Learning Media for Sound Picture Cards Based on E-Flashcard Quizlet Content for Elementary School IPAS Lessons

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A B S T R A K

Beberapa sekolah mampu memanfaatkan teknologi secara maksimal. Kurangnya penyesuaian media pembelajaran dengan perkembangan teknologi berdampak pada siswa yang tidak mendapat manfaat dari teknologi secara maksimal. Tujuan penelitian ini yaitu mengembangkan media pembelajaran Elektronik Flashcard berbasis Quizlet pembelajaran IPAS kelas V SD Penelitian dan pengembangan dilakukan memakai model pengembangan ADDIE. Metode pengumpulan data melalui wawancara, kuesioner, dan tes. Instrument pengumpulan data berupa lembar kuesioner dan soal tes. Subjek penelitian ini yaitu 1 ahli materi Pelajaran, dan 1 ahli media pembelajaran. Implementasi atau uji coba produk dilaksanakan dalam dua tahap yakni menguji coba skala kecilnya dari jumlah 6 siswa serta diuji coba skala besarnya yakni 27 siswa. Teknik yang digunakan untuk menganalisis data yaitu analisis deskritif kualitatif, kuantitatif, dan statistik inferensial. Hasil penelitian yaitu media yang dikembangkan mendapatkan kualifikasi sangat layak dari ahli materi dan ahli emdia pembelajaran. Hasil uji-t menunjukan terdapat peningkatan yang signifikan dari hasi pre-test dan post-test. Hasil uji N-Gain menunjukkan peningkatan pada kategori tinggi. Disimpulkan bahwa media pembelajaran E-Flashcard berbasis Quizlet efektif meningkatkan hasil belajar siswa. Implikasi penelitian ini yaitu media Kartu Gambar Bersuara Berbasis E-Flashcard Quizlet yang telah dikembangkan dapat dijadikan salah satu solusi untuk membantu siswa belajar pada mata pelajaran IPAS dan juga memudahkan guru dalam kegiatan belajar mengajar

A B S T R A C T

Some schools can make maximum use of technology. The lack of adapting learning media to technological developments impacts students who do not benefit from technology to the maximum. This research aims to develop Quizlet-based Flashcard electronic learning media for science and science learning for class V elementary school. Research and development were carried out using the ADDIE development model. Data collection methods through interviews, questionnaires and tests. Data collection instruments are in the form of questionnaires and test questions. The subjects of this research were 1 subject matter expert and 1 learning media expert. The product implementation or trial was carried out in two stages, namely a small-scale trial of 6 students and a large-scale trial of 27 students. The techniques used to analyze data are qualitative descriptive analysis, quantitative and inferential statistics. The results of the research are that the media developed received very decent qualifications from material experts and learning media experts. The t-test results show a significant increase in the pre-test and post-test results. The N-Gain test results show an increase in the high category. It was concluded that Quizlet-based E-Flashcard learning media effectively improved student learning outcomes. The implication of this research is that the E-Flashcard Quizlet-based Sound Picture Card media that has been developed can be used as a solution to help students learn science subjects and also make it easier for teachers in teaching and learning activities.

1. INTRODUCTION

The curriculum is a set of educational programs that have been structured and carried out so that educational goals are achieved, containing components that support each other and are related. One way for education in Indonesia to always improve in quality is curriculum development (Baharun, 2018; Santoso et al., 2017; Wachidi et al., 2020). Curriculum development can be adjusted to the educational unit, regional capabilities, and studies must be evaluated regarding the effectiveness of the implemented curriculum (Aisyah et al., 2022; Manalu et al., 2022; Solong et al., 2020; Syam, 2019). Curriculum updates that are developed can be called effective if the results are in accordance with needs and demands, effectiveness, practicality, continuity, flexibility, relevance (Firdaus et al., 2022; Indarta et al., 2022). This means that the curriculum being developed should have a strong basis and have principles to help achieve educational goals. The *Merdeka* Curriculum, which was previously known as the prototype curriculum, has developed into a teaching framework that is better flexible, while still focusing on important material and developing students' personalities and skills (Aisyah et al., 2022; Chaniago et al., 2022; Indarta et al., 2022; Priantini et al., 2022; Sopiansyah et al., 2022).

One of the lessons learned in the *merdeka* curriculum is science (Muhardini et al., 2023; Surya et al., 2023). The Natural and Social Science Project is an integration of existing natural science and social science so that problems regarding natural social and natural events can be solved. Science learning covers seven aspects, namely: welfare and economic behavior; social dynamics, social intuition, socialization, communication, and interaction; connectivity and spatiality between time and space; space and earth; energy and changes in energy; substances and changes in substances; environment and living creatures (Saadah et al., 2022; Wanti & Chastanti, 2023). Natural and social sciences are made into projects called project based learning. Project based learning is a learning approach that is based on real task activities and learning that provides restrictions for students related to their daily lives so that they can be overcome in groups (Farida & Rasyid, 2019; Pawar et al., 2020; Susanto et al., 2020). In the Natural and Social Sciences there are achievements consisting of three elements, namely evidence and data translated scientifically, scientific investigations designed and evaluated, and phenomena explained scientifically (Muhardini et al., 2023; Surya et al., 2023).

However, the current problem that occurs is the low science and social learning outcomes for students. Previous research findings also state that there are still many students who do not understand science concepts well (Aprilia, 2021; Septi et al., 2022; Y. Wulandari et al., 2020). The TIMSS study aims to measure the science understanding and abilities of elementary school students from grade IV. TIMSS also has another aim, namely to see how the implementation of the curriculum by schools is in accordance with the curriculum that has been launched by each participating country (Faddar & Kjeldsen, 2022; Glassow et al., 2023). The TIMSS survey is carried out every 4 years starting in 1995 and is held by The International for Evaluation of Education Achievement (IEA) (Faddar & Kjeldsen, 2022; Glassow et al., 2023; Oberleiter et al., 2023). TIMSS develops an assessment framework based on two dimensions, consisting of cognitive and content dimensions (Kirsten et al., 2023; Ünal et al., 2011). The content dimensions are arranged to determine the learning material that will be given a grade, the target percentage for assessing the science content dimensions, especially in the fourth grade of elementary school, consists of three content domains consisting of 45% life science, 35% physical science, and 20% earth science. These two dimensions are prepared by taking into account the curriculum applicable in the participating countries (Hooper et al., 2022; Reynolds et al., 2022). The results of the TIMSS survey from 1995 to 2015 show that Indonesia is still at a below average level. The latest results in 2015 show that Indonesia's level of 57 participating countries is 45 with a score of 397 and an international average score of 500. The average score for Indonesian students is 398.8 and 490.8 for the international average score. The results of the survey carried out show that the curriculum that has been implemented by the government needs to be reviewed.

Science learning in the 2013 curriculum is taught differently from social studies, so the *Merdeka* Curriculum provides a new policy to unite the two as science. This is a challenge for students and teachers (Aisyah et al., 2022; Indarta et al., 2022; Jannati et al., 2023). The results of data from interviews and initial observations conducted by researchers with class teachers, class V students at SD Negeri 2 Daren and their learning results found several problems. Some of the problems that exist are the low interest of students in learning Natural and Social Sciences material if the teacher only uses the lecture method. This method makes students feel that they are not directly involved in the learning process. As a result, students feel bored, sleepy, enjoy playing alone, and even chatting with friends. The use of the lecture method in learning is influenced by several factors such as the teacher's lack of skills and understanding regarding how to use the learning media that the school has provided. Then teachers also feel that using learning media requires time-consuming preparation so teachers prefer not to use learning media. The existing problems certainly affect the learning outcomes of students in science and technology subjects which can be proven from the scores that do not fully meet the Minimum Completeness Criteria (KKM), namely 75. There are still 11 students from class V of SD Negeri 2 whose scores do not reach the KKM.

Efforts to overcome this problem include the need to develop learning media that can be used efficiently. Previous research findings also reveal that the use of learning media is very effective because it has an influence on increasing student learning outcomes (Arimbawa et al., 2017; Aryantini et al., 2021; Devi & Bayu, 2020; Sutama et al., 2017). Teachers can use rapid technological developments to develop digital media (Aristiani & Agung, 2022; Hadi et al., 2022; Wijaya et al., 2020). One of the uses of technology and the internet as a learning medium is the use of Electronic Flashcards or can be abbreviated as Quizlet-based E-Flashcards. E-flashcard media is a visual tool that functions to form a child's imagination when looking at something in the form of numbers, words, pictures, etc (Jampel & Sudatha, 2018; Kusumawati et al., 2017; Noge, 2019). One platform that provides electronic flashcard features is Quizlet. This application is often used in language lessons, but its functions can be used for other subjects. This technology allows students to create digital learning cards (flashcards) that contain information or concepts in the lesson material.

Previous research findings stated that the use of appropriate learning media can help students learn so that it has an impact on increasing student understanding (Evianti & Atika, 2021; Fitriyana et al., 2020; Kusumawati et al., 2017; Ramadani et al., 2021; F. Wulandari et al., 2021). Other research also states that using flashcards can make it easier for students to learn (RW Chen & Chan, 2019; Noge et al., 2022; Sage et al., 2020; Ying et al., 2021). Based on several previous studies which show the effectiveness of using Quizlet-based

electronic flashcards, they can be used as a solution to help students learn science and science subjects at SD Negeri 2 Daren. The advantage of the media developed is that Quizlet-based e-flashcards can be used to help students understand and remember complex scientific concepts. This electronic media can make it easier for teachers and students to use it.The limited studies regarding E-Flashcard Quizlet-Based Sound Picture Card Learning Media in Elementary School Science Lesson Content makes it urgent for this research to be carried out. Previous research that had been conducted regarding the E-Flashcard Quizlet media was mostly tested in language learning, so researchers felt it was necessary to use this media in science learning. Another update to the media being developed is that electronic flashcards are equipped with audio which can help students understand the material better.Based on this, the aim of this research is to develop Sound Picture Card Learning Media Based on E-Flashcard Quizlet Elementary School Science Lesson Content.

2. METHOD

This research uses development and research or what is usually called Research and Development (R&D). Development research is a basic research activity to obtain information that users need (needs assessment), then development activities to get the results and the effectiveness of the product is studied (Sugiyono, 2013). The model used to develop Quizlet-based e-flashcard products is ADDIE. The ADDIE development model was chosen which the researchers used as a development model in this research. ADDIE is a development that has five stages in its development, these stages include Analysis, Design, Development, Implementation, and Evaluations (Tegeh, 2010). ADDIE is a traditional generic or general process that training developers and researchers use, which is dynamic and used flexibly in training results and as a tool demonstration on display.

At the analysis stage, the developer carries out an actual search for information using direct research in the field to find information about student abilities, student characteristics, learning processes and designs, and an understanding of student attitudes. The design stage is a systematic process that begins with concept design consisting of a design for learning objectives, a test design for evaluation, and a design for the learning that will be implemented. Apart from the concept, developers also need to design product content which can be in the form of learning content, teaching materials, as well as learning plots or storyboards. At the development stage, the product plans that have been made at the previous stage will be realized. The conceptual design that has been prepared will be implemented as a new product after being realized into a product that can be used in the field. Products that are ready to be used directly in the field require an instrument to measure the usability, performance, and effectiveness of the product being developed. At the implementation stage, the product is applied in the field by referring to the product design which has been prepared systematically so that the implementation runs as planned. This implementation stage aims to test the product so that feedback is obtained from experts, teachers, and students. Then, to get feedback from experts, expert tests can be carried out by experts or material content validators, learning validators, test validators, and learning media validators. The purpose of testing by experts is to fulfill product standards, product development requirements, as well as needs in the field for products that have been developed. At the evaluation stage, this is carried out so that feedback is given on the products used. In this case, revisions are carried out based on requirements or results of evaluations that have not been carried out on the product. This evaluation aims to measure the development goals achieved.

The subjects of this research were 1 subject matter expert and 1 learning media expert. The product implementation or trial was carried out in two stages, namely a small-scale trial of 6 students and a large-scale trial of 27 students. The methods used to collect data are observation, interviews, questionnaires, and tests. Observation and interview methods are used to collect data regarding problems that occur in the field. The test method is used to measure the effectiveness of the Quizlet E-Flashcard. The instrument used to collect data was a questionnaire sheet. The questionnaire sheet grid used is presented in Table 1 and Table 2.

Table 1. Material Expert Instrument Grid

Assessment Aspects	Assessment Indicators	Item
Presentation Aspects	The material is presented coherently	2
	Attract students' curiosity	2
Content Aspect	Suitable for supporting material	3
	Interactive	2
	Able to increase students' knowledge	4
Language Aspects	Use standard language	1
	The language used is short and clear	2
	Language according to students' level of thinking	1
Technical Quality	Visual images and text are clear	2
	Amount	**19**

Table 2. Media Expert Instrument Grid

| Assessment Aspects	Assessment Indicators	Item
Linguistic Aspect	The language used is short and clear	2
	Language according to students' level of thinking	1
Display Aspects	Media displays emphasize targeted information	3
	Selection of font type and font size	2
	Has an attractive color display	1
Usage Aspects	Easy to use	1
	Has instructions for use	3
	Practical	1
Usefulness Aspect	Make it easier for students to understand the material	2
Aspects of Effectiveness	Makes it easier for teachers to convey material	2
Amount		**18**

The techniques used to analyze data are qualitative descriptive analysis, quantitative, and inferential statistics. Qualitative descriptive analysis is used to analyze input or comments provided by experts and students. Quantitative descriptive analysis is used to analyze the scores given by experts and students. Inferential statistics are used to analyze the effectiveness of Quizlet e-flashcard-based sound picture card learning media on elementary school science course content.

3. RESULT AND DISCUSSION

Result

Sound picture cards based on Quizlet e-flashcards as a learning medium for science and science lesson content for grade V elementary school are developed using the ADDIE development model which includes five stages in its development, these stages include analysis, design, development, implementation, and evaluation. The first stage is analysis. At this stage, an analysis is carried out of the science and science learning process carried out by the class teacher and students' responses to the learning that has been carried out by the class teacher. Then, further analysis was carried out by distributing a needs analysis questionnaire on the Quizlet e-flashcard sound image card media which was filled in by class V students and teachers at SD Negeri 2 Daren. From the results of the needs questionnaire that was filled out by the class teacher, it was found that according to the teacher, students need to have a good understanding of the science learning content. In the student needs questionnaire, the results showed that many students still found it difficult to understand the science material taught by the teacher. Monotonous use of learning media and lack of optimal use of technology are the main factors in students' difficulty understanding the material. So students need new learning media that are more interesting and innovative to increase students' enthusiasm for learning.

The second stage is design. This stage is carried out through designing the e-flashcard media concept which will later be developed. Concept design begins with setting learning objectives, followed by compiling test questions and quizzes that will be used for evaluation. Teaching modules are also prepared as guidelines for the learning design that will be implemented. In the teaching module, of course, there is learning content, teaching materials, as well as learning plots or storyboards that will be used during the learning process. The third stage is development. The development of electronic flashcards was made using the Quizlet application which can be accessed using electronic devices (devices) in the form of smartphones, computers, or laptops. The e-flashcard media developed contains class 5 science lesson content in chapter 2 Harmony in Ecosystems, Topic A Eating and Being Eaten. Quizlet e-flashcard media consists of 20 flashcards (cards) where each card has a term on the front side and a definition on the backside. Each card is also equipped with images and audio to support the explanation of the material to make it more interesting and easy for students to understand. Apart from cards, there are also several other features such as tests and matches which are used as evaluation material and the evaluation results will automatically come out after completing them. Apart from grades, the results of students answering correctly or incorrectly will also come out accompanied by corrections to wrong answers. The results of product development are presented in Figure 1.
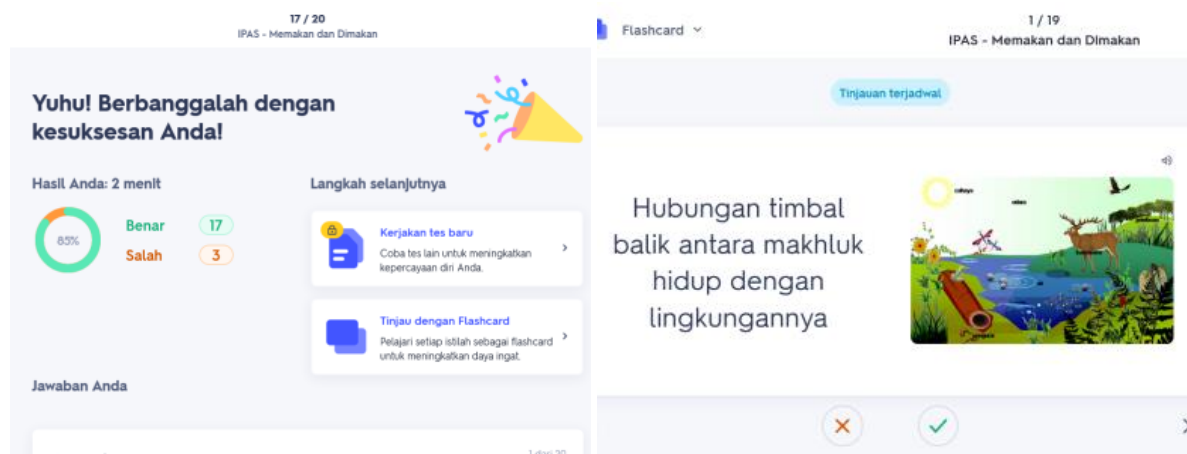
Figure 1. Results of the Development of Sound Picture Card Learning Media Based on e-Flashcard Quizlet

The Quizlet E-Flashcard Based Sound Picture Card Learning Media was then tested for validity by learning media experts and learning content experts. The assessment results given by learning media experts were 91% so that the qualifications were very worthy. The results of the assessment given by the learning material expert were 96.5%, resulting in a very decent qualification. Based on this, it can be concluded that Quizlet E-Flashcard Based Sound Picture Card Learning Media is suitable for use in the learning process.

The fourth stage is implementation. This stage carried out the application of the product in Class V science and science lessons at SD Negeri 2 Daren with material about eating and being eaten. The product implementation or trial was carried out in two stages, namely a small scale trial of 6 students and a large scale trial of 27 students. In small-scale and large-scale trials, post-test and pre-test scores have been taken which will later be processed to determine whether or not there has been an increase in the average number of post-test and pre-test scores. Data processing uses a prerequisite test in the form of a normality test whose aim is to check whether the variable data is normally distributed or not. The normality test results are presented in Table 3.

Table 3. Normality Test Results

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pre-test-Small Scale	0.147	6	0.200*	0.980	6	0.953
Post-test-Small Scale	0.272	6	0.185	0.864	6	0.204
Pre-test-Large Scale	0.263	6	0.200*	0.866	6	0.210
Post-test-Large Scale	0.208	6	0.200*	0.902	6	0.384

Based on the data from the normality test results from table 3 in the form of pre-test and post-test, it is known that both groups, both small scale and large scale groups, have normal distributions. This is known from the significant gain in the Shapiro-Wilk column which has a value of > 0.05 so the data is said to be normal. Next, a t test is carried out, the aim of which is to determine whether there is an average between the two. The t-test results are presented in Table 4.

Table 4. T-Test Results

	Mean	Std. Deviation	Std. Error	Lower	Upper	t	df	Sig. (2-tailed)
Small Scale	-41.167	13.703	5.594	-55.547	-26.786	-7.359	5	0.001
Large Scale	-38.741	13.575	2.612	-44.111	-33.371	-14.829	26	0.000

The t-test results show a significance of 0.001 on the small scale and 0.000 on the large scale. So it can be concluded that both small-scale groups and large-scale groups experienced an increase in learning outcomes from pre-test and post-test data. This can be seen in the significance value for both groups < 0.05. Then analyze the data using the N-Gain test which aims to measure improved learning outcomes before and after using Quizlet e-flashcards. The N-Gain results are presented in Table 5.

Table 5. N-Gain Test Results

Class	Pre-Test Average	Post-Test Average	N-Gain	Category
Small Scale	44.5	85.6	0.7368	0.07587
Large Scale	45.92	83.6	0.7020	0.14944

Based on the results of the N-Gain test, it was found that on a small scale the N-Gain result was 0.7368, namely > 0.7, so it can be concluded that the increase in learning outcomes for small scale groups is in the high category. Meanwhile, the large scale N-Gain results obtained were 0.7020, namely > 0.7, so it can be concluded that the large scale group also experienced an increase in learning outcomes which were in the high category in the post-test results. The fifth stage is evaluation. The feedback received by researchers after the media implementation stage directly in the field is used as material for evaluating the media they have developed. This aims to ensure that the Quizlet e-flashcard media that has been developed can be improved in accordance with the suggestions that have been received so that the resulting product experiences increased quality and effectiveness.

Discussion

The results of data analysis show that the learning media in the form of Quizlet E-Flashcard Based Sound Picture Cards has very good qualifications so it is suitable for use in learning. Apart from that, several factors make learning media in the form of Quizlet E-Flashcard-based sound picture cards suitable for use in learning, namely as follows. First, the learning media in the form of Quizlet E-Flashcard-based Sound Picture Cards is suitable for use because it makes it easier for students to learn. The results of the data analysis show that there are significant differences in the learning outcomes of small-scale groups before using the Quizlet E-Flashcard Based Sound Picture Card media and after using this media. Likewise in the large-scale trial group. It was concluded that there was an increase in student learning outcomes before and after using Quizlet E-Flashcard Based Sound Picture Card media. Previous research also revealed that E-Flashcards are a medium that can really help students' learning activities (Kusumawati et al., 2017; Noge, 2019). In a learning context, flashcards can make it easier for students to learn (Evianti & Atika, 2021; Fitriyana et al., 2020). This is because picture cards can enable students to visualize the concepts or material being taught. Images presented on media can help students understand and remember material better than just text or verbal explanations (Evianti & Atika, 2021; Fitriyana et al., 2020; Kusumawati et al., 2017; Maronta et al., 2023; Noge, 2019; Utomo et al., 2023). Apart from that, the sound element allows students to listen to explanations accompanied by pictures. This can help students who learn better by hearing or who have limitations in reading text (Karisma et al., 2019; Nomleni, FT & Manu, 2018; Pradilasari et al., 2019).

Second, learning media in the form of Sound Picture Cards based on Quizlet E-Flashcards is suitable for use because it increases students' enthusiasm for learning. Developing interactive media that is integrated with technology will increase learning motivation(Cahyani & Jayanta, 2021; Uygarer & Uzunboylu, 2017; Wichadee & Pattanapichet, 2018). Apart from that, using appropriate media can meet the needs of students and teachers so that learning becomes interactive, effective, and efficient(Chen, 2017; Ghani et al., 2022; Saputro & Setyawan, 2020). In developing the Quizlet e-flashcard-based audio flashcard learning media, it is adjusted to the learning outcomes that must be achieved by the provisions in the independent curriculum. The media developed also contains material in the form of text, animation, and sound that can attract students' attention. Previous findings also reveal that media presented in the form of text or animation can increase learning motivation (Rachmavita, 2020; Rachmawati et al., 2023; Saripudin et al., 2018). The presentation of learning media is aligned with students' needs so that the material in this learning media contains text, animation, and also interesting sounds which makes learning conditions more interesting.

Third, learning media in the form of Sound Picture Cards based on Quizlet E-Flashcards improves a welcoming learning atmosphere. With the media that has been developed, students can get new learning experiences that are interactive, effective, efficient, and easy to access because they can be accessed online and offline (Kusumawati et al., 2017; Noge, 2019). Apart from that, the E-Flashcard developed can interact with students. Students can click on the image or text to hear further explanation, thus getting additional information. This gives students control over the pace and way they understand the material (Kusumawati et al., 2017; Maronta et al., 2023). Quizlet E-Flashcard Based Sound Picture Cards can also be accessed from various devices, such as smartphones or laptops. This allows students to learn anywhere and at any time, so learning is not just limited to the classroom. Learning activities like this can certainly create a pleasant learning atmosphere.

Previous research findings also confirm that appropriate media can increase a pleasant learning atmosphere (Ilmiyah et al., 2019; Roffiq et al., 2017). Previous research also revealed that the use of learning media is very effective because it has an influence on increasing student learning outcomes (Arimbawa et al., 2017; Aryantini et al., 2021; Devi & Bayu, 2020; Sutama et al., 2017). E-flashcard media is a visual tool that functions to make it easier for students to learn (Jampel & Sudatha, 2018; Kusumawati et al., 2017; Noge, 2019). It can be concluded that Quizlet E-Flashcard Based Sound Picture Cards can help students learn.The implication of this research is that the E-Flashcard Quizlet-based Sound Picture Card media that has been developed can be

used as a solution to help students learn science and science subjects at SD Negeri 2 Daren. Quizlet-based e-flashcards can be used to help students understand and remember complex scientific concepts. This makes it easier for students to learn science so that it is very effective in improving student learning outcomes. E-flashcard media as a learning tool can also make it easier for teachers to explain the material being taught.

There were several limitations during the research, one of which was the lack of optimal media development carried out due to limited time and costs. The media that has been developed contains material in the form of writing, images and also audio. Researchers feel the mediaQuizlet e-Flashcards will be used more effectively if they are equipped with material in the form of videos that are interesting to students. Researchers hope for future research on the E-Flashcard Quizlet learning media so that they can be more optimal in developing the E-Flashcard Quizlet media.

4. CONCLUSION

The results of the research show that the E-Flashcard Quizlet based Sound Picture Card learning media for the science and science learning material on Eating and Being Eaten received very good qualifications from experts and students. The results of the effectiveness test also show that the E-Flashcard Quizlet learning media is effective in improving student learning outcomes. This is proven by the results of a significant increase in learning outcomes between before using the media and after using the media. It was concluded that this learning media with science learning content can be used as a support for learning in the classroom or used independently by students.

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