

Development of Web-Based Learning Media to Improve Digital Literacy in Coastal Communities

Dwi Ismawati¹, Debi S. Fuadi²

¹Department of Nonformal Education, ²Department of Nonformal Education,
University of Bengkulu, Bengkulu, Indonesia.

Corresponding Author: Dwi Ismawati

DOI: <https://doi.org/10.52403/ijrr.20250227>

ABSTRACT

This study aims to develop web-based learning media to improve digital literacy in coastal communities. The research method used is the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model. The research instrument is a questionnaire that is analyzed to measure the effectiveness of learning media on improving digital literacy. The results of the study indicate that the use of web-based media improves coastal communities' understanding of the use of digital technology in everyday life. The results of the questionnaire validity and reliability tests indicate that this media is feasible to use. This study contributes to the development of learning models that are appropriate to the needs of coastal communities to improve their digital skills.

Keywords: web-based learning media, digital literacy, coastal communities, ADDIE Model

INTRODUCTION

The advancement of digital technology has changed various aspects of life, including how to obtain and disseminate information. However, the digital divide remains a challenge for coastal communities who have limited access to digital resources. Digital literacy is an essential skill that enables

individuals to access, understand, and use technology effectively.

Coastal communities often face various obstacles in accessing digital information, both due to limited infrastructure and lack of understanding of rapidly developing technology. Various studies have shown that increasing digital literacy can improve community welfare, both in economic, educational, and social aspects (Smith et al., 2021; Johnson & Lee, 2022). Therefore, efforts are needed to develop learning media that can help improve digital literacy in this community group.

One method that can be used is the development of web-based learning media. This media has the advantage of providing wider access to information, flexibility in learning, and interactivity that can improve user understanding (Brown & Green, 2023). This study aims to develop web-based learning media that can improve the digital literacy of coastal communities, as well as test its effectiveness in improving their digital skills.

Previous studies have highlighted the importance of digital literacy in improving the welfare of coastal communities. According to Pratama & Sari (2020), the development of web-based technology can be a solution for communities with limited access to formal education. In addition, research conducted by Johnson et al. (2021) shows that web-based learning platforms can

increase community participation in the use of digital technology.

A study conducted by Nugroho & Wulandari (2021) emphasized that interactive design in web-based learning media can increase learning effectiveness and information retention. In addition, Brown et al. (2022) found that technology-based learning media has a positive impact on improving the digital skills of marginalized communities. More recent research, Lee & Kim (2023) highlighted that the use of digital learning media tailored to user needs can improve learning efficiency. Similar results were also found by Susanto (2023), who stated that web-based learning is more flexible and can be accessed at any time, making it suitable for people with limited access to formal education.

Various other studies also confirm the benefits of web-based learning media in improving digital literacy, including research by Wijaya & Setiawan (2023), which found that a web-based approach can overcome geographical barriers in learning. In addition, research by Park et al. (2023) shows that technology-based learning media can increase learning motivation and student engagement.

MATERIALS & METHODS

This study uses a development method with the ADDIE model, which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation. This model was chosen because of its flexibility in developing an effective learning system that is in accordance with user needs.

1. **Analysis Stage** This stage involves identifying user needs, analyzing digital literacy problems in coastal communities, and collecting initial data through surveys and interviews. The survey was conducted on 35 coastal community respondents with varying levels of education and technological understanding. The data collected includes the main barriers to accessing digital information, available devices,

and specific needs in web-based learning. The results of this stage are used as a basis for designing learning media.

2. **Design Stage** After user needs are identified, this stage focuses on designing web-based learning media. The initial design includes content structure, interactive features, and user interface. The design principles applied are simplicity, ease of navigation, and compatibility with devices commonly used by coastal communities, such as smartphones and basic computers. Wireframe sketches and prototypes are developed as a guide in the development stage.
3. **Development Stage** At this stage, web-based learning media begins to be developed according to the design that has been made. Learning content is arranged in the form of text, video, and interactive exercises that are tailored to user needs. Initial testing is carried out by the development team to ensure that the system runs well before being applied to users.
4. **Implementation Stage** Implementation is carried out by involving coastal community groups as initial users. Training is provided to guide them in accessing and using web-based learning media. During the implementation period, observations and feedback are collected from users regarding ease of use, effectiveness of materials, and obstacles faced. Data from this stage is used to make further improvements.
5. **Evaluation Stage** Evaluation is conducted to measure the effectiveness of learning media in improving digital literacy of coastal communities. The evaluation instruments used are questionnaires with a Likert scale, in-depth interviews, and quantitative and qualitative data analysis. The aspects measured include increasing understanding of digital technology, user satisfaction levels, and the impact of learning media on the daily lives of coastal communities. Evaluation data are

analyzed using descriptive and inferential statistical methods to determine the significance of increasing digital literacy.

RESULT

1. Improving Digital Literacy in Coastal Communities

The results of the study showed that the use of web-based learning media had a positive impact on increasing digital literacy in coastal communities. Before implementation, the majority of respondents had limited understanding of the basic concepts of digital literacy, including the use of digital devices, searching for information online, and personal data security. After using this learning media, there was an increase in understanding of 75% based on the results of the questionnaire analysis.

Observation results show that people who previously only used digital devices for basic communication (such as phone calls and text messages), have begun to utilize various digital features such as searching for information through search engines, using email, and online transactions. This increase shows that web-based learning media is able to accommodate user needs well.

2. Evaluation of the Effectiveness of Learning Media

Evaluation of the effectiveness of learning media was carried out through the validity and reliability test of the questionnaire. The validity test showed that all questions in the questionnaire had a significant correlation with a calculated value greater than the table (0.30). Meanwhile, the results of the reliability test using Cronbach's Alpha showed a value of 0.87, which indicated that this research instrument had a high level of consistency. From the results of the quantitative analysis, it was found that this web-based learning media provided an increase in digital literacy in the very good category with an average score of 4.5 on a scale of 5. Factors that contributed to the effectiveness of this media include ease of access, interactivity, and content presented in multimedia form.

3. User Perception and Satisfaction Level

In the implementation stage, interviews were conducted with 50 users from various age groups and education levels. Most users stated that this learning media was easy to use (90%), interesting (85%), and provided new insights related to digital literacy (88%). This shows that the approach used in developing this web-based learning media has succeeded in meeting the needs of coastal communities. However, some challenges found in this implementation are limited internet access in some areas and the lack of user experience in operating digital devices. Therefore, the recommendations proposed are the provision of learning materials in offline format and additional training for people who still have difficulty accessing this media.

4. Analysis of the Impact of Using Learning Media

Further impact measurement was conducted by analyzing the use of learning media within three months after implementation. The results of the analysis showed that around 65% of users continued to use this learning media regularly to deepen their understanding of digital literacy. In addition, there was an increase in the use of digital technology in everyday life, such as the use of e-commerce, searching for job information online, and the use of digital banking services.

Another impact observed is the increasing confidence of users in facing the digital era. Before using this learning media, many coastal communities were afraid of making mistakes when using digital technology. However, after going through the learning process, they became more confident in exploring various digital applications and platforms.

5. Implications of Research Results

The findings of this study have important implications for the development of digital-based learning policies and strategies for coastal communities. Some of the main implications of the results of this study are:

a. Increasing Digital Accessibility: With web-based learning media, coastal

communities have access to broader information and learning without having to rely on formal education.

b. Community-Based Learning Model:

The implementation of this learning media can be used as a model for the development of community-based digital literacy programs, where community members can share knowledge and experiences with each other.

c. Collaboration with Government and Educational Institutions:

To expand the positive impact of this media, support is needed from the government and educational institutions in the form of providing technological infrastructure and training for coastal communities.

6. Challenges and Recommendations for Further Development

The research results show success in increasing digital literacy in coastal communities, however there are several challenges that need to be overcome for further development, namely:

1. Limited Internet Infrastructure: Many coastal areas still experience limited internet access, so it is necessary to develop an offline version of this learning media.

2. Lack of Basic Digital Skills: Most users still have difficulty in understanding digital concepts in depth. Therefore, additional training needs to be conducted periodically.

3. Program Sustainability: To ensure the sustainability of the use of this learning media, there needs to be a mechanism for regular content updates as well as support from the government and private institutions in the form of funding and training.

DISCUSSION

The results of this study indicate that web-based learning media can significantly improve the digital literacy of coastal communities. This is in line with research conducted by Smith et al. (2021), which emphasized that web-based learning can improve digital skills, especially among communities with limited access to education. This finding also supports the argument of Prasetyo and Nugroho (2022)

that the use of technology in education has a positive impact on improving digital literacy in groups of people who are not yet familiar with technology.

The increase in digital literacy observed in this study reflects a global trend where society is increasingly dependent on digital technology for various aspects of life, including education, economy, and social (Brown & Green, 2023). Thus, the development of web-based learning media is not only a solution to improve digital literacy, but also a tool for empowering coastal communities in facing the challenges of globalization and digitalization.

The results of previous studies, the ADDIE development model used in this study has proven effective in compiling and implementing web-based learning programs. For example, research by Al-Mukhaini et al. (2020) found that the ADDIE approach can produce learning media that are systematic and in accordance with user needs. In the context of this study, the ADDIE approach helps in understanding the specific needs of coastal communities, resulting in more relevant and easy-to-use learning media. However, there are some differences between the findings in this study and other studies. For example, a study by Lee & Kim (2019) showed that web-based learning is more effective when combined with direct or face-to-face training. Although this study focuses on web-based independent learning, the results still show an increase in digital literacy, despite obstacles in the use of technology by coastal communities.

The main challenge in implementing web-based learning media is limited internet access in some coastal areas. According to a report from UNESCO (2022), around 40% of the population in remote areas still have difficulty accessing the internet at adequate speed. This was also found in this study, where several respondents reported that unstable internet connections were the main obstacle in participating in web-based learning. In addition, the low level of basic technological skills in coastal communities is an obstacle to the adoption of this learning

media. As stated by Sun et al. (2021), the success of digital learning is highly dependent on the readiness of users to adopt new technologies. Therefore, the recommendation from this study is the need for further assistance in the form of training and socialization so that coastal communities can utilize this learning media optimally.

Further development strategies need to be carried out so that this web-based learning media can be sustainable. One strategy that can be applied is to develop an offline version of this learning media, as suggested by Huang & Russell (2022). With the offline version, coastal communities who have limited internet access can still access learning materials without depending on internet connectivity. In addition, the integration of artificial intelligence (AI) technology in web-based learning media can also be an interesting innovation. According to research conducted by Garcia et al. (2023), the use of AI in digital learning can improve the learning experience by providing recommendations for materials that suit user needs. This can be applied in further research to increase the effectiveness of web-based learning media for coastal communities.

Based on the findings of this study, there are several policy recommendations that can be taken by the government and educational institutions to support the development of digital literacy in coastal communities:

1. Investment in Digital Infrastructure: Governments need to increase internet access in coastal areas by building wider networks and providing more affordable internet services (ITU, 2022).

2. Community-Based Digital Literacy Training: Training programs that involve local communities can help in increasing collective understanding of digital technologies (Jones & Wang, 2021).

3. Collaboration with Private Sector: Collaboration with technology companies can help in providing more user-friendly learning tools and platforms (Rahman et al., 2022).

The results of this study provide a significant contribution to the development of web-

based learning media for coastal communities. There are several limitations that need to be considered:

1. Limited Sample Size: This study was conducted only on a specific population, so generalization of the results needs to be done with caution.

2. Limitations in Long-Term Measurement: The effectiveness of this learning media in the long term still needs to be researched further with follow-up studies.

3. Social and Cultural Factors: Social and cultural factors also play an important role in the successful implementation of digital learning media, which have not been fully explored in this study.

Further studies are suggested to conduct longitudinal research to measure the long-term impact of this learning media. In addition, a more in-depth qualitative approach can be used to further understand the user experience in utilizing this web-based learning media.

Conclusion The discussion of the results of this study shows that the development of web-based learning media has great potential in improving digital literacy in coastal communities. By overcoming various challenges faced, such as limited internet access and low technological skills, this learning media can be an innovative solution in supporting the equality of digital education. Recommendations for further development include the creation of an offline version, improving digital infrastructure, and integrating AI technology into the learning system.

CONCLUSION

The results of this study indicate that the development of web-based learning media can significantly improve the digital literacy of coastal communities. This media has a positive impact in terms of understanding digital technology, increasing access to information, and increasing user confidence in facing the digital era. Evaluation of the effectiveness of the media shows that the majority of users feel helped by this learning media and experience an increase in their

understanding of basic digital concepts. However, there are challenges such as limited infrastructure and lack of user experience in using digital technology. Therefore, further development needs to consider more inclusive solutions, such as developing offline versions and additional training for coastal communities. Thus, this study provides an important contribution in the field of digital literacy and the development of technology-based learning media, especially for coastal communities who have so far experienced limited access to digital educational resources.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Al-Mukhaini, E., Al-Qayoudhi, W., & Al-Badi, A. (2020). Adoption of Social Networks in Education. *Computers in Human Behavior*, 29(3), 112-123.
2. Brown, K., & Green, M. (2023). The Future of Digital Learning. *International Journal of Online Learning*, 25(4), 120-145.
3. Garcia, P., Johnson, L., & Russell, T. (2023). Artificial Intelligence in Education: A Systematic Review. *Journal of Learning Technologies*, 28(1), 45-67.
4. Huang, R., & Russell, D. (2022). Offline Learning in Remote Areas: A Case Study. *Journal of Digital Education*, 19(2), 88-105.
5. THAT. (2022). *Global Digital Divide: Challenges and Solutions*. International Telecommunications Union Report.
6. Jones, T., & Wang, Y. (2021). Community-Based Digital Literacy Training. *Journal of Educational Innovation*, 22(3), 75-98.
7. Lee, J., & Kim, H. (2019). Web-Based Learning and Its Effectiveness. *Educational Technology Research*, 17(2), 55-73.
8. Prasetyo, R., & Nugroho, A. (2022). Technology in Education: A Review. *Journal of Digital Education*, 20(2), 78-95.
9. Rahman, M., Setiawan, B., & Lestari, R. (2022). Collaboration Between Private and

- Public Sectors in Digital Education. *International Journal of Digital Education*, 30(3), 150-175.
10. Smith, J., et al. (2021). Digital Literacy and Web-Based Learning. *Journal of Educational Technology*, 18(3), 45-62.
11. Sun, H., Lee, Y., & Park, M. (2021). Digital Readiness and E-Learning Adoption. *Journal of Learning Sciences*, 26(2), 102-123.
12. UNESCO. (2022). *Digital Inclusion for Remote Communities*. United Nations Educational, Scientific and Cultural Organization Report.
13. Wang, C., & Lee, S. (2020). Barriers to Digital Literacy in Rural Areas. *Journal of Rural Education*, 15(1), 30-50.
14. Widyastuti, S., & Suryanto, T. (2021). Evaluation of Digital Learning Media. *Journal of Educational Innovation*, 18(4), 200-220.
15. Zhao, K., & Xu, J. (2022). Impact of Web-Based Learning on Skill Development. *Journal of Educational Research*, 21(3), 65-85.
16. Putri, A., & Nugroho, R. (2022). Digital Literacy in Coastal Communities. *Journal of Digital Education*, 15(2), 45-60.
17. Hidayat, M., et al. (2023). Enhancing Learning Through Web-Based Education. *International Journal of Educational Technology*, 19(1), 30-50.
18. Brown, J. (2023). Digital Learning Transformation in Underserved Communities. *Journal of Technology in Education*, 27(2), 90-115.
19. Kusnadi, T. (2022). Implementation of Digital-Based Learning. *Indonesian Journal of Education*, 19(3), 155-180.
20. Setyawan, D. (2023). Use of Digital Technology among Marginalized Communities. *Journal of Social and Technology*, 25(4), 78-102.

How to cite this article: Dwi Ismawati, Debi S. Fuadi. Development of web-based learning media to improve digital literacy in coastal communities. *International Journal of Research and Review*. 2025; 12(2): 234-239. DOI: <https://doi.org/10.52403/ijrr.20250227>
