JPPIPA 9(3) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

The Development of Web-Based Learning Media (Glideapps) to Improve Digital Literacy and Science Literacy About Materials Human Digestive Systems

Charolin Aprilia[1*], Evita Anggereini [1], Nazarudin[1], Yuni Ahda[2]

[1] Master Program in Natural Science Education, Postgraduate of Universitas Jambi, Indonesia
[2] Department of Biology FMIPA Padang State University, Indonesia

Received: December 13, 2022
Revised: March 19, 2023
Accepted: March 25, 2023
Published: March 31, 2023

Corresponding Author:
Charolin Aprilia
Olinnaw@gmail.com

DOI: 10.29303/jppipa.v9i3.2618

Abstract: Learning media is part of learning that contains messages, people, and devices, which follow technological developments. This study aims to determine the feasibility of developing web-based learning media to improve digital and scientific literacy skills in the material of the human digestive system in class VIII J at SMP Negeri 11 Jambi City. This research development uses the Dick & Carey development model. The test subjects consisted of a small group of 6 people and a large group consisting of 33 students who were students of Junior High School state 11 Jambi. The instruments used in this study were interviews, questionnaires, tests, and validation assessment sheets. This study uses a *one-shot* case study experimental design. The data analysis technique used in this research is descriptive research with a quantitative approach. The results of this study are media validation. The first material validation gets a score of 56%, and the classification of eligibility is not good, with several improvements. The second gets a score of 72%, the classification of eligibility is good, and the third gets a score of 91%, the classification is very good. The first media validation gets a score of 50%, and the feasibility classification is not good, with several improvements. The second gets a score of 72%, the feasibility classification is good, and the third gets a score of 94%, and the classification is very good. The effectiveness of web-based learning media (*glideapps)* in increasing digital literacy was carried out in large group tests obtaining an average value of 0.7757 or 77.5712% with high category in effective interpretation. The effectiveness of web-based learning media (*glideapps)* in increasing sains literacy is carried out in large group tests obtaining an average value of 0.7836 or 78.3601 % with high category in effective interpretation.

Keywords: Digital literacy; Glideapps; Science literacy; Web based media

Introduction

The rapid development of technology in the current era of globalization has brought many benefits to progress in various levels of society, including the world of education. Learning focuses on the development of the times, which can be seen from its characteristics, namely the increasing and diverse use of technology to affect various lines of life, including in the field of education, especially the learning process (Zulfa et al., 2021). The use of information and communication technology and digital literacy has now become an innovation applied in the world of education. Individuals with a low technology literacy culture will find it challenging to deal with information and communication technology that is growing rapidly, especially in the field of education (Zahroh et al., 2022). As technology develops, learning facilities and infrastructure also develop, therefore the learning process in educational units is organized interactively, inspiringly, and motivating students to participate actively in helping students' physical and psychological development (Rohdiani et al., 2017). Along with the development of communication and information technology, accompanied by the rapid growth of digital

How to Cite:
Aprilia, C., Anggereini, E., Nazarudin, N., & Ahda, Y. (2023). The Development of Web-Based Learning Media (Glideapps) to Improve Digital Literacy and Science Literacy About Materials Human Digestive Systems. *Jurnal Penelitian Pendidikan IPA*, *9*(3), 1112–1117. https://doi.org/10.29303/jppipa.v9i3.2618

technology, media awareness, and capabilities. Media literacy and digital literacy are approaches that focus on critical analysis of the content of media messages (Restianty, 2018). According to Karpati (2011), "Digital literacy is a skill (life skill) that does not only cover the ability to use technology, information and communication devices, but also involves the ability to socialize, think creatively, critically and inspire in digital competition. Digital literacy is not only limited to the process of interacting with digital media, but also refers to how the interaction contributes to various aspects of knowledge and also emotions when using digital media and devices (Kurnia, 2019).

Web-based learning media is one of the learning media that can be used by teachers in learning science. According to Sundayana (2016) that learning media is "media whose use pays attention to the objectives and content of teaching which is usually outlined in the curriculum, and is used to present or convey the author including books, films, videos, tapes, slides, and so on as well as the voice of the teacher". Web-based learning allows students to still be able to gain knowledge outside of school hours (Kurniawan, 2017). Web-based learning media is an innovation in applying social programs and software using technology or social networks (Park, 2011). Mobile applications or mobile apps are "programs that are loaded and can be used anytime and anywhere" (Mohammad, 2021).

Web learning media is a form of data management in the form of products that can store, input, and transfer data (Yu, 2007). Applications that have been made can be shared with other people to be able to use the applications that we have created (Miranti et al., 2021). This web-based media combines and integrates text, audio, and video with interactions between participants. It can be used globally and is platform-independent (Mehdipour et al., 2013). Making web-based learning media must be significantly prepared and planned so that it is easy, can be used for interactive learning, and is suitable for use outside of a communicative classroom (Lindemann et al., 2018). Darussalam (2015) explains that the use of web-based learning media can break a static atmosphere, create a practical, exciting, and interactive learning process, and arouse student learning motivation. Using web-based learning media is also easier because students can easily access web-based learning media anytime and anywhere. In web-based media, it is equipped with explanatory text, and has a clear voice. So that by adding videos to this website-based learning media it can support the process of understanding the material. Learning resources and web-based learning media that can support learning activities are still very limited (Priyambodo et al., 2012). Media can be interpreted as a communication tool used to carry information from a source to a recipient (Priyanto, 2017).

Teaching science in schools is accepted as an increase in scientific literacy. In response to society's technological developments, it is proposed that it is more appropriate to consider scientific and technological literacy (Rante et al., 2013).

The result of the interviews with one of the teachers and one of the students in class VIII J Junior High School state 11 Jambi showed that this material on the digestive system contains a lot of theory and memorization. Thus, it makes the learning process become boring and not interesting. Learning media, such as books provided by schools, contain a lot of writing that makes learning boring and boring. During online learning, students also experience difficulties with the media used. During online learning, students use Google Classroom, wherein the media students must download the material presented by the teacher, causing the student's cellphone memory to be full.

The learning media that researchers will develop is web-based learning media (*glideappss)* whose use is only by opening the shared link without having to download the application. The products developed in this study also improve students' digital literacy and scientific literacy. Literacy skills are an urgent need that everyone must have to be able to compete globally. The current *online* learning process further strengthens students' reasons for understanding digital literacy. Digital literacy is the ability to understand and use information from various digital sources in Gilster (Munir, 2017). It is not only to understand and use the information contained in digital media, but it also uses to evaluate many digital sources. Through digital-based learning systems such as via the web, students can explore more and learn information and have a more comprehensive range of learning resources that provide opportunities for students to broaden their horizons about knowledge.

Scientific literacy has been recognized as an essential characteristic of every citizen. Based on PISA data in 2018, students' scientific literacy in Indonesia received a score of 396 and was ranked 70th, which means that students' scientific literacy skills in Indonesia are still very low. According to OECD (2016), scientific literacy can be defined as scientific knowledge and skills to be able to identify questions and draw conclusions based on facts to understand and make decisions in carrying out activities. According to Yuliati (2017), scientific literacy skills, such as the ability to understand science, communicate science (oral and written), and apply scientific abilities to solve problems so that they have a high attitude and sensitivity towards themselves and their environment in making decisions based on scientific considerations. Scientific literacy helps students form mindsets, behaviors and build human character to care for and be responsible for themselves, society, and the universe.

Previous research on websites, namely the Development of Website-Based Learning Media on Solar System Material (Hastuti Dwi, 2020) *"Say No To Coding": Designing of Mobile App Based Learning Media Using Glide Apps* (Rahmawati et al., 2021). This study aims to determine the feasibility of developing web-based learning media to improve digital literacy and scientific literacy in the material of the human digestive system in class VIII J Junior High School state 11 Jambi. Analyzing the effectiveness of web-based learning media to improve digital literacy and scientific literacy in the material of the human digestive system in class VIII J Junior High School state 11 Jambi.

Method

This development research uses the Dick & Carey development model. This model is included in the procedural model. Dick & Carey is a research model oriented to descriptively describing the stages of research. The selected development research model is the following Dick & Carey development (Dick et al., 2015).

The subjects to be taken are students of SMPN 11 Kota Jambi, class VIII J, odd semester, who study the subject of the human digestive system. The test subjects consisted of small groups and large groups. The instruments used were interviews, questionnaires, tests, and validation assessment sheets.

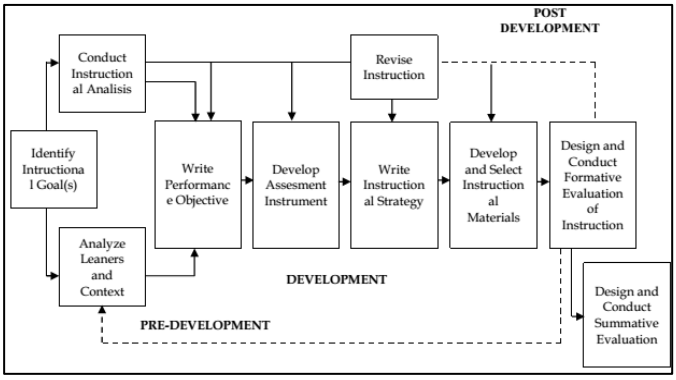

Figure 1. Dick & Carey development model (Dick et al., 2015)

The data analysis technique used in this research is descriptive research with a quantitative approach. In the questionnaire, to calculate the percentage of each indicator, use the following formula:

$$Response\ persentage = \frac{the\ total\ score\ obtained}{maximum\ number\ of\ scores} \times 100\% \quad (1)$$

Furthermore, to determine the level of effectiveness of the product being developed, a one-shot scheme is used the case study is described as follows:

X O

Figure 2. Experimental design one-shot case study

Information:
X : Treatment given
O : Observation

To find out the effectiveness of the product in increasing students' creative thinking skills and scientific literacy, N-gain test was carried out with the following formula:

$$N - gain = \frac{skor\ posttest - skor\ pretest}{skor\ maksimal - skor\ pretest} \quad (2)$$

The distribution of N-gain value categories is in the following table:

Table 1. Distribution of N-gain (Novita et al., 2019)

N-gain value	Category
$g > 0.7$	High
$0.3 \leq g \leq 0.7$	Moderate
$g < 0.3$	Low

Result and Discussion

Pre-Development Stage

The analysis is a preliminary activity in research or can be named by the term pre-development stage. This analysis activity includes the core stages: *Identify Instructional Goal (s), Conduct Instructional Analysis, and Analyze Learns and Contexts*.

Based on the interview results, the teacher wants students to understand the material with the development of a web-based learning media such as *glideapps* which can deepen students' understanding. In response to this, the science learning process at SMPN 11 Jambi City has used web-based learning media that can help the learning process. The only web-based learning media that have ever been used are *Google Classroom and WhatsApp*. In addition, teachers have never tried to make their own web-based learning media. After conducting these interviews, the researchers selected material for the human digestive system for the development of web-based learning media *(glideapps)* and the ability to think creatively, digital literacy and scientific literacy. These three skills will be used in evaluating media developed to improve skills in the 21st century.

Development Stage Product Validation

Product validation was carried out three times by media experts and material experts. The following presents a graph of media and material validation results.

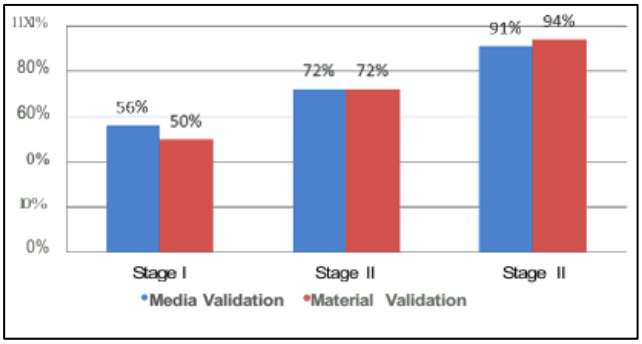

Figure 3. Comparison of media validation and material validation stage I, II, and III

Table 2. Prototype of Web-Based Learning Media (*Glideapps*)

Menu	Appearance
Initial display	
Sub material display	
Material display	

Post-DevelopmentStage

Teacher Assessment Test

The teacher's assessment of web-based learning media *(glideapss)* obtained a total score of 125 with a score percentage of 98%, the results are very good and feasible to be tested in the next stage.

Furthermore, the teacher assessment questionnaire results from the two science teachers will be tested for correlation to see the level of relationship between the first science teacher and the second science teacher. Based on the correlation test results between the first science teacher and the second science teacher, the score was 0.683. This figure shows a moderate and positive correlation between the two science teachers towards the developed web-based learning media *(glideapss)*, and this web-based learning media *(glideapss)* is feasible to use.

Small Group Trial

Small group trials were conducted on 6 class VIII J students of SMPN 11 Jambi City. The instruments used were open and closed questionnaires using a Likert scale. Based on the students' responses, it can be analyzed that web-based learning media (glideapps) are categorized as very good and suitable for learning, with a percentage of 88%.

Large Group trials

The large group trial was conducted on 33 class VIII J students of SMPN 11 Jambi City. In this test, researchers conducted a pre-test and post-test intending to see an increase in digital and scientific literacy after using web-based learning media (*glideapps*).

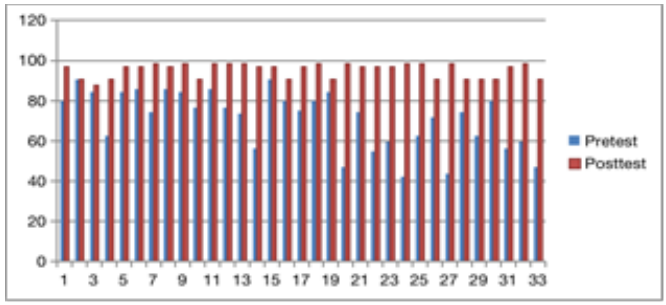

Figure 4. The comparison of pre-test and post-test score of digital literacy (Source: Research data processing)

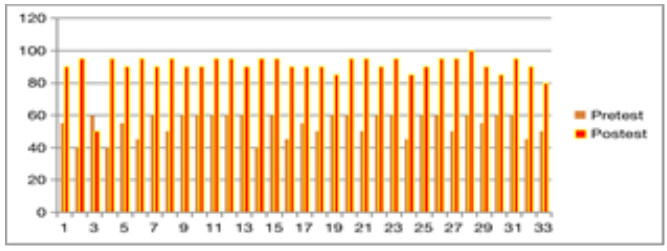

Figure 5. The comparison of pre-test and post-test scores of science literacy (Source: Research data processing)

From the results of the digital literacy pretest, it was found that it had a total score of 1502 with a percentage of 71% and included in the good category. As for scientific literacy, it gains an average percentage of 54.28 54%, with the highest score of 60 and the lowest score of 40. Furthermore, the digital literacy posttest results were obtained with a total score of 1863 with a percentage of 88% and included in the very good category. At the same time, scientific literacy obtains an average of 0.45 percentage of 90%, with the highest score of 100 and the

lowest score of 50. The following graph compares each student's scores during the pre-test and post-test.

Effectiveness Test

The results of the trial of web-based learning media (glideapps) will be evaluated using an effectiveness test. The results of the posttest and pretest that have been done previously will be used as data to test the effectiveness. To determine the effectiveness of web-based learning media (glideapss), the N-gain test will be continued using SPSS. The following are the results of the N-gain test on the pretest and posttest.

Table 3. Results of the N-gain Pretest (before) and Posttest (after) Digital Literacy (Source: SPSS Data Processing 25.2022)

	Descriptive Statistics			
	N	Minimum	Maximum	Mean	Std. Deviation
N-gain_score	33	.00	.97	.7757	.23023
N-gain_percent	33	.00	97.30	77.5712	23.02264
Valid N (listwise)	33				

Based on the calculation of the digital literacy N-gain test using SPSS ver.20, the average N-gain score was 0.7757 with a 77.5712%, so web-based learning media (glideapss) is included in the category of effective interpretation in improving in increasing digital literacy at SMPN 11 Kota Jambi.

Next will be tested the effectiveness of web-based learning media (glideapss) on students' scientific literacy skills. The following are the results of the N-gain test on the pretest and posttest.

Table 4. Results of N-gain Pretest and Posttest Science Literacy (Source: SPSS Data Processing 25.2022)

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
N-gain_score	33	-.25	1.00	.7836	.2076
Ngain_percent	33	-25.00	100.00	78.3601	20.76589
Valid N (listwise)	33				

Based on the results of the scientific literacy N-gain test calculation using SPSS ver.20, the average N-gain score was 0.7836 with a percentage of 78.3601%. Therefore web-based learning media (glideapss) is included in the category of effective interpretation in improving in increasing scientific literacy among students at SMPN 11 Jambi City.

Conclusion

Based on the results of research on the development of web-based learning media (glideapss) in increasing digital literacy and scientific literacy in the material of the digestive system in humans in class VIII J SMPN 11 Jambi City. Therefore, the researchers conclude several discussions. Firstly, Web-based learning media (glideapss) is declared feasible by one person validating the material by providing a validation instrument in the form of a questionnaire. The validation activity was carried out three times because it was deemed necessary to improve based on the comments from each validation. The first material validation gets a score of 56%. The feasibility classification is not good, with several improvements. The second gets a score of 72%, the feasibility classification is good, and the third gets a score of 91%, and the classification is very good. The first media validation gets a score of 50%, and the feasibility classification is not good with several improvements. The second gets a score of 72%, the feasibility classification is good, and the third gets a score of 94%, and the classification is very good. Thus, it was declared feasible based on student responses at the development stage, carried out in small groups of 6 students and got a score of 88% very good classification. Secondly, the effectiveness of web-based learning media (glideapss) in increasing digital literacy is carried out in large group tests obtaining an average value of 0.7757 with a 77.5712%, so web-based learning media (glideapss) is included in the category of effective. The effectiveness of web-based learning media (glideapss) in increasing digital literacy is carried out in large group tests obtaining an average value of 0.7836 or 78.3601% included in the category of effective.

Acknowledgements

The researcher expresses his deepest gratitude to those who have supported and assisted in the implementation of this research. Especially to schools that have been authorized to carry out this research, to teachers, and all students who have helped.

References

Dick, W., Carey, L., & O. Carey, J. (2015). *The Systematic Design Of Instruction.* Pearsons. https://rb.gy/9ayqn3

Hastuti, I. D., & Ghoni, A. (2020). Pengembangan Media Pembelajaran Berbasis Website Pada Materi Tata Surya. *Primary: Jurnal Pendidikan Guru Sekolah Dasar,* 11(1), 29-34. https://rb.gy/rfro77

Karpati, A. (2011). Digital literacy in education. Policy Brief, May, 1–12.

Kurnia, N. (2019). Family Digital Literacy: Theory and Practice of Parental Assistance to Children on the Internet. Gajah Mada University Press.

Kurniawan, FA (2017). The effect of web-based learning on student motivation and learning outcomes.

Scientiae Educatia: Journal of Science Education Journal, 6(1), 1–7. https://rb.gy/sssraj

Lindemann, D.M, Allender, M.C, Thompson, D., Adamovicz, L., & Dzhaman, E. (2018). Development and validation of a quantitative PCR assay for detection of Emydoidea herpesvirus 1 in free-ranging Blanding's turtles (Emydoidea blandingii). *Journal of Virological Methods,* 254, 40–45. https://doi.org/10.1016/j.jviromet.2018.01.006

Mehdipour, Y., & Zerehkafi, H. (2013). Mobile Learning of Education: Benefits and Challenges. *International Journal of Computational Engineering Research*, 3(6), 93–101. https://rb.gy/gzgnkl

Miranti, MG, Wibawa, SC, Lestari, N., Yantony, D., & Anjelita, RM (2021). Utilization Development of Glide "Daily Nutrition" Application Based on Android. International Joint Conference on Science and Engineering 2021, 209(Ijcse), 105–110. https://www.atlantis-press.com/proceedings/ijcse-21/125966546

Mohammad, A. (2021). Development of Final Project Evaluation Application Using Google Sheet and Glide Apps. International Journal of Modern Education, 3(8), 71–90. https://doi.org/10.35631/ijmoe.38007

Munir. (2017). *Digital Learning*. Alphabet.

Novita, L., Sukmanasa, E., & Yudistira Pratama, M. (2019). Penggunaan media pembelajaran video terhadap hasil belajar siswa SD. *Indonesian Journal of Primary Education*, 3(2), 64–72. https://doi.org/10.17509/ijpe.v3i2.22103

OECD. (2016). PISA 2015 Assessment and Analytical Framework. In Science, Reading, Mathematics and Financial Literacy.

Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *International Review of Research in Open and Distance Learning*, 12(2), 78–102. https://doi.org/10.19173/irrodl.v12i2.791

Priyanto, TP (2017). Macromedia Flash Discussion Methods for Improving Learning Outcomes Measuring Instruments Mechanics. Vocational Park, 5(1), 31. https://doi.org/10.30738/jtvok.v5i1.1427

Priyambodo, E., Wiyarsi, A., & Sari, RLP (2012). The Effect of Web-Based Interactive Learning Media on Student Learning Motivation. Journal of Education: Learning Innovation Research, 42(2), 99–109. https://journal.uny.ac.id/index.php/jk/article/view/2236

Rahmawati, AIN, Ariffudin, I., Latifah, L., & Soejanto, LT (2021). "Say no to coding": Designing of mobile-app-based learning media using Glide apps. *Journal of Physics: Conference Series*, 1869(1). https://doi.org/10.1088/1742-6596/1869/1/012079

Rante, P., Sudarto, & Ihsan, N. (2013). Pengembangan multimedia pembelajaran fisika berbasis audio-video eksperimen listrik dinamis di SMP. *Jurnal Pendidikan IPA Indonesia,* 2(2), 203–208. https://doi.org/10.15294/jpii.v2i2.2724

Restianty, A. (2018). Literasi Digital, Sebuah Tantangan Baru Dalam Literasi Media. *Gunahumas,* 1(1), 72–87. https://doi.org/10.17509/ghm.v1i1.28380

Rohdiani, F., & Rakhmawati, L. (2017). Development of Web-Based Learning in Basic Electronics Subjects at SMK Negeri 3 Jombang. *Journal of Electrical Engineering Education, 6*(1), 105–110. https://rb.gy/wvqyn5

Salam, A. D. (2015). Pengembangan media pembelajaran berbasis web interaktif (blog) untuk meningkatkan motivasi belajar pada mata pelajaran pemasaran online sub kompetensi dasar merancang website (studi pada siswa kelas X tata niaga SMK Negeri 2 Nganjuk). *Jurnal Pendidikan Tata Niaga (JPTN),* 3(2), 1–7. https://rb.gy/tmenw4

Sundayana, R. (2016). Media And Teaching Aids In Learning Mathematics: For Teachers, Prospective Teachers, Parents And Mathematics Lovers. Alphabet.

Yu, PK (2007). The international enclosure movement. *Indiana Law Journal,* 82(4), 827–907. https://www.repository.law.indiana.edu/ilj/vol82/iss4/1/

Yuliati, Y. (2017). Scientific Literacy in Science Learning. *Journal of Pendas Cakrawala,* 3(2), 21–28. https://doi.org/10.31949/jcp.v3i2.592

Zahroh, F., & Sholeh, M. (2022). Efektivitas Literasi Digital dalam Meningkatkan Pelaksanaan Pembelajaran Daring di Masa Pandemi Covid-19. *Inspirasi Manajemen Pendidikan*, 9(5), 1147-1158. https://ejournal.unesa.ac.id/index.php/inspirasi-manajemen-pendidikan/article/view/44154

Zulfa, LN, & Haryanto, H. (2021). Pengaruh Media Macromedia Flash Terhadap Literasi Sains dan Sikap Demokratis Mahasiswa. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education),* 9(1), 52-64. https://doi.org/10.24815/jpsi.v9i1.18266