edu/hse_cp/608)
- Ruipérez-Valiente, J. A., Jenner, M., Staubitz, T., Li, X., Rohloff, T., Halawa, S., Turro, C., Cheng, Y., Zhang, J., Despujol, I., & Reich, J. (2020). Macro MOOC learning analytics: Exploring trends across global and regional providers. *ACM International Conference Proceeding Series*, 518–523. <https://doi.org/10.1145/3375462.3375482>
- Shahdat, M., Munna, H., Rajib Hossain, M., Roeven, K., & Saylo, C. (2024). Digital Education Revolution: Evaluating LMS-based Learning and Traditional Approaches. *Journal of Innovative Technology Convergence*, 6(2), 21–40. <https://doi.org/10.69478/JITC2024V6N002A03>
- Spatioti, A., Kazanidis, I., & Pange, J. (2023). EDUCATIONAL DESIGN AND EVALUATION MODELS OF THE LEARNING EFFECTIVENESS IN E-LEARNING PROCESS: A SYSTEMATIC REVIEW. *Turkish Online Journal of Distance Education*, 24(4), 318–347. <https://doi.org/10.17718/TOJDE.1177297>
- Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*.
- Van, L. K., Dang, T. A., Pham, D. B. T., Vo, T. T. N., & Pham, V. P. H. (2021). The Effectiveness of Using Technology in Learning English. *AsiaCALL Online Journal*, 12(2), 24–40. <https://asiacall.info/acoj/index.php/journal/article/view/26>
- Viberg, O., Khalil, M., & Baars, M. (2020). Self-regulated learning and learning analytics in online learning environments: A review of empirical research. *ACM International Conference Proceeding Series*, 524–533. <https://doi.org/10.1145/3375462.3375483>
- Wibawa, R. P., Dwi, M., & Susanti, E. (2025). *Design And Construction Of Project Based Learning Media Using The Addie Method*. 1019–1028. [https://doi.org/10.2991/978-2-38476-317-7\\_100](https://doi.org/10.2991/978-2-38476-317-7_100)
- Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers & Education*, 145, 103729. <https://doi.org/10.1016/J.COMPEDU.2019.103729>