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DEVELOPING WEB-BASED LEARNING MEDIA TO FOSTER LITERACY IN HIGHER EDUCATION

by

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Abstract:

The research aims to develop web-based learning media to foster literacy in higher education that is valid, practical, and potentially effective. Besides, this study attempts to obtain the average literacy score using the developed web-based learning media. The researchers employed the ADDIE model of instructional design comprising five phases: analysis, design, development, implementation, and evaluation. The research subjects were university students of Musi Charitas Catholic University, particularly the English Language Education Study Program students. The data collecting technique employed tests, questionnaires, and documentation. The collected data was analyzed by using qualitative descriptive analysis and thematic analysis. The research results show that web-based learning media on literacy using Google Sites is categorized as valid and practical and has potential effects. The result shows that the average literacy score is 84.8. Thus, web-based learning is likely to foster literacy in the context of higher education.

Keywords: higher education; literacy; learning media; web-based learning

Abstrak:

Penelitian ini bertugas untuk mengembangkan media pembelajaran berhasil web untuk menumbuhkan literasi di Perguruan tinggi yang valid, praktis dan berpotensi berpengaruh. Selain itu, penelitian ini berupaya memperoleh nilai rata-rata literasi dengan menggunakan media pembelajaran berbasis web yang telah dikembangkan. Para peneliti menggunakan model desain instruksional ADDIE yang terdiri dari lima fase, yaitu analisis, desain, pengembangan, implementasi, dan evaluasi. Subjek penelitian adalah mahasiswa Universitas Katolik Musi Charitas, khususnya mahasiswa Program Studi Pendidikan Bahasa Inggris. Teknik pengumpulan data menggunakan tes, kuesioner, dan dokumentasi. Data yang terkumpul dianalisis dengan menggunakan analisis deskriptif kualitatif dan juga analisis tematik. Hasil penelitian adalah media pembelajaran berbasis web tentang literasi dengan menggunakan google sites dikategorikan valid, praktis, dan berpotensi berpengaruh. Hasil penelitian menunjukkan bahwa skor rata-rata literasi adalah 84,8. Dengan demikian, pembelajaran berbasis web kemungkinan akan menumbuhkan literasi dalam konteks pendidikan tinggi.

Kata kunci: pendidikan tinggi; literasi; media pembelajaran; pembelajaran berbasis web

INTRODUCTION

It is agreed that literacy plays a significant role in people's lives. Literacy is often considered critical to economic development and individual and community well-being. Adequate literacy skills open the doors to more educational and employment opportunities so societies

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can pull themselves out of poverty. Further, in this increasingly rapid change in information technology, it is essential that individuals continuously expand their knowledge and learn new skills to keep up with the pace of change. As well as that, the empowering potential of literacy may increase political participation and contribute to the equality of public policies and democracy. Next, people with adequate literacy skills maintain better health through their ability to understand and interpret health information. People may then inquire whether education could contribute to literacy development. Literacy is indeed the target of much early education since it is assumed that literacy is less heritable than general cognitive ability (intelligence), which is not taught directly and is viewed as an aptitude inherent in individuals (Kovas et al., 2013). So, what is literacy in this context?

According to Oxford Advanced Learner's Dictionary, literacy is the ability to read and write. Further, the Alberta Education website (alberta.ca) defines literacy as the ability, confidence, and willingness to engage with language, to acquire, construct, and communicate meaning in all aspects of daily living. Additionally, strategies that promote the development of children's language and literacy skills, such as engaging in shared book reading (Elliot et al., 2021), are commonly referred to as the home literacy environment (HLE). The HLE has positively impacted various language and early literacy abilities, including vocabulary, phonological sensitivity, and word decoding (Sénéchal & Lefevre, 2014; Liebeskind et al., 2014). Another question arises when discussing the literacy level in Indonesia since it has been a concern of the researchers.

Referring to the Program for International Student Assessment (PISA) results in 2018, Indonesia is ranked 74th out of 79 participating countries in terms of reading ability category. Indonesia's performance in the PISA assessment has remained consistent in ranking since its initial participation from 2000 to 2018 (Hewi & Shaleh, 2020). Reading performance, for PISA, measures the capacity to understand, use, and reflect on written texts to achieve goals, develop knowledge and potential, and participate in society. Hence, reading performance in the context of PISA demonstrates a particular country's literacy level. Therefore, based on Indonesia's unsatisfactory result, the researchers aim to contribute to the ongoing discourse by conducting research that is more likely to increase the literacy level among Indonesian students. More specifically, literacy in this research focuses on analyzing reading

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comprehension abilities, such as what PISA measures. Indeed, literacy has become the researchers' interest and concern (Inharjanto & Lisnani, 2020; Inharjanto & Lisnani, 2023). Previously, the research involved the creation of a validated coloring book centered around parenting contexts or themes, which will aid in enhancing literacy skills (Inharjanto & Lisnani, 2021).

Meanwhile, Indonesia was experiencing an ongoing transmission of the Covid-19 virus outbreak, affecting all regions. Covid-19 is a virus that leads to respiratory system disorders, lung infections, and even fatalities. The number of individuals affected by Covid-19 continued to rise at that time. Internet technology is not bound by distance or time and offers numerous advantages. It enables learning to take place anytime and anywhere. The government of Indonesia also instructed that the learning-teaching process could be conducted online or in a hybrid way.

Moreover, it proves particularly beneficial when traditional classroom learning is not feasible, such as during the COVID-19 pandemic. Utilizing technology as a medium for distance learning significantly aids the learning process (Wirani & Manurung, 2020; Inharjanto & Leovani, 2022). Websites are well-suited as an alternative option for distance learning. They serve as an effective tool to enhance the positive impact of internet usage, provided that trained personnel play their designated role effectively and follow the learning process.

Furthermore, education worldwide has developed various approaches, methods, and techniques. The education paradigm could also be revitalized according to the advances of an era (Pranoto & Inharjanto, 2020). Creating learning media has become one of the endeavors to equip learners with beneficial approaches, methods, and techniques. Learning media refers to various tools and resources employed to deliver messages and stimulate cognitive processes, emotions, focus, and the desire to learn, thereby fostering the learning process. In simpler terms, media can be understood as instruments that facilitate the transmission of messages from sources of information-to-information recipients. As a communication form, learning relies on media to effectively convey educational messages to students (Supriyanto et al., 2021). This argument is also highlighted by Pranoto et al. (2021), Leovani et al. (2022), and Lisnani & Inharjanto (2023).

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To foster the learning process, one of the standard media utilized in the current technology era is web-based learning media. Utilizing web-based learning systems offers the opportunity to present information in diverse formats. The specific traits of field-dependent and field-independent individuals mentioned earlier have implications for instructional methods and design that can impact the effectiveness of web-based learning. This idea is echoed by Hendriana et al. (2021) and Maesyaroh et al. (2023). Web-based learning is considered a breakthrough in teaching writing skills to the pre-service teachers at the University of PGRI Semarang (Rikani et al., 2021). Some prior studies also demonstrate the beneficial utilization of web-based learning media in teaching-learning. Wirani Manurung (2020) underlines the importance of using a web-based learning model to prevent the spread of coronavirus. Next, Maesyaroh et al. (2023) utilize web-based learning media to foster English language learning. In contrast, Hendriana et al. (2021) use it to increase students' audio-video electronics competencies.

Google has developed Google Sites, a platform that allows users to create personal or community websites at no cost. Google Sites offers a convenient and straightforward way to make information easily accessible to individuals who require quick and up-to-date access. Users can collaborate on a Site by adding attachments, incorporating information from various Google applications (such as Google Docs, Google Calendar, YouTube, and Picasa), and including new and customizable content. Educators can incorporate learning materials in text, visuals, and educational videos by utilizing Google Sites as a learning medium. All these resources can be consolidated on Google Sites and shared with students. Additionally, teachers can utilize Google Sites to archive documentation related to classroom activities or school-wide initiatives, taking advantage of the limitless storage space it offers for school-related documentation.

In addition, Google Sites provides an interactive platform where students, parents, and other users can engage, leave comments, and contribute. Teachers can invite students to participate in online learning, allowing for engagement beyond traditional classroom hours and outside the physical school environment (Supriyanto et al., 2021). Many researchers use Google Sites in teaching and learning, such as physics subjects (Ismawati et al., 2021), mathematics, English subjects, and others. Since the researchers have been involved in

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tertiary education and are familiar with Google Classroom to assist learning, especially during the pandemic, they were interested in using Google Sites to encourage teaching-learning, especially within English modules. It is well known that English is increasingly used in most countries (Inharjanto, 2023), and Indonesian universities always encourage their students to master this international language.

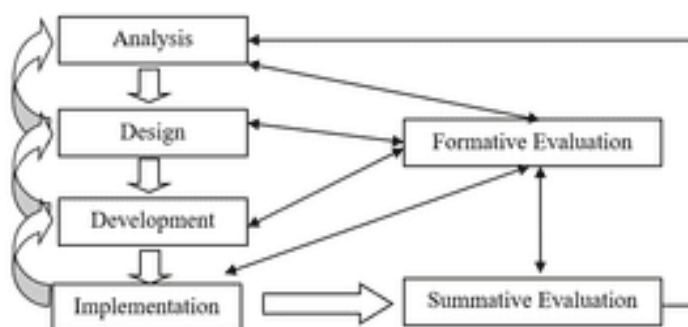
Previous researchers have conducted several studies related to the use of web-based learning media. First, Astuti, L., Wihardi, Y., & Rochintaniawati, D. (2020) entitled "The Development of Web-Based Learning using Interactive Media for Science Learning on Levers in Human Body Topic." These writers highlight the benefits of developing web-based learning despite the challenging topic in science learning. Secondly, Yuniarto, E., F. D. Widayanti, & R. Khasanah. (2021) entitled "Online Learning Management Using Google Sites in Covid-19 Pandemic Era". The result of the study was that the use of Google Sites as a learning medium during the pandemic could be further developed to increase student motivation and make it easier for students to learn while conducting online learning.

Based on the background, problems, preliminary research, and related studies described previously, this research was hoped to bring a novelty. It could contribute to the field of education. The researchers considered the importance of developing web-based learning media to foster literacy among university students, especially in English modules. Furthermore, the changes in education because of the pandemic have demanded creativity and improvement to deal with some hindrances in the learning process. It has been shared now that teachers or lecturers conduct online or hybrid teaching, including modules or subjects fostering literacy skills. The use of web-based learning media is more likely beneficial for increasing literacy, which becomes the concern of this research.

It should be noted here that the literacy discussed here will be focused on learning language. Thus, this research has three research questions. First, how do we develop a web-based learning media to foster literacy in higher education? Secondly, could implementing web-based learning media foster literacy at the university level? Lastly, what is the potential effect of web-based learning media in fostering literacy in tertiary education?

METHOD***Design***

The research methodology employed in this research and development (R&D) was the ADDIE model, which was relevant to the purpose of this study. The current research involved the investigation of students' needs and creating products (i.e., web-based learning media) to resolve the problems and hindrances to fostering literacy in higher education. This idea was echoed by Safitri and Aziz (2022), who underline the ADDIE model's adaptability, flexibility, and structured framework. As per Aldoobie (2015), the design and development stages within the ADDIE model are sequential steps that involve incorporating and integrating the necessary characteristics of a digital-based environment into the educational setting and process. Figure 1 illustrates the scheme. It should be noted here that formative evaluation plays a significant role in development research (Akker, 1999). Thus, the writers suggest that throughout the development process in educational research (Gay et al., 2012), the quality of products or solutions was determined by the transition from validity to practicality and effectiveness.



Adopted from McGriff (2000)

Figure 1. Stages in the ADDIE Model

Participant

The participants of this study were all students of higher education in the English Language Education Study Program attending English-related lectures at Musi Charitas Catholic University. Nine students were from Class PPBI201(MBKM), and six other students were from Class PPBI401(MBKM), making 15 students in total samplings. The research was conducted in the second semester of the 2022/2023 academic year.

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Instruments

The research instruments employed in this study were tests, questionnaires, and documentation. The test comprised three assessments to measure their literacy skills, especially reading comprehension, writing, and speaking, towards using web-based learning media. The test was administered during the lecture in the second semester of the 2022/2023 academic year. The first assessment on reading comprehension consisted of two questions related to the number of questions. In contrast, the second assessment on writing skills comprises six questions. Both assessments needed answers in the form of short or long essays. Next, the third assessment of speaking skills was based on the second assessment.

Moreover, the questionnaire aimed to determine the practicality and effectiveness of the developed web-based learning media. There were seven closed-ended questions, a Likert scale measuring how the students felt and levels of agreement, and an open-ended question. As for documentation, the researchers used photography and excavation of available sources related to the English modules. Thus, the three instruments were likely to obtain triangulation for the research.

Data collecting technique

This methodical process gathers and analyzes specific information to proffer solutions to relevant questions and evaluate the results. This research aimed to develop a web-based learning media to foster literacy, which was valid, practical, and potentially effective. Consequently, to ascertain its validity, practicality, and potential impact, this study employed instruments such as tests, questionnaires, and documentation, as mentioned previously. It can be underlined here that the collected data was to be further subjected to hypothesis testing, which sought to explain a phenomenon.

As discussed previously, this study employed the ADDIE model to develop web-based learning media for promoting literacy, consisting of five distinct instructional design phases. First, the phase is named analysis. This analysis phase is the initial step in examining and understanding the knowledge, skills, learner requirements, instructional goals, and learning objectives. It forms the fundamental basis for conducting further investigations and development. During this current study, the researchers analyzed the problems raised because of the pandemic crisis, the need for analysis of the students at the tertiary level who learn

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English modules, the curriculum designated for English lectures, and the opportunities for the advancement of information technology. Those aspects became the basis for raising several research questions that needed investigation.

Secondly, it is called the design phase. The design phase creates blueprints for how the instructional draft can be performed effectively. Therefore, the web-based learning media was designed using materials based on the curriculum and the evaluation. The researchers planned the learning media by utilizing online Google sites fully supported by the campus where they worked. Next, the third phase is the development phase. This developing phase demonstrated the creation and organization of material used during the instruction. The topic of 'Morning Routine' was selected because it was linked with the module's learning outcome and the purpose of the research, which was to foster literacy skills.

Further, the fourth phase is implementation—the implementation phase is the actual delivery of instructional design and the promotion of developed instructional design. The developed web-based learning media was used during the teaching-learning process, either in class or at home. The learning media was, of course, able to be accessed online wherever the students were. As mentioned earlier, the three literacy assessments were conducted during the interaction in online or offline classes. Finally, the fifth phase is named evaluation. The evaluation phase aims to assess and appraise the effectiveness and efficiency of the instructional design that has been developed. In this study, the researcher employed a questionnaire to measure the practicality and effectiveness of the developed web-based learning media. Apart from this questionnaire, the evaluation phase could be drawn from the assessments, which were considered formative and summative evaluations. The reading comprehension and writing based on the selected topic were considered a formative evaluation. In contrast, the speaking test was its summative evaluation because it was conducted at the end of all meetings.

Data analysis technique

Data analysis systematically applies logical techniques to describe, illustrate, interpret, recap, and evaluate data. The researchers gathered qualitative data based on the instruments employed in this study (i.e., tests, questionnaires, documentation). The collected data was

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then analyzed through qualitative descriptive analysis presented on pie charts or tables and involved percentages.

Moreover, the data collected were further analyzed and interpreted systematically using thematic analysis. According to Braun & Clarke (2006), this thematic analysis aims to identify patterns or themes within qualitative data and involves six steps. First, the researchers were required to be familiar with the data by reading and re-reading the data from the participants. Secondly, it is necessary to generate an initial code to organize the data meaningfully and systematically. Thirdly, searching for themes that aim to capture something significant or interesting about the data was conducted. Fourthly, this phase involved reviewing themes, aiming to review, modify, and develop the preliminary themes generated previously. The fifth phase was when the researchers defined and named themes to identify the core idea of each theme. Finally, each theme was elaborated in the study report while producing the report.

RESULT AND DISCUSSION

Findings

Based on the thematic analysis, the researchers present the study results or findings in several sub-sections. The sub-sections include the developed web-based learning media on literacy, the implementation of web-based learning media to foster literacy, and the potential effect of web-based learning media to foster literacy.

The developed web-based learning media on literacy

In the early stages, the researchers designed a web that became a learning medium by using Google sites named web-based learning to foster literacy and numeracy in higher education. It was indeed that, even though this research is concerned with literacy, the researchers also investigated numeracy for different participants (i.e., the students at Primary School Teacher Education at the same university). The URL link is <https://bit.ly/webbasedlearningliteracynumeracy>, which was then filled with features on the website, namely:

1. Homepage screenshot



Figure 2. Home Features

Figure 2 shows the content of the home feature, which introduces literacy and numeracy in two study programs, namely English Language Education and Elementary School Teacher Education, Faculty of Humanities and Education, Musi Charitas Catholic University in the city of Palembang. However, as mentioned previously, this study and its discussion only focus on literacy.

2. Literacy



Figure 3. Literacy Features

Figure 3 explains the content of literacy features related to the definition of literacy and literacy activities in the form of morning routines.

3. Evaluation



Figure 4. Evaluation Features

Figure 4 explains the content of the evaluation feature related to evaluating literacy skills. The evaluation is carried out using a link presented in Google Forms. There are two links provided for the literacy evaluation, as follows: <https://forms.gle/LYpVdM6GNypjCrY58> and <https://forms.gle/2YVBkxHu6hSMrMaM7>. The former link assesses the students' responses to the discussed topic, 'Morning Routine.' The students need to answer two questions elaboratively based on the reading. The latter link comprises six questions involving written skills to assess the implementation of reading comprehension toward the students' concrete context.

4. Questionnaire



Figure 5. Questionnaire Features

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Figure 5 describes a questionnaire about numeracy and literacy to determine students' literacy and numeracy abilities at the link: <https://bit.ly/QuestionnaireLiteracyNumeracy>.

5. Developer

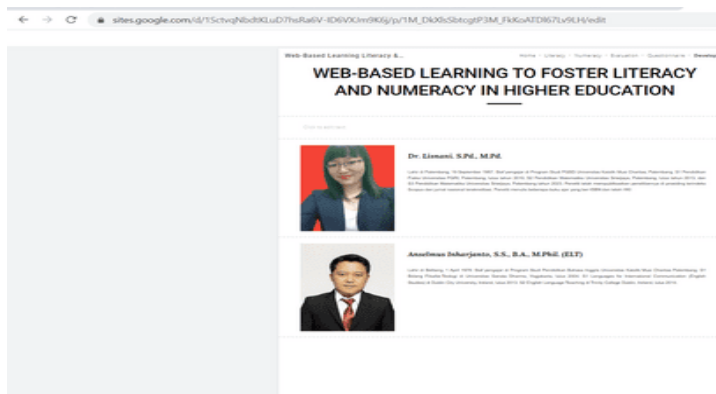


Figure 6. Developer Features

Figure 6 describes the developers of this website, that is, the two researchers, namely Anselmus Inharjanto, M.Phil. (ELT) and Dr. Lisnani, S.Pd., M.Pd. They are the lecturers at Musi Charitas Catholic University of Palembang, South Sumatra, Indonesia.

The implementation of web-based learning media to foster literacy

This section describes the implementation of web-based learning media to foster the literacy process conducted by the researchers. To begin with, one of the researchers, the lecturer of English-related modules, initially asked students to open the website link: <https://bit.ly/webbasedlearningliteracynumeracy>, as shown in Figure 7.

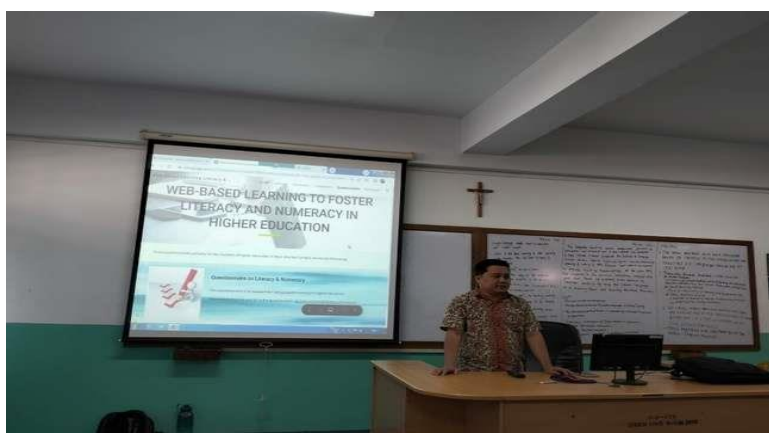


Figure 7. Researchers show the website.

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After that, the researcher directs students to read the text on the website. They may access the website during class or individually at home. Apart from computer access, the website could be easily accessed through mobile phones, as shown in Figure 8.



Figure 8. Students' access via mobile devices.

Thirdly, the students are then asked to do the assignments. Based on the reading material, there are two written assignments and one spoken assignment.

After working on the literacy assignments, students fill in the questionnaire on the website. The questionnaire is facilitated through Google Forms. Finally, the researchers score their performance on the written and spoken assignments. In addition, they analyzed the results of the questionnaire. Figure 9 shows the scores resulting from the student's work. Based on Google Forms' insights, it is evident that the average score is 84.8, and the median is 85.

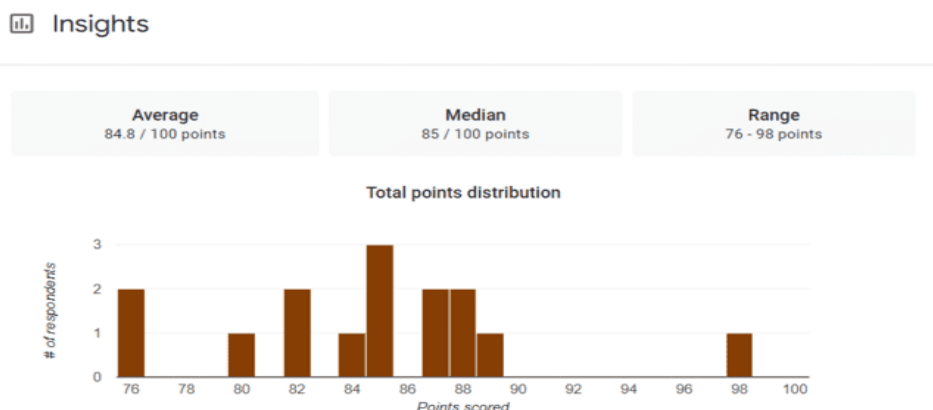


Figure 9. Insights from Google forms

The potential effect of web-based learning media on foster literacy

This section will present the potential effect of web-based learning media on fostering literacy among university students. There were 15 participants in the research on literacy. They participated well during either in-class sessions or individual activities at home. There were three assignments on literacy, i.e., literacy 1, 2, and 3. The mean score of literacy 1 (i.e., reading comprehension), as illustrated in Table 2, is 84.8, considered an excellent score. Next, the mean score for literacy 2 (i.e., writing skills) is lower (83.2) but good. Finally, the mean score of literacy 3 (i.e., speaking skills) is considered excellent. Thus, based on the three literacy assignments, the average score is 84.8, considered an excellent score.

Table 2. Score of Literacy

Tests	Literacy 1 Reading Comprehension	Literacy 2 Writing Skills	Literacy 3 Speaking Skills	Average
Mean Score	84.8	83.2	86.3	84.8

The questionnaire results may also show the potential effect of web-based learning media. The questionnaire results related to literacy abilities are described in Figures 14 to 20. Figure 10 demonstrates that most participants (40% strongly agree and 54.3% agree) perceived that web-based learning helped them study or discuss specific topics.

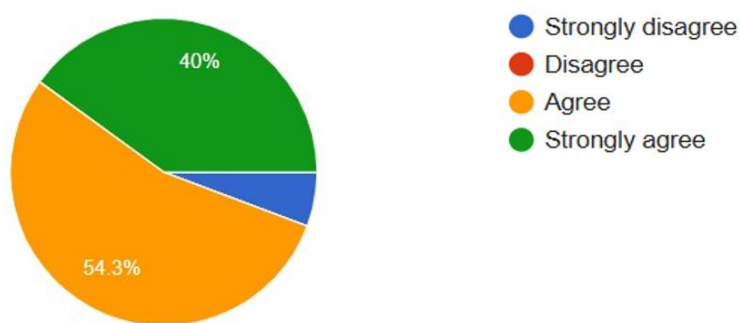


Figure 10. Web-based learning for learning topics

The next question is, "Are the materials presented in the web-based learning interesting and practical?" The response is shown in Figure 11, which illustrates that most

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university students agreed that the materials presented were interesting and practical. Almost half of the participants (48.6%) strongly agreed with the attractiveness of the materials' contents or links.

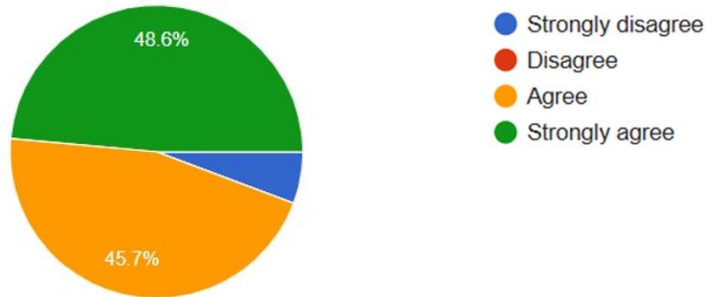


Figure 11. Attractiveness of the materials/contents/links presented.

Furthermore, Figure 12 shows that most participants could understand the content or materials presented. Figure 13 also shows positive results, showing that students perceived this web-based learning as an interesting learning medium. Only a few students disagree that web-based learning is an interesting learning medium. This finding could be noted for further evaluation and development.

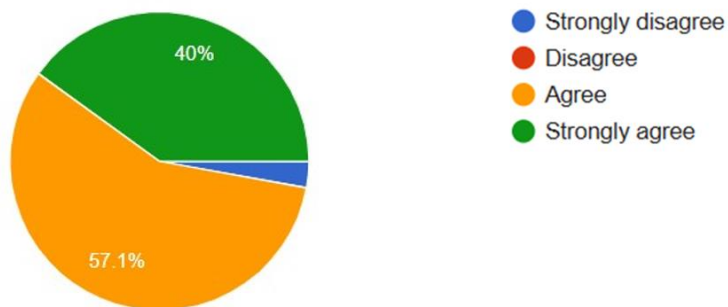


Figure 12. Understanding of material content

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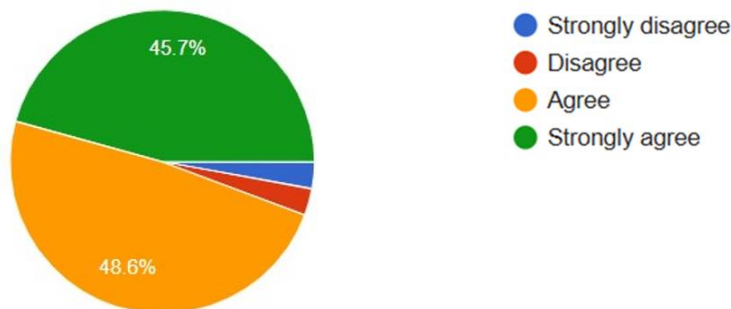


Figure 13. *Web-based learning is one of the interesting learning media*

In addition, most participants agreed that web-based learning benefited them and a wider society because the website could be accessed freely and everywhere, as illustrated in Figure 14. Meanwhile, Figure 15 demonstrates the sustainability of web-based learning. This means that the website can be continued or developed.

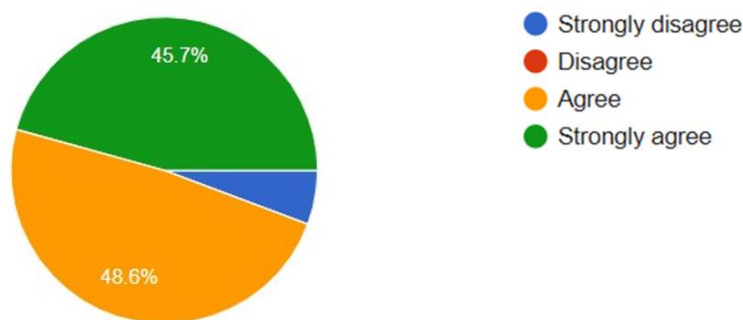


Figure 14. *The usefulness of web-based learning*

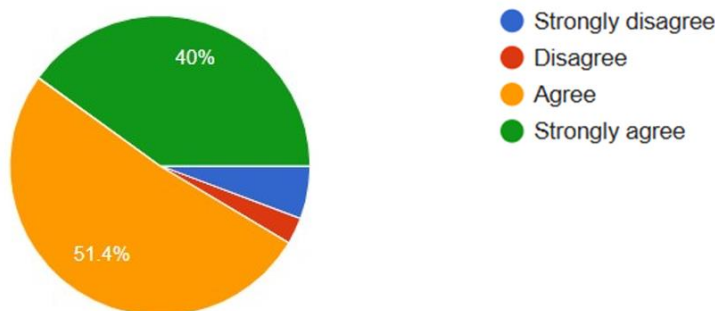


Figure 15. *Sustainability of web-based learning*

Finally, when the participants were asked whether web-based learning could be the media to increase literacy skills, positive responses are shown in Figure 16.

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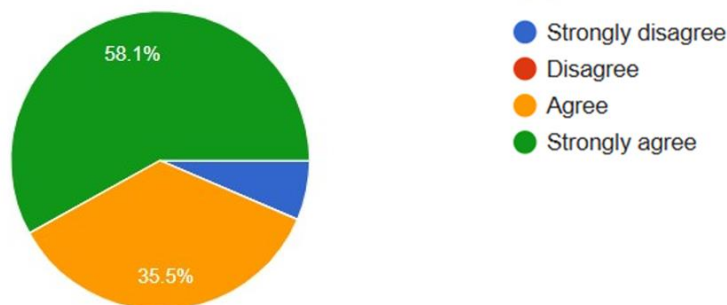


Figure 16. Increasing Literacy Skills

Besides, based on the open-ended questionnaire, there are several suggestions from students regarding using web-based learning. First, adding the appeal of more types of images is suggested by using trending images such as Canva, which is often used, and using plain or dark text colors such as black or following a theme and not bright such as green and yellow. Next, the design format can be further upgraded to adjust the font color and the word font, which is even better if there is a modern or exciting typeface. It is recommended not to be too flashy and softer for colors so it is not dull. Another suggestion is that, hopefully, all browsers can access this website, unlike the university portal, which can only be accessed on Mozilla Firefox. Furthermore, hopefully, it will not be slow when many people open this website, like Lumen, while filling in attendance.

In addition, some suggest that web-based learning can provide more interesting topics and materials. Hopefully, it will grow and be useful for students to study material and themes used in or outside of class. The participants also hope that this website can be helpful for students, especially now that the learning method is very dull, so this website must be used in the future. This web literacy can progress and develop in the future. It can benefit the public, especially in the world of education today. They state that services are growing and advancing. This web-based learning could be beneficial in the teaching-learning process.

Finally, the participants perceive that web-based learning is extremely helpful in organizing and managing learning for the better. It is suggested that this website be further developed with creativity and variations so that the readers are more interested. Next, this is likely to help students increase their independence of student learning, encourage students' participation in learning, and add students' skills.

Discussion

After presenting the findings or results of this study, the researchers will discuss them in this section. This discussion aims to interpret and describe the significance of the findings, considering what is already known about the research question being investigated. Further, the discussion is to explain any novel understanding or fresh insights concerning the problem after considering those findings. The interpretation will be presented and supported by some theories and previous studies.

The researchers have developed web-based learning media to foster literacy in higher education. Based on the previous part, the study's results have also been presented extensively, comprising tests, questionnaires, and documentation. Web-based learning media has shown some features that are needed to foster literacy. As the literature review suggests, this website flexibly displays information in many ways. The creativity of designers is necessary. The open-ended questionnaire suggests the website could be developed according to recent advancements, modern images, availability, etc.

Next, the web-based learning media uses Google Sites as a free digital platform. This is beneficial for lecturers and students to access it easily. The questionnaire's results show some positive comments regarding its benefits. It can also be noticed that Google Sites has become a platform allowing individuals from various backgrounds, including students, parents, and other users, to engage, offer comments, and contribute. As underlined by Supriyanto et al. (2021), lecturers can invite students to interact in online learning, which can be conducted outside of learning hours and outside the school environment. This was proved during the documentation process, as illustrated in the results section. The site may be used for different subjects or modules, as echoed by Ismawati et al. (2021).

Since literacy means the ability to read and write, the features shown in the web-based learning media have been perceived as valuable and beneficial for students' comprehension, particularly in reading and writing. Referring to the Alberta Education website (alberta.ca), which defines literacy as the ability, confidence, and willingness to engage with language to acquire, construct, and communicate meaning in all aspects of daily living, the researchers further improve the assignment for students by involving speaking skills. The researchers also include a wide array of language and emergent literacy skills, such as vocabulary,

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phonological sensitivity, and word decoding, as suggested by Sénéchal & Lefevre (2014) and Liebeskind et al. (2014).

Furthermore, the open-ended questionnaire provides some ideas for improvement since this website is only used for one topic on literacy. One of the ideas is to add some recent or trending images such as Canva, using plain or dark text colors such as black or following a theme and not bright, such as green and yellow. The participants also considered the website's availability since internet connection and browsers have been hindrances. Students' positive comments and perceptions will likely lead to improved web-based learning. Some state that, hopefully, this website can be helpful for them, especially now that the learning method is very dull, so this website must be used in the future. Overall, the scores obtained during the evaluation may prove that web-based learning will likely foster college students' literacy.

CONCLUSION AND IMPLICATION

Conclusion

This study was conducted to develop web-based learning media to foster literacy in tertiary education, to figure out the implementation of web-based learning media to foster literacy among university students, and to investigate the potential effect of the developed web-based learning media. Several conclusions can be drawn from the results and discussion in the previous chapter. First, web-based learning on literacy for higher education is valid because it measures what it claims to measure. It has demonstrated essential features such as the homepage, literacy, evaluation, questionnaires, and developer. Web-based learning is also clear about what it is assessing; consequently, the assignments provided have been taught, and the students can expect to know. Secondly, web-based learning media could foster literacy among university students.

Regarding practicality, the web-based learning media is verified to be easy to design, administer, and score. It is also economical to deliver and not excessively expensive because the web is available online, free of charge, and may use abundant, authentic materials related to literacy. Finally, the developed web-based learning media has a potential effect in fostering literacy among students, as proved by the results of their scoring and marking as

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well as their perceptions and feedback. Thus, the web-based learning media on literacy will likely foster students' literacy ability in tertiary education.

Limitation

The study's limitations are those characteristics of design or methodology that impact or influence the application and interpretation of the study's results. In this context, the current research has several limitations, among others: the research focused only on one topic of literacy and obtained a posttest as a summative evaluation but not a pretest. Moreover, another weakness would be the number of participants and its scope. The participants are considered minor because the number of students was also limited. The scope of the research, which was only in one university, can be another limitation.

Implication

This last sub-section is concerned with the research implications. The current research might impact future studies, policy decisions, or relevant fields of interest of similar studies. Therefore, some suggestions are offered. First, this research should be continued to the next stage, the further implementation stage, which involves field trials after improvements. Secondly, the topics offered could be varied to foster more literacy and further affect the targeted community, the third-level students.

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