Jurnal Inovasi Teknologi Pendidikan
Volume 11, No. 2, June 2024 (132-145)
Online: http://journal.uny.ac.id/index.php/jitp

Development of digital learning media based on the GlideApps website on geography subjects endogenous power material

Mohammad Thofiqo Fakhruddin *, Alfi Sahrina, Dwiyono Hari Utomo, Ifan Deffinika
Universitas Negeri Malang, Indonesia.
***** Corresponding Author. E-mail: mohammad.thofiqo.1907216@students.um.ac.id

ARTICLE INFO

Article History
Received:
21 June 2023;
Revised:
6 November 2023;
Accepted:
15 December 2023;
Available online:
30 June 2024.

Keywords
Digital learning media;
GlideApps website;
Endogenous energy

ABSTRACT

The research was driven by the limited implementation of technology and the lack of interesting geography learning media on endogenous material. Abstract and complex material requires media to visualize events resulting from endogenous forces. Based on these problems, the right form of technology utilization is the media website GlideApps supported with images and animations. The research aims to produce a website-based learning media and a proper application of endogenous materials. This type of research is Research and Development with a 4-D development model, namely: Define, Design, Development, and Decimate. This media validation test is based on assessing media expert validators and material experts. Evaluation of product validation results by media expert validators was 98.75% (valid), and material experts 80% (valid enough). In addition, implementation was carried out for subject teachers and students, and the results showed a positive response because the media presented material that was more interesting, easily accessible at any time, and made learning not boring supported by various features so that it increased the enthusiasm and activeness of students in participating in learning activities.

How to cite:
Fakhruddin, M. T., Sahrina, A., Utomo, D.H. & Deffinika, I. (2024). Development of digital learning media based on the GlideApps website on geography subjects endogenous power material. *Jurnal Inovasi Teknologi Pendidikan, 11*(2), 132-145. https://doi.org/10.21831/jitp.v11i2.60995

INTRODUCTION

21st-century learning is an implication of the development of society and increasingly modern information and communication technology. The electronic learning system (e-learning) can facilitate students in the implementation of learning the use of this will make it easier for students to obtain learning information through various online media and easily accessible using devices owned by students (Sulaiman, 2020). Based on the 2013 Curriculum, the learning process adopted by Indonesian Education as contained in the National Education System Law No.20 of 2003 article 1 is a student-centered learning process, where students are required to actively find solutions to problems encountered related to the learning process (Undang-Undang Republik Indonesia Nomor 20 Tahun 2003, 2003). For this reason, technology and learning innovation deliberately take a direct and creative role in helping to explore learning problems in the 21st century, one of which is in Geography learning.

Geography learning requires media innovation that can encourage and increase students' motivation in learning activities. The media serves to direct different information and involve

students in their minds psychology, and real activities so that learning occurs (Arsad & Rahman, 2017). It is still found that learning carried out by educators still relies on conventional learning models and the media used tends to be boring. This is in line with research (Mahmudah & Pustikaningsih, 2019), where 60% of teachers are still focused on using conventional learning approaches. Meanwhile, in the current digital era, educators need to utilize technological updates that can support learning activities, as well as make learning activities more interesting for students (Wulandari et al., 2019). One of the utilization of digital technology updates can be applied in GlideApps website-based learning media.

The GlideApps website is a website https://www.glideapps.com/ which can be used for independent application development that is integrated with Google Sheets (Rahmawati et al., 2020). GlideApps can be developed by anyone because making the application does not take much time and is free. GlideApps in its development makes it easy to create applications visually (without code) and utilize Google Sheets for data sources. The developer only needs to enter the material into the Google Spreadsheet then inputted into https://www.glideapps.com/ and the material will appear. The development of application-based learning media on the website is by the utilization of technological developments supported by various features in it, such as being able to add various types of text, images, video, audio, diagrams, locations, and other content.

Geography is one of the subjects that explore geosphere phenomena with complex aspects of region, space, and ecology. Geosphere phenomena include the atmosphere, lithosphere, hydrosphere, anthroposphere, and biosphere. Based on the analysis of the 2013 curriculum, lithospheric material is contained in Basic Competency 3.5 with the achievement of analyzing the relationship between humans and the environment as a result of lithospheric dynamics (Kurniawati et al., 2019). There are several sub-subjects in lithosphere material, one of which is endogenous energy. Endogenous energy is an event that occurs inside the earth that results in changes in the skin of the earth and its character that makes the earth's surface uneven (Sukandarrumidi et al., 2019).

The results of the needs analysis conducted on X IPS class students using a closed questionnaire totaling 30 students found that 80% chose digital learning media compared to using PowerPoint Point and according to students learning media is important to increase motivation in learning. The applied media becomes a supplement or intermediary for educators in learning and helps students to understand the material, to obtain good learning outcomes and interest in learning (Mardhiah & Akbar, 2018). The results of teacher observations still use PowerPoint media and there is still a lack of innovation in the use of technology in delivering material, especially endogenous energy material. The learning process that is adapted to technological developments, namely utilizing mobile learning, has practicality and makes it easier for students to understand learning (Rahmat et al., 2019). Mobile learning is one of the technology-based learning models, especially mobile devices and internet networks so that information is obtained quickly (Efriyanti & Annas, 2020). Therefore, there is a need for learning media that can make students understand the process of events and can improve critical thinking skills, such as the development of the GlideApps website learning media.

Similar research has been conducted by Viola et al., (2021) which states that the use of the GlideApps website media in learning activities can improve learning outcomes and a very good response is shown by students to the media. And there was an increase in learning outcomes from the results of paired t-test data, the average post-test score (74) was higher than the pretest (64). Similar research by Nisa et al., (2022) with interactive learning based on the GlideApps website states that the use of web-based interactive learning media can increase students' activeness in the learning process and learning activities become interactive and interesting. The previously developed GlideApps website-based learning media has not paid attention to aspects of practicality, the material is too much, and there is no innovation such as animation that can facilitate student understanding of the material. Deficiencies in the previously developed GlideApps website media can be improved by paying attention to the practicality of the material to be delivered and providing animations about the material being taught. It is hoped that the GlideApps website media developed by researchers can be recognized by many educators and can be used as a media reference for learning activities.

Based on these problems, it is necessary to develop the GlideApps website as a newer Geography learning media and adapt to events that occur in the surrounding environment. The use

of media is expected to create learning activities to are more interesting, dynamic, and interactive so that students have the motivation to learn. Based on the problems and needs, the research "Development of Digital Learning Media Based on GlideApps Website on Geography Subjects Endogenous Power Material" was conducted. The purpose of the research is to produce digital learning media products based on the GlideApps website equipped with animation and can be used in supporting learning activities. The contribution of this research is of course providing more interesting geography learning material through GlideApps.

METHOD

This research method is a research and development (R&D) method, with the 4-D development model, which consists of four stages, namely define, design, develop, and disseminate (Thiagarajan et al., 1974). The model selection was based on the suitability of the model with the developed media. The 4-D development model stage has the advantage of a systematic sequence of activities in solving learning problems related to a learning media (Arywiantari et al., 2015). The target/objective of this research is Xth-grade high school students. The research subjects consisted of the following: (1) subjects for needs analysis consisted of 30 grade X students and 1 Geography teacher, (2) validation test subjects by media experts and material experts, (3) test subjects and media implementation were carried out by 36 grade X students and 1 Geography teacher in Table 1.

Table 1. 4-D Development Stage

No.	Stage	Activity
1	Define	a. Front-end Analysis • Needs analysis of Students of SMA Negeri 10 Malang Class X IPS • Geography Teacher Interview SMA Negeri 10 Malang b. Learner Analysis • Analysis of Field Conditions (observation) of Geography Learning Activities at SMA Negeri 10 Malang c. Task Analysis • Analysis of Basic Competency and Core Competencies on the Dynamics of the Lithosphere, and its Impact on Life d. Concept analysis • Analysis of Endogenous Energy Material based on Reliable Sources and References e. Specifying Instructional Objectives • GlideApps Website Media Development Objectives based on Initial Analysis to Concept Analysis
2	Design	a. Preparation of Questions • Preparation of Practice Questions on Endogenous Energy b. Media selection • GlideApps Website Media Selection based on Needs Analysis c. Format Selection • GlideApps Website Media is in the form of a Link and can be Downloaded Into an Application Supported by Several Animations d. Initial Design • Designing Storyboards, Displays, and Media Material Content based on Needs Analysis • GlideApps Website Media Design
4	Develop	a. Expert Appraisal • Conduct Product Validation to Expert Validators, Namely Media Experts and Material Experts b. Development Testing • Testing and Implementation of GlideApps Website Media in Class X F SMAN 10 Malang which Amounted to 36 People and was Accompanied by a Geography Teacher

No.	Stage	Activity
		c. Response Questionnaire • Spread the Response Questionnaire to Teachers and Students Related to the GlideApps Website Media that has been Implemented
5	Disseminate	a. Packaging • Package GlideApps Website Media in the Form of Links which can be Easily Accessed b. Dissemination and Adoption • Dissemination of the GlideApps Website Media to Geography Teachers or Distribution via Social Media

(Maydiantoro, 2021)

The research was conducted at SMA Negeri 10 Malang in class X with as many as 36 students in one class and one Geography teacher selected using a purposive sampling technique based on certain considerations with the aim that the data obtained can represent the population representative (Lenaini, 2021). Data collection techniques are obtained by conducting validation using an assessment questionnaire instrument and responses. The assessment questionnaire was used to validate the GlideApps website media by media expert validators and material expert validators. Response questionnaire to obtain response data from teachers and students.

The research data analysis used qualitative descriptive and quantitative descriptive analysis techniques. Qualitative descriptive data is obtained based on data on suggestions and criticisms given by expert validators with the results of media development, as well as questionnaires of teacher and student responses to the GlideApps website media. Quantitative descriptive data is obtained from the assessment of the GlideApps website learning media by validators. The instrument used in collecting data in this study was a questionnaire. The assessment in the questionnaire uses a Likert scale (1-4 scale), including 4 (very good), 3 (good), 2 (not good), and 1 (very bad) (Sugiyono, 2022).

The assessment results obtained from the validators were then calculated and analyzed to determine the validity level of the media, using calculations according to Formula 1 (Akbar & Holid, 2013).

$$Vp = \frac{TSe}{TSh} \times 100\% \quad (1)$$

Description:
Vp: validity of the expert validator
TSe: total empirical score (expert assessment results)
TSh: total maximum score

The data obtained from the media and material expert validators were then analyzed using descriptive statistical analysis techniques to determine validity by giving a score for each item with the answers Very Good (4), Good (3), Less Good (2), and Very Less Good (1), adding up the total score of each validator, and finding the average score.

The data obtained were then interpreted and concluded based on the validity criteria. The results of the criteria listed indicate the level of validity of the learning media that has been developed. The validity level criteria are in the following Table 2.

Table 2. Criteria for Interpretation of the Validity Test Score

No.	Validity Percentage	Criteria for Validity	Description
1	85.01 – 100.00	Valid	Valid or can be Used without Revision
2	70.01 – 85.00	Fairly Valid	Moderately Valid or Usable with Minor Revisions
3	50.01 – 70.00	Less Valid	Less Valid, Recommended not to be Used Because it Needs Major Revisions
4	01.00 – 50.00	Not Valid	Not Valid or Should not be Used

(Akbar & Holid, 2013)

RESULTS AND DISCUSSION

Results

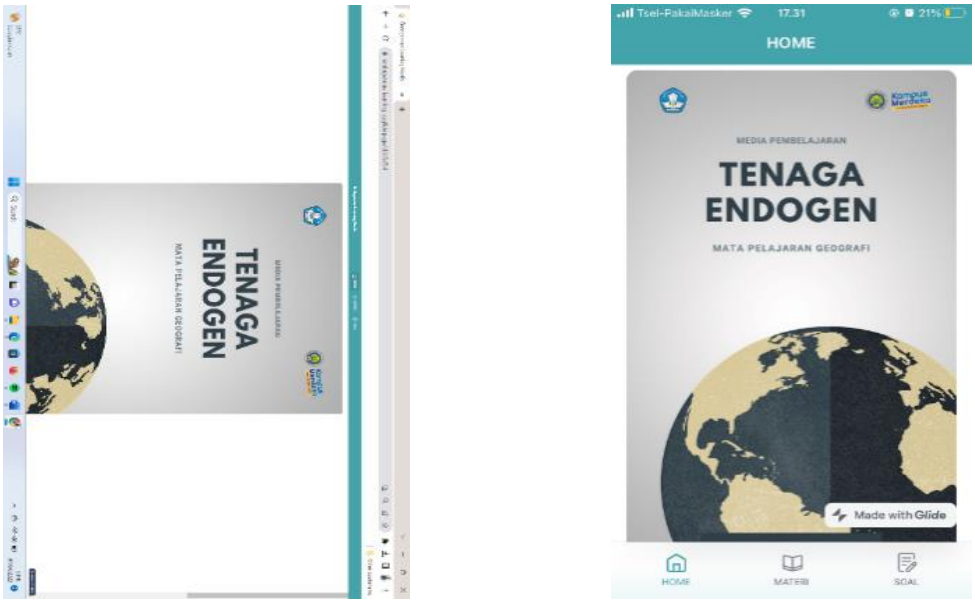
Learning Media Products

The research "Development of Digital Learning Media Based on the GlideApps Website on Geography Subjects Endogenous Power Material" which has been carried out using the 4-D development model produces the final development product in the form of an application. The final result of the development product contains endogenous energy material on basic competency 3.5 with three sub-materials accompanied by animated events and also practice questions. The results of the validation test with recommendations given by expert validators have minor revisions as in Table 3.

Table 3. Media Differences Before and After Revision

No.	Media Revision		Description
1			Added the Definition of Endogenous Energy: Endogenous Energy is the Dynamics within the Lithosphere as a Result of Physical and Chemical Processes, in the Form of Pressure on the Rock Layers Forming the Lithosphere or Magma Activity. Endogenous Energy is Divided Into Three Types: Tectonism, Volcanism, and Seism Or Earthquake. The Three Types of Endogenous Energy are Complemented by Illustrations of The Process of Occurrence of These Events.
	Figure 1. Before Revision	Figure 2. Aftet Revision	
2			Adding Animation Hints: Watch the Following Animation!
	Figure 3. Before Revision	Figure 4. After Revision	

The product is packaged in the form of a web link and can be downloaded easily to provide easy access to media, interesting media, easy-to-understand material, and clear content presented (Aisyah et al., 2022). The media can be accessed in the form of a website or downloaded into an application on a smartphone. The initial appearance of the GlideApps website media contains three main menus, namely the home menu, material menu, and question menu in Figure 2.



A B

Figure 2. Initial Display of Learning Media on Website (A) and Smartphone (B)

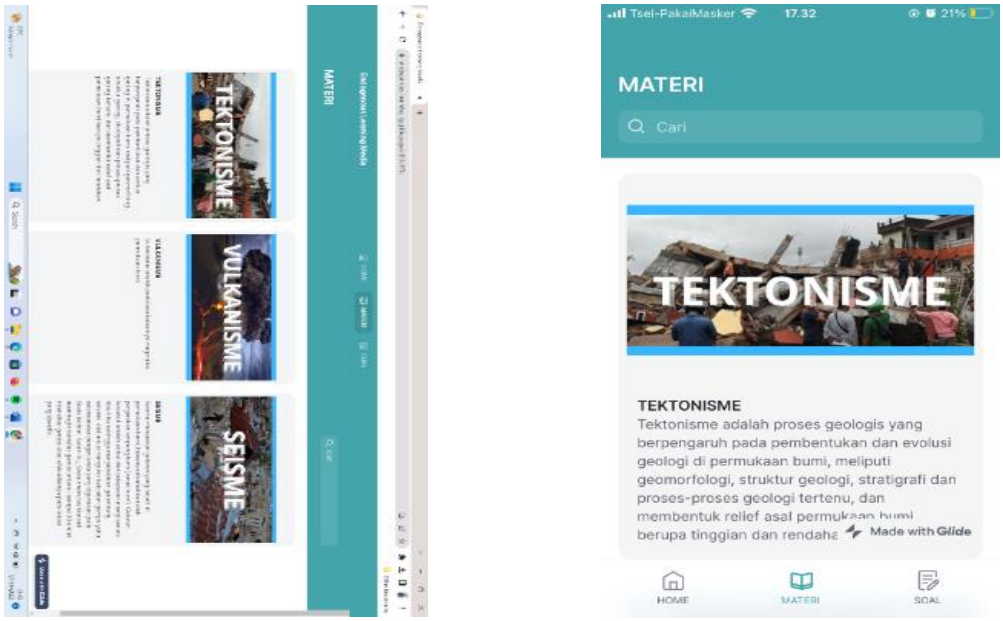
The menu page contains the cover, introduction to the material, about the application, and application instructions. The cover contains the material icon, the material contained in the media, and the name of the media maker/writer. The introduction to the material contains an explanation of the endogenous energy material that will be discussed in full in the media. The application contains the use of GlideApps website learning media in the Geography learning process at school. And equipped with instructions for using the GlideApps website media to operate it as found in Figure 3.

A B

Figure 3. Media Home Page on Website (A) and Smartphone (B)

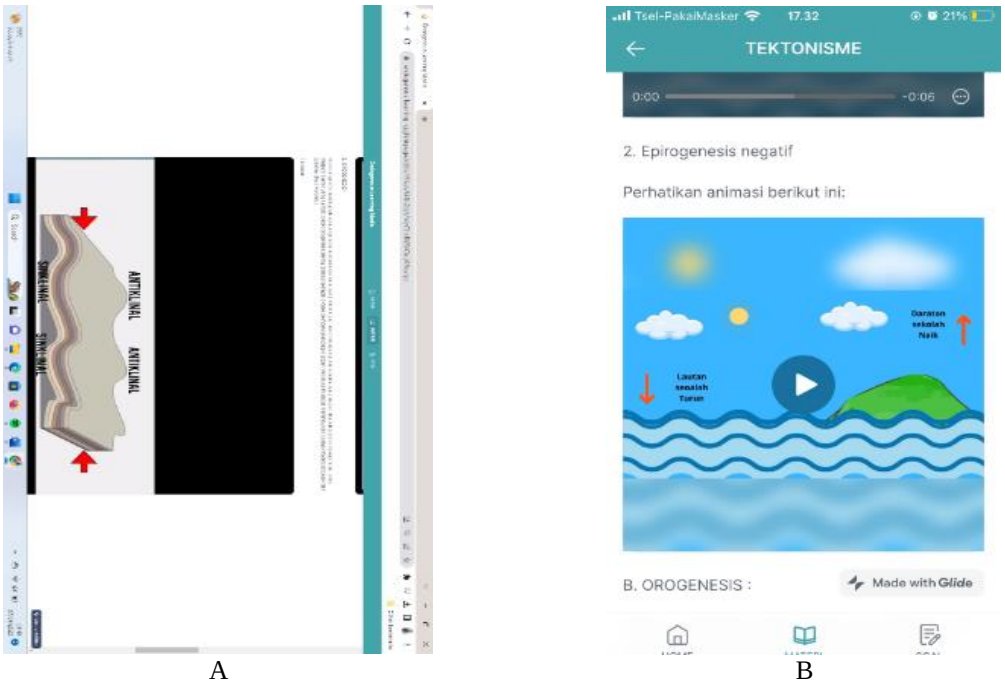
The material page contains material content from the basic competency 3.5 subchapter, namely endogenous energy material. Endogenous energy is a force that comes from within the earth and results in changes in the skin or surface of the earth (Amin, 2014). The material contained in the media is tectonism, volcanism, and seism or earthquake in Figure 4. The explanation of the material is adjusted to the sources and references from Geography books, as well as articles that have been trusted for their validity. In addition, each material is also accompanied by images and animations

about the process of events in Figure 5, where the use of images and animations has a good effect in increasing interest producing satisfactory grades, and achieving learning objectives (Sunami & Aslam, 2021).



A B

Figure 4. Media Material Page on Website (A) and Smartphone (B)

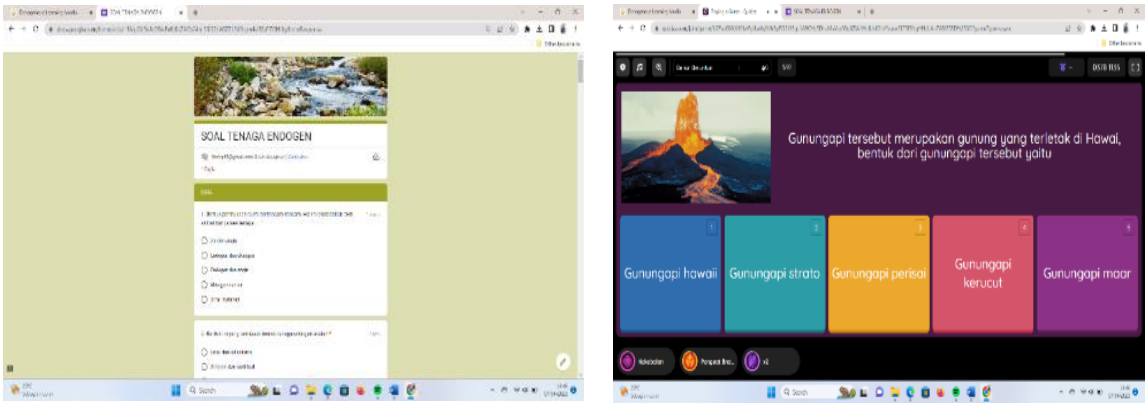


A B

Figure 5. Animation on Material in Website (A) and Smartphone (B)

The question page contains practice questions and quizzes on endogenous energy material Figure 6. Exercise questions consist of 25 questions that are adjusted to the achievement of basic competency 3.5 Exercise questions using the help of Google Forms Figure 7, as an alternative to making evaluations that have ease, speed, practicality, and efficiency (Mardiana & Purnanto, 2017). The quiz consists of 20 questions with the use of the Quizizz platform Figure 7, to increase the enthusiasm of students which includes response, attention, concentration, willingness, and awareness to increase knowledge about the material (Asria et al., 2021).

Figure 6. Problem Page



A B

Figure 7. Practice Questions and Quizzes Google Forms (A) and Quizizz (B)

GlideApps website-based digital learning media is suitable for use in Geography learning activities after validation by validators, as well as media revisions. Supported by an attractive design that is adjusted to the material in it. The material contained in the media is brief and clear by the curriculum and valid references. The media is also supported by elements of images and animations of events based on the material, namely tectonism, volcanism, and seism. In addition, there are tools for evaluation, namely practice questions using Google Forms and quizzes using Quizizz.

Media Product Validation

GlideApps website-based digital learning media on Endogenous Energy material that has been developed has gone through the validation stage. Product validation is carried out by two expert validators including media experts and material experts to get suggestions and recommendations from expert validators and find out whether the media that has been developed needs improvement or not. Not only in Indonesia, the use of GlideApps has also been carried out by Nor (2021) who developed a student final project assessment application in Malaysia using GlideApps to be flexible and efficient.

Validation by media experts contains three aspects, namely software engineering aspects, visual communication aspects, and usefulness aspects. Based on the validation assessment by media experts, a percentage of 98.75% is obtained in the valid category or can be used without revision in Table 4. The suggestions and recommendations given by media expert validators to make the media more practical are shown in Table 5.

Table 4. Results of Media Validator Assessment

No.	Suggestions and Recommendations	Assessment Item	Score
1	Software Engineering Aspects	9 Item	36
2	Visual Communication Aspect	8 Item	32
3	Usability Aspect	3 Item	11
Total		**20 Item**	**79**
Percentage			**98.75%**
Category		Valid or can be Used without Revision	

Table 5. Media Expert Suggestions and Recommendations

No.	Suggestions and Recommendations
1	Addition of Learning Instructions
2	Adjust the Display to Make it More Informative

The material expert validation contains four aspects, namely material aspects, question aspects, language aspects, and implementation aspects. The results of the material expert validators obtained a percentage of 80% in the category of valid enough or can be used with minor revisions in Table 6. The suggestions and recommendations given by the material expert validators are in Table 7.

Table 6. Results of Material Validator Expert Assessment

No.	Suggestions and Recommendations	Assessment Item	Score
1	Material aspect	9 Item	31
2	Problem aspect	6 Item	18
3	Language aspect	2 Item	6
4	Implement ability aspect	3 Item	9
Total		**20 Item**	**64**
Percentage			**80%**
Category		Fairly Valid or can be Used with Minor Revisions	

Table 7. Suggestions and Recommendations of Material Experts

No.	Suggestions and Recommendations
1	Addition of Understanding of Endogenous Energy
2	Shorten and Clarify the Content to Make it More Interesting
3	Correct Some Sentences in the Material that are Less Effective and Wrong Writing

Validators of digital learning media products based on the GlideApps website have been carried out by two expert validators. Results from media experts obtained a percentage of 98.75% (valid) and from material experts 80% (quite valid), along with suggestions and recommendations for improvement. Similar research was also conducted (Aprilia et al., 2023), GlideApps web-based media scored 94% and was classified as very good and effective in improving science literacy. Based on the results of media product validation GlideApps website-based learning media is feasible and valid to be applied in Geography learning activities on endogenous energy material.

Media Testing and Implementation

The learning media was tested and the implementation that had been validated and revised was carried out to Geography teachers and students of class X F SMA Negeri 10 Malang. The trial of students in one class amounted to 36 students. The trial and implementation procedures were carried out in Geography learning activities by utilizing digital learning media based on the GlideApps website and then providing feedback on the products developed. Assessment of media products is

done by filling out a research questionnaire in the form of a response questionnaire by both educators and students. The results of educators' responses, suggestions, and comments are in Table 8.

Table 8. Results of Teacher Respondent Assessment

No.	Item Assessment	Score
1	GlideApps Website Media has an Attractive Appearance	3
2	The Material Presented in the GlideApps Website Media is by the Curriculum and Basic Competencies and Core Competencies Geography Subjects	4
3	The Suitability of the Material Presented with the Learning Objectives to be Achieved	4
4	GlideaApps Website Media can be Accessed Independently by the Teacher	4
5	GlideApps Website Media Makes it Easier for Teachers in the Learning Process	4
6	The Ability of GlideApps Website Media to Increase Student Learning Motivation	3
7	GlideApps Website Media is Effective in Facilitating Student Understanding of the Material	3
8	GlideApps Website Media Helps Deliver Material to More Interesting	4
9	The Satisfaction Felt After Using the GlideApps Website Media	3
10	GlideApps Website Media is Fun to Use in Learning Activities	3
Total Score		**35**
Percentage		**87.50%**
Suggestion: Some Concepts are not Correct so there is A Need for Improvement The Test Questions Still do not Stimulate Students to HOTS Comments: The Animation Displayed is Interesting so it is Quite Helpful in Student Understanding		

The results of the Geography teacher response assessment showed a product assessment percentage of 87.50%. Educators gave a positive response to the GlideApps website media because learning media that is tailored to the current situation is more acceptable to foster a sense of desire for students to learn it (Syafiudin et al., 2016). Media can meet the needs and characteristics of students as an intermediary for messages from concrete to abstract. The thinking ability of students who are still at the concrete operational stage according to Piaget states that students build knowledge concepts through concrete objects (Ali & Asrori, 2014).

The results of the trial and implementation of the GlideApps website learning media to students of class X F SMA Negeri 10 Malang to find out responses and responses using a questionnaire. The results of students' responses after the implementation of learning media on endogenous energy material as in Table 9.

Table 9. Student Respondent Assessment Results

No.	Assessment Item	Score	Percentage Value
1	The GlideApps Website Media has an Attractive Appearance	121	84.03%
2	The Material Presented in the GlideApps Website Media is Clear	117	81.25%
3	The GlideApps Website Media can be Accessed Easily	116	80.56%
4	The GlideApps Website Media Makes it Easy to Understand the Material	116	80.56%
5	The ability of the GlideApps Website Media to Increase Learning Motivation	112	77.78%
6	The Display of Images or Animations in the GlideApps Website Media is Clear	111	77.08%
7	The GlideApps Website Media Helps Deliver Material to More Interesting	118	81.94%
8	The Satisfaction Felt After Using the GlideApps Website Media	109	75.69%
9	The GlideApps Website Media is Fun to Use in Learning Activities	115	79.86%
10	The Media can be Used Repeatedly	122	84.72%
Total Score and Percentage		**1157**	**80.35 %**

The results of student respondents obtained an average percentage of 80.35% and gave a positive response to the GlideApps website learning media. Based on Table 9 the response points

with the highest percentage of 84.03% are found in assessment item 1. The GlideApps website media has an attractive display design supported by the use of images and animations so that the media looks attractive to students. In addition, the low average percentage value is on assessment item 6 of 77.08%.

Discussion

This is related to the term user friendly, which means that the product or media can facilitate the user so that the user feels comfortable in using the media (Aziz et al., 2013). In this statement, the media still has shortcomings because students have difficulty displaying some animations because they need an adequate device. The utilization of the GlideApps website is felt to make students more efficient, because the media can be used to study either at home, during holidays, or approaching exams, as well as material and image and animation support. Animation aims to visualize the subjects taught so that the material is easier to understand (Höffler & Leutner, 2007). The utilization of animation in learning media provides benefits, namely learning becomes more interesting, motivates students, and presents and provides a clear explanation of the material.

The utilization of technology-based media is expected to be able to produce intensive communication between students and educators. The internet is evidence of the development of technology that is widely used today and can support when teaching and learning activities (Cholid et al., 2016). Website-based learning media can break the static atmosphere create an effective, interesting, and interactive learning process, and be able to motivate students to learn. In addition, with digital website media, students will train their digital skills, such as digital literacy which is a skill in using digital-based devices, analyzing and processing information to obtain information, and increasing critical thinking in solving problems (Kurniawan et al., 2023).

The GlideApps website has advantages that make the learning media display resemble an Android display. The media contains endogenous energy material supported by animations, images, and quizzes that can produce innovative and interactive learning media. GlideApps presents media with interesting and diverse functions, thus increasing student motivation to understand the content of the material (Minan & Ekohariadi, 2022). Even so, there are still complaints from users such as the level of security, there are images or animations that do not appear, and so on where researchers try their best to fix the problem completely. Apart from the existing problems, users are very enthusiastic and interested in using GlideApps startup in learning activities, especially endogenous energy material.

CONCLUSION

Based on the results of the study, it is concluded that the digital learning media product based on the GlideApps website on endogenous energy material is included in the category worthy of use in Geography teaching and learning activities. The results of the media expert validator are 98.75%, the category is valid and can be used without revision. The results of the material expert validator are 80%, the category is quite valid and can be used with minor revisions. In addition, according to the results of the response assessment from teachers, 87.50% and students 80.35%, showed a positive response to the learning media. From the development of this media, it is hoped that future researchers will display images or animations so that the size is not too large so that they can be displayed and pay attention to media security. Educators are also expected to be able to develop and utilize web-based media well so that it can be utilized for learning activities and improve student learning outcomes.

REFERENCES

Aisyah, B. N., Sutiadiningsih, A., Astuti, N., & Bahar, A. (2022). Pengembangan e-modul berbasis Glideapps pada materi pemilihan dan pemotongan daging bagi siswa kelas X SMK. *Jurnal Tata Boga*, *11*(2), 155–163. https://ejournal.unesa.ac.id/index.php/jurnal-tata-boga/article/view/49253

Akbar, S., & Holid, A. (2013). *Instrumen perangkat pembelajaran*. Remaja Rosdakarya.

Ali, M., & Asrori, M. (2014). *Psikologi remaja: Perkembangan peserta didik*. Bumi Aksara.

Amin, M. (2014). *Geologi dasar kelas X semester 1*. Repositori Kemdikbudi. https://repositori.kemdikbud.go.id/9769/

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. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, *9*(3), 1112–1117. https://doi.org/10.29303/jppipa.v9i3.2618

Arsad, A., & Rahman, A. (2017). *Media pembelajaran*. Rajawali Pers.

Arywiantari, D., Agung, A. A. G., & Tastra, I. D. K. (2015). Pengembangan multimedia interaktif model 4D pada pembelajaran IPA dI SMP Negeri 3 Singaraja. *Jurnal Edutech Undiksha*, *3*(1), 1–12. https://doi.org/10.23887/jeu.v3i1.5611

Asria, L., Sari, D. R., Ngaini, S. A., Muyasaroh, U., & Rahmawati, F. (2021). Analisis antusiasme siswa dalam evaluasi belajar menggunakan platform Quizizz. *Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika*, *3*(1), 1–17. https://doi.org/10.35316/alifmatika.2021.v3i1.1-17

Aziz, A. L., Musadieq, M. Al, & Susilo, H. (2013). Pengaruh kemudahan penggunaan terhadap kemanfaatan pada sikap pengguna e-learning. *JAB: Jurnal Administrasi Bisnis*, *6*(2), 1–7. https://media.neliti.com/media/publications/78252-ID-pengaruh-kemudahan-penggunaan-terhadap-k.pdf

Cholid, A. A., Elmunsyah, H., & Patmanthara, S. (2016). Pengembangan model web based learning pada mata pelajaran jaringan dasar paket keahlian TKJ pada SMKN Se-Kota Malang. *Jurnal Pendidikan: Teori, Penelitian dan Pengembangan*, *1*(5), 961–970. https://doi.org/10.17977/jp.v1i5.6333

Efriyanti, L., & Annas, F. (2020). Aplikasi Mobile learning sebagai sarana pembelajaran abad 21 pada era revolusi industri 4.0. *JURNAL EDUCATIVE: Journal of Educational Studies*, *5*(1), 28–40. https://doi.org/10.30983/educative.v5i1.3132

Höffler, T. N., & Leutner, D. (2007). Instructional animation versus static pictures: A meta-analysis. *Learning and Instruction*, *17*(6), 722–738. https://doi.org/10.1016/j.learninstruc.2007.09.013

Undang-undang Republik Indonesia nomor 20 tahun 2003, 1 (2003). https://jdih.kemdikbud.go.id/sjdih/siperpu/dokumen/salinan/UU_tahun2003_nomor020.pdf

Kurniawan, D. A., Darmaji, Astalini, & Husna, S. M. (2023). A study of critical thinking skills, science process skills and digital literacy: Reviewed based on the gender. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, *9*(4), 1741–1752. https://doi.org/10.29303/jppipa.v9i4.1644

Kurniawati, D., Sari, Y. I., & Efendi, A. (2019). Pengembangan LKS berbasis learning cycle 5E pada materi litosfer. *Jurnal Swarnabhumi : Jurnal Geografi Dan Pembelajaran Geografi*, *4*(2), 70–79. https://doi.org/10.31851/swarnabhumi.v4i2.3135

Lenaini, I. (2021). Teknik pengambilan sampel purposive dan snowball sampling. *HISTORIS : Jurnal Kajian, Penelitian & Pengembangan Pendidikan Sejarah*, *6*(1), 33–39. https://doi.org/10.31764/historis.vXiY.4075

Mahmudah, A., & Pustikaningsih, A. (2019). Pengembangan media pembelajaran interaktif berbasis Lectora Inspire pada materi jurnal penyesuaian untuk siswa Kelas X Akuntansi dan Keuangan Lembaga SMK Negeri 1 Tempel Tahun Ajaran 2018/2019. *Jurnal Pendidikan Akuntansi Indonesia*, *17*(1), 97–111. https://doi.org/10.21831/jpai.v17i1.26515

Mardhiah, A., & Akbar, S. A. (2018). Efektivitas media pembelajaran terhadap hasil belajar kimia siswa SMA Negeri 16 Banda Aceh. *Lantanida Journal*, *6*(1), 49–58. https://doi.org/10.22373/lj.v6i1.3173

Mardiana, T., & Purnanto, A. W. (2017). Google Form sebagai alternatif pembuatan latihan soal evaluasi. *The 6th University Research Colloquium 2017: Seri Pengabdian Kepada Masyarakat*, 183–188. https://web.archive.org/web/20180413114310/http://journal.ummgl.ac.id/index.php/urecol/article/download/1582/701/.

Maydiantoro, A. (2021). Research model development: Brief literature review. *Jurnal Pengembangan Profesi Pendidik Indonesia*, *1*(2), 29–35. https://jurnal.fkip.unila.ac.id/index.php/JPPPI/article/view/22164

Minan, D. A., & Ekohariadi, E. (2022). Pengembangan media pembelajaran e-modul berbasis Mobile Glideapps pada mata pelajaran kejuruan Kelas X DKV SMK Negeri 1 Cerme Gresik. *IT-Edu : Jurnal Information Technology and Education*, *7*(1), 36–45. https://ejournal.unesa.ac.id/index.php/it-edu/article/view/49048

Nisa, E. M., Bahar, A., Purwidiani, N., & Romadhoni, I. F. (2022). Pengembangan media pembelajaran interaktif berbasis web pada kompetensi dasar personal hygiene di SMK Negeri 2 Ponorogo. *Jurnal Tata Boga*, *11*(2), 89–97. https://ejournal.unesa.ac.id/index.php/jurnal-tata-boga/article/view/47926

Nor, A. M. M. (2021). Pembangunan aplikasi penilaian projek akhir menggunakan “Google Sheet” dan 'Glide Apps". *IJMOE: Journal of Modern Education*, *3*(8), 71–90. https://doi.org/10.35631/IJMOE.38007

Rahmat, R. F., Mursyida, L., Rizal, F., Krismadinata, & Yunus, Y. (2019). Pengembangan media pembelajaran berbasis Mobile learning pada mata pelajaran simulasi digital. *Jurnal Inovasi Teknologi Pendidikan*, *6*(2), 116–126. https://doi.org/10.21831/jitp.v6i2.27414

Rahmawati, A. I. N., Ariffudin, I., Latifah, L., & Soejanto, L. T. (2020). “Say no to coding”: Designing of Mobile-app-based learning media using Glide apps. *2nd Annual Conference of Science and Technology (ANCOSET 2020)*, 1–5. https://doi.org/10.1088/1742-6596/1869/1/012079

Sugiyono. (2022). *Metode penelitian kuantitatif*. Penerbit Alfabeta.

Sukandarrumidi, Purnawati, D. I., Miftahussalam, Rakhman, A. N., & Maulana, F. W. (2019). *Geologi umum bagian kedua*. UGM Press.

Sulaiman, J. M. (2020). Pengaruh media belajar Smartphone terhadap belajar siswa di era pandemi covid-19. *Indonesian Educational Administration and Leadership Journal*, *2*(2), 94–106. https://doi.org/10.22437/ideal.v2i2.10465

Sunami, M. A., & Aslam. (2021). Pengaruh penggunaan media pembelajaran video animasi berbasis Zoom meeting terhadap minat dan hasil belajar IPA siswa sekolah dasar. *Jurnal Basicedu*, *5*(4), 1940–1945. https://doi.org/10.31004/basicedu.v5i4.1129

Syafiudin, M., Sumarmi, & Astina, I. K. (2016). Pengembangan modul geografi pariwisata dengan project based learning untuk materi ekowisata pesisir dan laut di Program Studi S1 Pendidikan Geografi Universitas Negeri Malang. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *1*(3), 347—353. https://doi.org/10.17977/jp.v1i3.6160

Thiagarajan, S., Semmel, D. S., & Sommel, M. I. (1974). *Instructional development for training teachers of exceptional children: A sourcebook*. Council for Exceptional Children. https://files.eric.ed.gov/fulltext/ED090725.pdf

Viola, N. E., Sulandjari, S., Kristiastuti, D., & Suhartiningsih. (2021). Pengembangan media pembelajaran e-modul berbasis Glideapps pada kompetensi dasar metode dasar pengolahan

makanan Kelas X Tata Boga 2 SMKN 3 Kediri. *Jurnal Tata Boga*, *10*(3), 474–482. https://ejournal.unesa.ac.id/index.php/jurnal-tata-boga/article/view/43393

Wulandari, V., Abidin, Z., & Praherdhiono, H. (2019). Pengembangan media pembelajaran e-book infografis sebagai penguatan kognitif siswa X MIA. *JKTP: Jurnal Kajian Teknologi Pendidikan*, *2*(1), 37–44. https://doi.org/10.17977/um038v2i12019p037