Development of Learning Media Based on Google Web Sites on Animal Reproductive Topic to Increase Higher Order Thinking Skills

Rozani Azhar[1], Arif Sholahuddin[2], Mella Mutika Sari[3]
[1,2,3]Science Education Study Program, Lambung Mangkurat University, Jl. Brigadier General Hasan Basri Banjarmasin
*Email: 1710129210019@mhs.ulm.ac.id

ABSTRACT

This study aims to analyze the validity, practicality and effectiveness of web-based learning media google sites on reproductive material in animals to improve Higher Order Thinking Skills (HOTS). The method used in this research is Research and Development with a 4D development model. Data collection techniques are using validation sheets of media experts and material experts; student response questionnaire; and test instruments for reproductive knowledge in animals. The research subjects were six students in class IX C in the small group trial and 24 students in class IX D in the large group trial held at MTs Ibtidaussalam, Barito Kuala Regency. The results showed that the learning media developed in category (1) was very valid based on the assessment of media and material experts with an average validity score of 0.88 (2) very practical based on the assessment after testing to students with a practicality score of 90.89% and (3) effective based on learning outcomes of learning outcomes of reproductive material in animals by students with an N-gain score of 0.76. Based on the results of these studies, it can be concluded that the web-based learning media google sites material reproduction in animals is very suitable for students to use to increase HOTS.

Keywords: HOTS, learning media, reproduction in animals, web google sites.

ABSTRAK

Penelitian ini bertujuan untuk menganalisis validitas, kepraktisan dan keefektifan media pembelajaran berbasis web google sites materi reproduksi pada hewan untuk meningkatkan Higher Order Thinking Skills (HOTS). Metode yang digunakan dalam penelitian ini adalah Research and Development dengan model pengembangan 4D. Teknik pengumpulan data yaitu menggunakan lembar validasi ahli media dan ahli materi; angket respon peserta didik; dan instrumen tes pengetahuan reproduksi pada hewan. Subjek penelitian adalah enam orang peserta didik kelas IX C pada uji coba kelompok kecil dan 24 orang peserta didik kelas IX D pada uji coba kelompok besar. Penelitian ini dilaksanakan di MTs Ibtidaussalam Kabupaten Barito Kuala. Hasil penelitian menunjukan bahwa media pembelajaran yang dikembangkan terkategori (1) sangat valid berdasarkan penilaian ahli media dan materi dengan rerata skor validitas sebesar 0,88 (2) sangat praktis berdasarkan penilaian setelah uji coba kepada peserta didik dengan skor kepraktisan 90,89%

dan (3) efektif berdasarkan hasil belajar hasil belajar materi reproduksi pada hewan oleh peserta didik dengan skor N-gain sebesar 0,76 terkategori tinggi. Berdasarkan hasil penelitian tersebut dapat disimpulkan bahwa media pembelajaran berbasis web google sites materi reproduksi pada hewan sangat layak digunakaan oleh peserta didik untuk meningkatkan HOTS.

Kata kunci: HOTS, media pembelajaran, reproduksi pada hewan, web google sites.

BACKGROUND

In the early 20th century, education focused on achieving basic literacy skills: reading, writing, and counting. Most schools do not teach to think and read critically or to solve complex problems. The primary role of the teacher is considered to be the transmission of information to students (Bransford *et al*, 2000). In the 21st century, the educational paradigm began to shift to mastering *soft skills*. Through the 2013 curriculum, education in Indonesia is implemented to hone; (1) critical thinking and *problem-solving*; (2) *communication and collaboration skills*; (3) creativity and innovation *skills*; (4) information and *communication technology literacy*; (5) *contextual learning* skills, and (6) information and *media literacy skills*.

The issue of *Higher Order Thinking Skills* (HOTS) colors school learning in Indonesia. The following three questions: (1) What exactly are higher-order thinking skills?; (2) What steps should educators take to teach that hone students' higher-order thinking skills?; and (3) How to access and measure learners' higher-order thinking skills?, are important and difficult questions that educators feel. Many educators complained about the unpreparedness of educators and learners to face the demands of the 2013 Curriculum in learning.

According to a survey conducted by the *Organisation for Economic Cooperation and Development* (OECD) using the *Programme Internationale for Student Assessment* (PISA) test in 2015, education in Indonesia was ranked 69th out of 76 countries that took the PISA test. Data generated from PISA tests show the importance of educators directing their learners to higher-order thinking. One of the factors that causes their thinking ability to be low is the lack of training of Indonesian children in completing tests or questions that require analysis, evaluation, and creativity. Questions that have these characteristics are questions for measuring HOTS.

The results of the research of Sani *et al*. (2020), shows that educators tend to be more active than students, this is due to the use of dominant conventional methods such as lectures. Such conditions result in passive learners in receiving the material delivered by educators, so that students' abilities are only limited to rote memorization, and cause problems such as students are less critical in analyzing problems, evaluating, and creating solutions, maintaining low opinions, and less happy in solving questions that require thinking skills. This shows that learners have not reached higher order thinking skills.

Higher order thinking skills / HOTS is a demand of the 2013 Curriculum. The National Education Standards Agency (BSNP) has developed an Indonesian National Assessment that emphasizes the competitiveness of Indonesian children in 21st century life skills. The

Indonesian National Assessment is directed to an assessment model that requires the ability to think that is not only *recall*, *restate*, or refer without processing. The policy of the Ministry of Education and Culture is considered appropriate to apply questions that encourage students to reason, not just understanding and applying. BSNP does not deny the fact that the ability of educators to compile HOTS model questions still needs to be improved.

In connection with that, the progress of science and technology in the industrial era 4.0 is growing rapidly, which requires digital transformation development through technology. This era is often referred to as the digital era (Alami, 2020). The use and utilization of technology in the classroom during the learning process has become a necessity as well as a demand in the global era. The rapid development of technology today will continue to produce new patterns in learning and encourage adaptation quickly. (Rijal &; Jaya, 2020). Learning media is one of the important elements of education in the learning process that must follow the flow of technological developments.

To improve the quality of learning in order to achieve learning objectives effectively and efficiently, a learning media is needed as a tool that helps the learning process in presenting interesting material by making learning situations active and can be easily understood by students (Audia *et al*, 2021). Learning media can help the process of learning activities that aim to clarify the delivery of the meaning of learning from educators to students so that learning objectives can be conveyed more perfectly and well (Kustandi &; Darmawan, 2020). Through learning media as a tool or connecting container, to convey a message or information from educators to students in understanding learning that is being carried out in the classroom and online. Learning media can also improve the quality of learning for educators as a recommendationto help deliver learning materials that are innovative, creative, comprehensive, attract students' enthusiasm and create a pleasant learning situation (Hamid *et al*, 2020). Learning media can also be used to support the development of highe order thinking skills (HOTS).

Higher Order Thinking Skills (HOTS) can be improved by applying the right learning model when the learning process in the classroom is carried out. HOTS is a critical analysis thinking process and also involves deep understanding, not only memorizing something learned (Lukitasari *et al,* 2018). Manalyzing, evaluating, and creating is a high-level domain of cognitive learning outcomes that exist in HOTS (Istiyono *et al*, 2018). To find out that students have achieved *Higher Order Thinking Skills* (HOTS) can be seen fromthe achievements of learning results that students achieve (Wartono *et al,* 2018).

Learning can be taught using learning media that is able to support educators in delivering good teaching material in order to increase student HOTS. According to Islamiah (2019), learning media is a tool, method, and technique used by educators in communicating and interacting with students to be more effective in the learning process at school, especially in the classroom. Learning media that can be used when learning is carried out online is one of them with *e-learning* media (Astini, 2020). *E-learning* is an information and communication technology that can be used by students to learn anytime and anywhere in places that have internet coverage. The application of *e-learning* in learning is currently mostly carried out using the *WhatsApp* application and *Google Classroom* (Dewi, 2020). This is reinforced by the results of Oktawirawan (2020) research, namely *Google Classroom* learning media (77%) and *Whatsapp* (66%). Educators are required to find other *e-learning* learning media for online

learning, because many educators who use *Google Classroom* and *WhatsApp* media only send materials and assignments. Educators take advantage of the available features to share material documents and assignments through the class grub, then students will work on and submit the assignments they have completed through the class grub (Setyorini, 2020). So many students object and complain about online learning because of the many tasks given by each educator.

Quoting from Suaramerdeka.com (Dwi, 2020) many students object and complain about learning patterns that are considered uninteresting and quite a lot of task load. This is reinforced by the results of research by Cahyani *et al.* (2020) that from the results of *the mann whitney U analysis,* questionnaire data from 344 students can be seen that during online learning student learning motivation decreases. Therefore, it is necessary to develop appropriate media to support fun online learning activities, especially in science subjects. This makes students start to get bored with monotonous learning with *Google Classroom* and *WhatsApp* media only. In addition, the recommendationa and pre-recommendation factors owned by students vary, so not all are strong enough to install many learning applications (Aji, 2020). Therefore, one of the solutions offered by researchers is to develop a learning media that uses *Google Sites* (Suryanto, 2018).

One of the learning media that can be used by teachers is *web-based* learning media google sites, because web-based learning media does not require additional applications to use the media, just accessed through search applications such as *google* or other search applications. Salsabila &; Aslam (2022) in their research only validated and tested the feasibility of Google Sites web-based learning media to be used by students during learning activities. In contrast to this study, learning media developers validate learning media, conduct feasibility or practicality trials, and the practicality of learning media. This study will examine the development of Google Sites web-based learning media which is used to improve HOTS for junior high school / MTs students through science subjects reproductive material in animals. So that the learning media that can be used is varied and not monotonous, which is expected to help students not to get bored in learning and be able to increase student HOTS.

RESEARCH METHODS

This research is research and development or *Research and Development*. This research aims to produce a product and test the validity, practicality, and effectiveness of the product. This research is designed to produce products in the form of science teaching materials SMP / MTs, researchers develop web-based teaching media *google sites* reproduction material in animals.

The development model used in this study is the 4D development model developed by Thiagarajan. According to Sugiyono (2012), the stages of the 4D model are *define*, *design*, *development* and *disseminate.*

The various stages of the 4D development model have been described in detail, more details can be seen through the detailed description of each stage. The description is based on Trianto (2011) as follows: the stage of defining (*Define*), the purpose of this stage is to establish and define learning requirements, starting with the analysis of the objectives of the discussion of the material to be developed; Design stage (*Design*), the purpose of this stage is to prepare learning tools to be developed, which include: media to be used, materials to be used,

assessment devices, test instruments and device formats that will adapt to existing formats; Development stage (*develope*), the purpose of this stage is to produce media that has been corrected after getting comments and Recommendation by expert input, including: media and material expert validation, followed by improvements and small group trials with learners; tahap deployment (*disseminate*), the purpose of this stage is to trial the use of learning media that has been developed in learning to large group learners. Therefore, this stage is the stage of media use that has been developed.

The research was conducted from March 14 to 17, 2022. The research site was carried out at Mts Ibtidaussaalam, Trans Kalimantan Road, Andaman II Village, Anjir Pasar District, Barito Kuala Regency 70565, South Kalimantan Province. The subjects of the study were six students of class IX C in small group trials and 24 students of class IX D in large group trials held at MTs Ibtidaussalam. The object of this study is *this google sites' web-based* learning media reproductive material in animals to increase HOTS.

Validation of the developed learning media is carried out by several experienced experts to validate the developed learning media. The tool used for the validation of learning media is in the form of questionnaires, namely validation questionnaires for media experts and material experts. The data obtained from these experts is used as a reference to revise learning media products until they are declared to be testable in the field.

A questionnaire is a list of questions about certain material presented to the subject, either individually or in groups to obtain certain information (Hasnunidah, 2017). The questionnaire in this study is a student response questionnaire used to determine the response of students after using learning media or the practicality of learning media.

The tests conducted in this study were *pretest* (practice questions before learning) and *posttest* (evaluation questions) to determine the comparison of student knowledge before and after using learning media or the effectiveness of learning media. The test equipment used is in the form of multiple-choice questions, with answer choices from a-d.

The criteria for the validity of the media and learning materials developed can be declared valid or not, this is based on the validator's assessment, if the media is valid it can be used for trials to students, while if it is less valid then the learning media must be improved first. The aspects assessed in learning media are presentation; Language and multimedia, while the aspects assessed in learning materials are content aspects. Giving value to the validity of media and learning materials developed using the Aiken V calculation formula, as follows:

$$V = \frac{\Sigma s}{n(c-1)}$$

Information:
V = deal index
s = $r - l_o$
r = number given by the appraiser
l_o = lowest validity assessment number
c = highest validity assessment number
n = number of appraisers

Valid or less valid teaching materials are determined from the validation results that are matched with the validity criteria of teaching materials that have been determined. The criteria for the validity of media and learning materials can be seen in Table 1.

Table 1 Criteria for validity of teaching materials

No	V Score Range	Category
1	V 0.4<	Less Valid
2	0.4 V 0.8< <	Valid
3	V 0.8>	Highly Valid

(Aiken, 1985)

The practicality of the learning media that has been developed can be seen through the response of students to the learning media that has been developed. The practicality of learning media is calculated using a percentage calculation formula, as follows:

$$Skor\ respon = \frac{Jumlah\ perolehan}{Jumlah\ skor\ maksimum} \times 100\%$$

Practical or not the learning media that has been developed is determined from the results of the response questionnaire that has been filled out by students and then matched with the assessment criteria for student responses that have been determined. The criteria for assessing student responses can be seen in Table 2.

Table 2 Assessment criteria for student response

No	Validity criteria	Category
1	81% to 100%	Very Practical
2	61% to 80%	Practical
3	41% to 60%	Quite Practical
4	21% to 40%	Impractical
5	0% to 20%	Very impractical

(Ridu, 2012)

The effectiveness of learning media that has been developed can be measured by *pretest* test instruments or practice questions before learning and *posttest* or evaluation questions given to students to determine the increase in student HOTS after using the learning media that has been developed. To determine the increase in HOTS, students using the developed learning media can use the normalized gain (*N-gain*) equation, as follows:

$$< g >= \frac{posttest\ score - pretest\ score}{maximum\ \ score - pretest\ scor}$$

The criteria for the effectiveness of learning media from student learning outcomes can be seen in table 3 as follows.

Table 3 N-gain Criteria

No	Interval	Category
1	$g <$ 0,30	Low
2	0,30 0,70< $g <$	Keep
3	0,70 < g	Tall

(Hake, 1998)

RESULT AND DISCUSSION

The product of learning media development in this study is web-based learning media *google sites* reproduction material in animals to increase HOTS. *Google Sites web-based* learning media is validated by three validators, namely as media experts and material experts. The results of the calculation of the validity of media experts can be seen in Table 4.

Table 4 Media expert validity results

No	Assessment Aspect	Validators			V	Information
		1	2	3		
1	Serving	40	45	39	0,90	Highly Valid
2	Language	33	31	28	0,85	Highly Valid
3	Multimedia	20	20	16	0,92	Highly Valid
Average					0,88	Highly Valid

Information:
V = deal index
The results of the calculation of the validity of material experts can be seen in Table 5.

Table 5 Material expert validity results

No	Assessment Aspect	Validators			V	Information
		1	2	3		
1	Fill	47	47	42	0,88	Highly Valid

Information:
V = deal index

Based on the results of validation by three validators, the developed learning media received several comments and recommendations, then what the media developer did was to improve in accordance with the comments and recommendations by validators so that the developed learning media could be used for trials with students. Comments and recommendations can be seen in Table 6.

Table 6 Expert comments and recommendations and improvement results

No	Comments and Recommendations	Revision
Comments and Recommendations for Learning Media		
1	Media is made very attractive and easy to understand, but it's best to add instructions for media use on the homepage or start page	Add media usage instructions and place them on the start page
2	We recommend that the first page begin with a summary of the material being taught and instructions for use (what to press to start learning	On the first page are added instructions for media use
3	Typewriter-like fonts make the reader less focused (the spacing between letters is too large), try to find letters that are like calibri, or change the	Change the font to a simpler but still attractive one

No	Comments and Recommendations	Revision
	spacing between letters (learn typography)	
4	Typo "example of dragonfly reproducing"	Fixing the word typo to "example of an animal reproducing"
5	For artificial insemination of the image is fixed	Changing the sample artificial insemination image
6	Can be used in the field	
7	Opening section - Add an image caption. Examples of new individuals (tadpoles) and others - The image of a butterfly egg is replaced with a butterfly larva	- Add a caption - Replacing the image of a butterfly egg with a butterfly larva
8	Material section - Add an image caption, for example (hydra) - Fix the phrase "to better understand the explanation above, watch the following video!"	- Because the picture below cannot add information, so the description and scientific language of animal examples are placed in the explanation section and scientific language is added to the animal example - Improve the connecting sentence in accordance with the recommendation
9	The material feels too little, maybe it can be enriched, the description can be simplified again and reproduced. For example, when explaining oviparous can be added general examples: ducks, and uncommon, for example, emperor penguins whose males are in charge of incubating eggs	Add examples of animal samples to each submaterial
10	Can be used in the field	

The learning media developed has been validated and improved in accordance with comments and recommendations by validators, then the developed learning media can be used for trials to six students of class IX C as a small group. Students provide assessments through student response questionnaires that have been provided to find out the practicality of learning media. The results of the assessment of learning media used as a practicality trial conducted by small groups can be seen in Table 7.

Table 7 Results of practicality trials in small groups

No	Aspects	Aspect Score (%)	Criterion
1	Display	94,00 %	Very Practical

2	Material	91,33 %	Very Practical
3	Benefit	94,67 %	Very Practical
	Total Overall Score	93,33 %	Very Practical

The assessment on the student response questionnaire has comments but there is no recommendation for the developed learning media to be improved, because the comments from these students do not have recommendations for improvement so that the developed learning media can be used for practical trials to large groups without any improvement first. Comments and recommendations can be seen in Table 8.

Table 8 Small group comments and recommendations

No	Comments and Recommendations
1	The material is quite good
2	Very good and understandable
3	The material is easy to understand
4	The material is self-explanatory enough that it is easy to understand and understand
5	The material adds to my understanding and knowledge in learning
6	The material is very easy to understand

Learning media has been tested to small groups, then the learning media can be used for trials to large groups of 24 students of class IX D to find out the practicality and effectiveness of the learning media developed. The results of the practicality trial can be seen in Table 9.

Table 9 Results of practicality trials in large groups

No	Aspects	Aspect Score (%)	Category
1	Display	89,33 %	Very Practical
2	Material	92,17 %	Very Practical
3	Benefit	91,17 %	Very Practical
	Total Overall Score	90,89 %	Very Practical

Practical trials in large groups of comments and recommendations for learning media being developed can be seen in Table 10.

Table 10 Comments and recommendations of large groups

No	Comments and Recommendations
1	Everything is good and easy to understand, especially since there is an explanation video, it has become easier to understand
2	Good enough
3	Web content is very simple and easy to understand
4	It's been good when it comes to delivering material
5	The learning media is very good, hopefully in the future it will be even better
6	Good
7	*This Google Sites web-based* learning media is more exciting and fun
8	Excellent at learning about web-based learning media *google sites*

No	Comments and Recommendations
9	The questions and discussions are fun and easy to understand
10	The media conveyed is very clear so it is easy to understand
11	Very good and understandable
12	The lessons used are already good
13	Excellent
14	The questions made really sharpen the brain so that the brain can be active in thinking
15	The learning media is good and interesting
16	The medium helped me become more familiar with the explanation of the learning material
17	Learning media is very interesting to use in learning
18	Excellent
19	Learning videos are very helpful for learning
20	The media created in my opinion is very easy to understand
21	Good, the questions provided are very interesting and sharpen the brain
22	This learning media is already very good
23	There is no recommendation from me because everything is good
24	Learning media is very helpful for learning

The effectiveness of learning media that is being developed and used as a trial media can be seen from the *results of pretest* and *posttest* that have been done by large groups can be seen in Table 11.

Table 11 Results of learning media effectiveness

Average Pretest Score	**Average Posttest Score**	**Average *N-gain*** Score	**Criterion**
31,25	83,33	0,76	Tall

Google Sites web-based learning media can be used using various types of *gadgets*, including: *smartphones*, laptops and tablets. *Google Sites web-based* learning media can be accessed and used by students through links that have been provided and shared by media developers. The form of learning media is in the form of a *website* connected to Google so that there are no restrictions on *gadgets* to use and open the learning media, as long as the *gadget* has a search engine application connected to Google.

The learning media is online or connected to the internet so that when students want to use the media their *gadgets* must be connected to the internet. Husniyah *et al.* (2022) states that Google Sites web-based learning media can be accessed by students using *smartphones* or computers with internet access to make it easier for educators to provide material to be taught to students.

Web-based learning media Google Sites is created and developed with a simple design and made as attractive as possible, so that the learning media developed is interesting for use by junior high school / MTs age students. According to Setiawan (2019), *Google Sites* is one of the places to create *websites* Online and very many advantages if used to create learning

media, one of the advantages is that it makes it easier for *website* creators without *coding* and for free.

Google Sites web-based learning media was developed with the aim of increasing *Higher Order Thinking Skills* (HOTS) of students. Learning media developers provide perceptions of examples of problems found in everyday life placed on the "Materials &; Practice Questions" page. The perception of examples of these problems is intended for students so that students try to solve problems that have been listed in the learning media, by analyzing and creating solutions so that the problem can be solved, so that students are trained in *Higher Order Thinking Skills*(HOTS).

Based on Table 4 that the *Google Sites web-based* learning media that has been developed and validated is declared valid, which means that the media and the material in the media are suitable for testing with students. When testing the validity of web-based learning media *google sites* reproduction material in animals on the media validation questionnaire sheet, there were three aspects assessed by three validators, namely aspects of presentation, language, and multimedia. The material validation questionnaire only has one aspect, namely the content aspect.

The presentation aspect that has been assessed by three validators gets a score of 0.90, the linguistic aspect gets a score of 0.85, and the multimedia aspect gets a score of 0.92 so that the presentation, language and multimedia on the learning media are included in the very valid category. According to Nurrita (2018), learning media that is presented attractively can help students more easily understand the material they learn. According to Arsyad (2014) in his research, in the linguistic aspect, readability must be achieved and the language used is easy to understand and understand. Pakpahan *et al*. (2020) states that learning media that are more fun and not boring are learning media that display learning materials through interesting videos, audio and colors.

Web-based learning media *google sites* reproduction material in animals to increase HOTS after assessing and summing all the values obtained in each aspect, then looking for the average for the developed learning media to get a score of 0.88, so that the learning media is included in the very valid category. *The Google Sites web-based* learning media developed was validated by three validator lecturers, after being validated by the learning media validator and the material contained in the learning media was improved by the researcher in accordance with comments and recommendations by the validator, so that the media and learning materials to be used as tools for trials became valid for use. In accordance with the comments and recommendations given regarding the developed learning media, the following is the display of learning media before and after improvement.

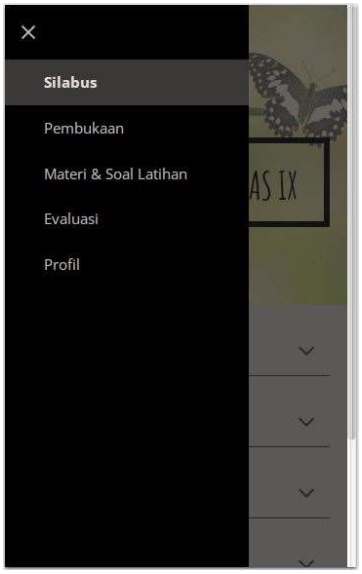


Figure 1 Menu display before revision

Figure 2 Menu display after revision

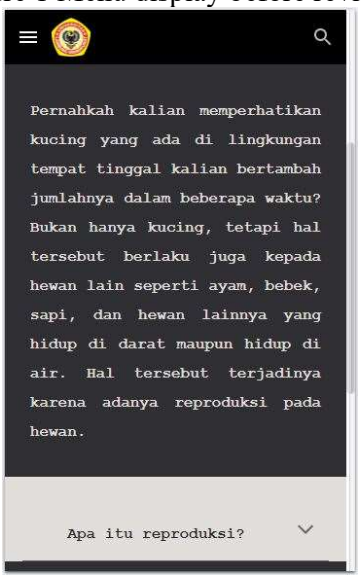


Figure 3 Font style display before revision

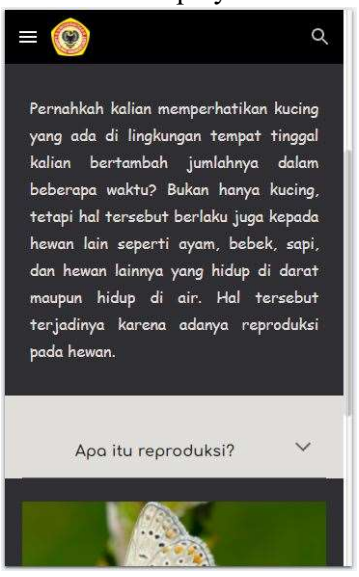


Figure 4 Font style display after revision

Figure 5 Display of adverbs before revision

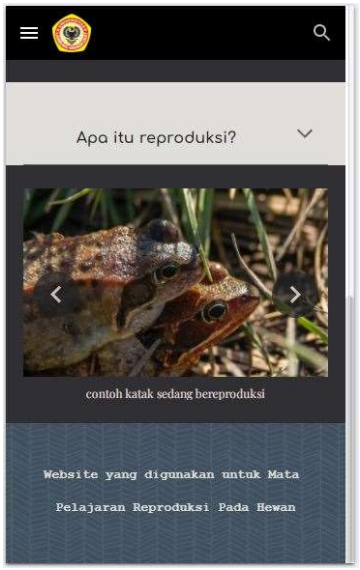


Figure 6 Display of adverbs after revision

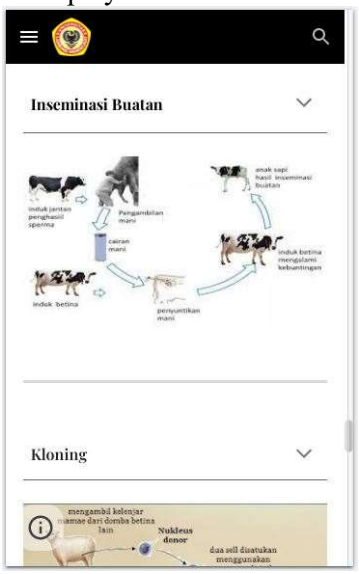


Figure 7 Display of artificial insemination image before revision

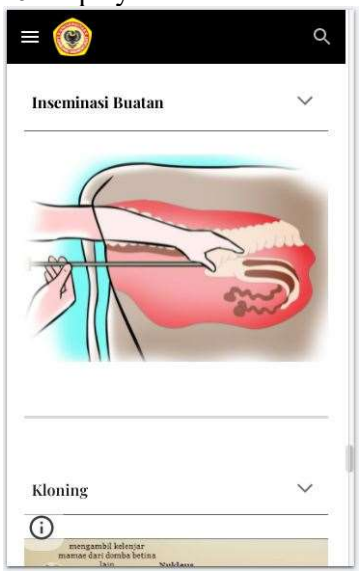


Figure 8 Display of artificial insemination image after revision

The content aspect contained in the material validation questionnaire after which was assessed by three validators received a score of 0.88 so that the content on the material was included in the very valid category. According to Ariawan (2015), the content of the material in the learning media provided will clearly help students learn and in the learning process will greatly facilitate educators.

Google sites web-based learning media Reproduction material in animals to improve HOTS only has content aspects which means the results obtained from the calculation of these

aspects get an average score of 0.88 so that the material used in Google Sites web-based learning media is included in the very valid category. According to Elpira & Ghufron (2015), the content of learning materials from learning resources to students individually or in groups, which can stimulate the thoughts, feelings, attention and interests of students in such a way that the learning process inside or outside the classroom becomes more effective.

In the content aspect, it also does the same thing as the validity of the media, namely improving the content of the material in accordance with the comments and recommendations given. Here's what the learning media looks like before and after it's fixed.

Figure 9 Display of image captions before revision

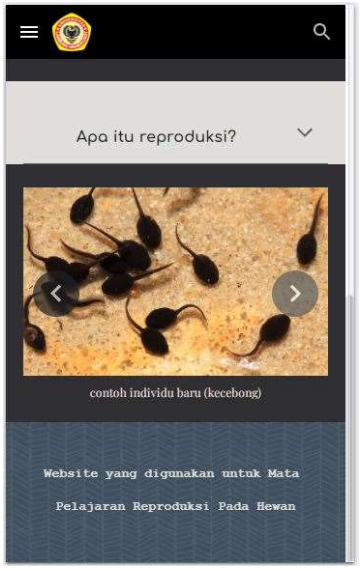
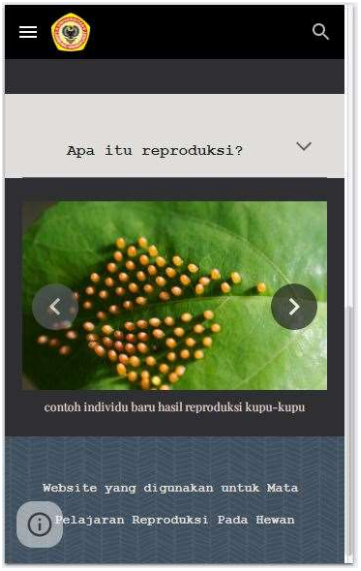


Figure 10 Image caption display after revision



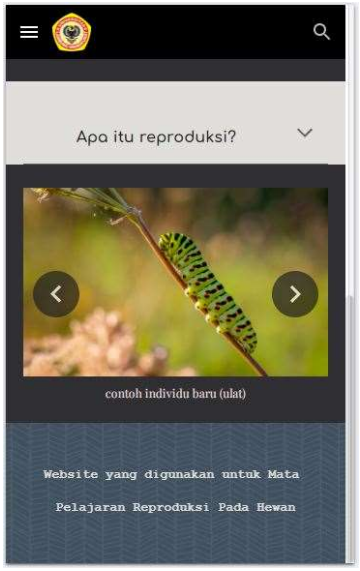


Figure 11 Display of a new individual image before revision

Figure 12 Display of new individual images after revision

Figure 13 Display of connecting sentences before revision

Figure 14 Display of connecting sentences after revision

In accordance with the formulation of the problem in this study, namely "How is the validity of *google* sites web-based learning media on reproductive material in animals to increase HOTS seen from the validity sheet?", the results of the study above state that the web-based learning media google sites reproduction material in animals to increase HOTS, the learning media developed is very valid.

The practicality of the learning media developed can be seen from the results of student responses. The first stage carried out by the researcher was a practical trial in a small group of six students, and continued by filling out a student response questionnaire, because the comments given were positive so that the learning media did not need to be improved again and could be directly tested in large groups. The second stage conducted practical trials on large groups of 24 students and continued by filling out student response questionnaires. In the student response questionnaire, there are three aspects of assessment, namely the appearance aspect, the presentation of the material, and the benefit aspect.

The results of practicality trials in large groups can be seen in Table 9. The display aspect that has been assessed by 24 students as a large group gets a score of 89.33% and is categorized as very practical. From the results of comments and recommendations contained in the response questionnaire, some students like the learning media developed because of the learning videos that help students understand learning. In addition to videos on learning media, the media also looks simple so that it is easy to understand, good, interesting, exciting and fun when used. The presentation aspect that has been assessed gets a score of 92.17% and is categorized as very practical. From the results of comments and recommendations contained in the response questionnaire, there are comments about the questions made that really sharpen

the brain so that the brain can be active in thinking, thediscussion is fun and easy to understand. The benefit aspect that has been assessed gets a score of 91.17% and is categorized as very practical.

Yuniansyah & Saputra (2017) stated that the ease of use of learning media will cause desire for students and create a sense of comfort and ease when using the learning media, so that there is a desire to repeat to use the learning media. The display of media here includes the display of media, buttons, and the suitability between images or videos displayed in the material on learning media. According to Nurrita (2018), the presentation of interesting learning media can help students to more easily understand the material they are learning, so that it can help students to train HOTS.

From the overall calculation results of student responses which can be seen in Table 9 get a score of 90.89%, which means *that web-based learning media google sites* reproduction material in animals to improve HOTS is included in the very practical category when used by students in learning seen from the aspects of appearance, presentation and benefits.

In accordance with the formulation of the problem in this study, namely "How is the practicality of using *web-based* learning media google sites on reproductive material in animals to increase HOTS seen from the response of students?", the results of the study above state that web-based learning media google sites reproduction material in animals to increase HOTS, the use of learning media developed is very practical.

The effectiveness of the learning media developed can be seen from the results of the calculation of pretest test instruments or practice questions before learning and posttest or HOTS evaluation questions that have been done by students. The calculation results of the effectiveness of learning media that have been developed can be seen in Table 11 in the table to see a comparison of the results of obtaining student scores in answering the HOTS test instrument before and after using *Google Sites web-based* learning media. Before using google sites web-based learning media, students did pretests or practice questions before learning and obtained an average score of 31.25, while after using google sites web-based learning media, students did posttests or evaluation questions and produced an average score of 83.33.

Based on this, it shows that the use of *web-based* learning media google sites on reproductive material in animals is able to train students to be able to think critically, because this *google sites* web-based learning media contains practice questions containing critical thinking questions or HOTS (*Higher Order Thinking Skills*)) which can train students to solve problems raised from everyday life and to train students' critical thinking skills. Students solve problems or problems in the learning media, where previously students first knew the information or material learned, namely reproduction in animals. The animals discussed in the learning media are animals that live in wetland environments and are found in everyday life. According to Dinni (2018), a problem can train students to HOTS or think higher order by solving the problem, but already have knowledge or material related to the problem.

The overall calculation results after seeing an increasing difference from the pretest and posttest results get an average score of 0.76, then the web-based learning media *google sites* reproductive material in these animals is able to increase HOTS and has a high category as listed in Table 11 which means that the learning media developed is effective.

In accordance with the formulation of the problem in this study, namely "How effective is the use of web-based learning media google sites on reproductive material in animals to

increase HOTS seen from the learning outcomes of students?", the results of the study above state that the web-based learning media *google sites* reproductive material in animals to increase HOTS, the use of learning media developed is effective. The results of this study are in line with the statement of Komarudin et al. (2020) in their research, that is, effective learning media is able to improve the concept of knowledge and is able to improve the HOTS ability of students.

During the research process, students use learning media guided by educators using available LCDs, students use media together from the first page to finish using their respective *mobile phones* . How to use such media turns out to make students not free to use media independently. Because, when other students have read on a certain page there are some students who still have not finished reading so that students who have finished must wait first to be able to continue to the next page. In addition, this media is only used during learning at school so that the use of media is limited by class hours and is not flexible in accordance with the abilities and learning opportunities possessed by students.

CONCLUSION

Based on the results of research on the development of web-based learning media *google sites* reproductive material in animals to increase HOTS, it can be taken to the conclusion for the learning media, namely: learning media category is very valid based on the assessment of media and material experts with an average validity score of 0.88; Very practical category learning media based on assessment after trials to students with a practicality score of 90, 89%; Effective category learning media based on learning outcomes of reproductive material learning in animals by students with an *N-gain* score of 0.76.

RECOMMENDATION

Based on the results of research on the development of web-based learning media *google sites*, reproductive material in animals to improve HOTS can berecommended to students to use this learning media without being guided by educators, so that students can learn independently according to the ability of students to use learning media. Learning media can be used not only at school but can also be used at the homes of each student, because the learning media is online or its use must be connected to the internet network so that the media can be used anytime in places that have internet coverage. Learning media can be developed again and varied the appearance and content of learning media, so that the web-based media *Google Sites* is interesting to use.

REFERENCES

Aiken, L. R. (1985). Tree coefficients for analiticalyzing the reliability, and validity of ratings. *Education and Psychological Measurement*, 45, 131-142. https://doi.org/10.1177/0013164485451012.

Aji, R. H. S. (2020). Impact of covid-19 on education in Indonesia: schools, skills, and learning process. *SALAM: Journal of Social & Cultural Shar'i,* 7(5), 395-402. https://doi.org/10.15408/sjsbs.v7i5.15314.

Natural, Y. (2020). Online learning media during covid-19. *Tarbiyatu Wa Ta'lim: Journal of Islamic Education*, 2(1), 49–56.

Ariawan, B. (2015). Solve linear program problems using geogebra. *Proceedings of the National Seminar on Educational Technology*. 69-85.

Arsyad, A. (2014). *Learning media*. Jakarta: Rajawali Press.

Astini, N. K. S. (2020). The use of information technology in elementary school level learning during the COVID-19 pandemic. *Lampuhyang Journal*. 11(2), 13-25. https://doi.org/10.47730/jurnallampuhyang.v11i2.194.

Bransford, J. D., Brown, A. L., &; Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Research Council, National Academy Press.

Cahyani, A., Listiana, I. D. &; Larasati, S. P. D. (2020). High school students' learning motivation in online learning during the COVID-19 pandemic. *Journal of Islamic Education*, 3(1), 123-140. https://doi.org/10.37542/iq.v3i01.57

Goddess, W. A. F. (2020). The impact of COVID-19 on the implementation of online learning in elementary schools. *Educative: Journal of Educational Sciences*, 2(1), 55-61. https://doi.org/10.31004/edukatif.v2i1.89.

Dinni, H. N. (2018). HOTS (*High Order Thinking Skills*) and its relation to mathematical literacy skills. *In PRISMA, Proceedings of the National Seminar on Mathematics,* 1, 170-176.

Dwi, S. (2020). *Monotonous and many tasks, the ability of students to learn online is only 4 hours.* Available at:https://www.suaramerdeka.com/news/nasional/234842-monotan-danbanyak-tugas-mampu-siswabelajar-online-hanya-4-jam.

Elpira, N., &; Ghufron, A. (2015). The influence of the use of powerpoint media on the interests and learning outcomes of science students in grade IV elementary school. *Journal of Educational Technology Innovation*, *2*(1), 94-104. https://doi.org/10.21831/tp.v2i1.5207.

Hake, R. R. (1998). Interactive engagement v.s traditional methods: six- thousand student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, 66(1), 64-74. https://doi.org/10.1119/1.18809.

Husniyah, R., Widiatsih, A., Fajarisman, F., Kunrozazi, K., &; Kurniawan, N. (2022). *Website development* using *google sites* production materials on plants and animals for SMP/MTs during the covid 19 pandemic. *Education Journal: Journal of Educational Research and Development*, 6(1), 47-58. https://doi.org/10.31537/ej.v6i1.616.

Istiyono, E., Dwandaru, W. B., &; Rahayu, F. (2018). Development of high school physics creative thinking skills tests (physcrethots) based on modern test theory. Educational horizons, 37(2), 190–200. https://doi.org/10.21831/cp.v37i2.1.

Komarudin, K., Suherman, S., Puspita, L., Arrafiansyah, R., &; Hasanah, U. (2020). Program course lab 2.4 mathematics learning media for increasing of creativity domain at higher order thinking skills (HOTS). *Journal of Gifted Education and Creativity*, 7(3), 131-136.

Kustandi, C., &; Darmawan, D. (2020). Development of learning media, concepts & applications, development of learning media for educators in schools and communities. Gold.

Lukitasari, M., Handhika, J., &; Murtafiah, W. (2018). Higher order thinking skills: using e-portfolio in project-based learning. *In Journal of Physics: Conference Series*, 983(1), 12047.

Nurrita, T. (2018). Development of learning media to improve student learning outcomes. Journal of the *Sciences of the Quran, Hadith, Shari'ah and Tarbiyah,* 3(1), 171-210. https://doi.org/10.33511/misykat.v3n1.171.

Oktawirawan, D. H. (2020). Factors that trigger student anxiety in conducting online learning during the COVID-19 pandemic. *Scientific Journal of Batanghari University Jambi,* 20(2), 542-544.

Pakpahan, A. F., Ardiana, D. P.Y., Mawati, A. T., Wagiu, E. B., Simarmata, J., Mansyur, M. Z., Purba, L. I. B., Chamidah, D., Jamaludin, F. J. K., &; Iskandar, A. (2020). *Development of learning media*. Our Foundation Writes.

Riduan, M. D. (2012). *Measurement scale of research variables*. Bandung: Alfabeta.

Rijal, A. S., &; Jaya, R. (2020). Development of web-based learning media to increase teacher creativity. Ideas: *Journal of Educational, Social and Cultural,* 6(1), 81. https://doi.org/10.32884/ideas.v6i1.238.

Salsabila, F., &; Aslam, A. (2022). Development of web-based learning media google sites in elementary school science learning. *Basicedu Journal*, *6*(4), 6081-6090. https://doi.org/10.31004/basicedu.v6i4.3155.

Sani, M. M. R., Meha, A. M., &; Nenotek, S. A. (2020). Application of the 5e learning cycle model to improve students' higher order thinking skills (HOTS) at SMP Adhyaksa 2 Kupang for the 2018/2019 school year. *Journal of Science and Science Education*, 3(1), 15-23. https://doi.org/10.24246/juses.v3i1p15-23.

Setiawan, P. (2019). *Understanding viscosity and its vactors*. https://www.gurupendidikan.co.id/viskositas

Setyorini, I. (2020). COVID-19 pandemic and online learning: does it affect the learning process in curriculum 13. *Journal of Industrial Engineering &; Management Research*, 1(1b), 95-102. https://doi.org/10.7777/jiemar.v1i1.31.

Sugiyono. (2012). *Quantitative research, and R&D*. Bandung: Alfabeta

Suryanto, D.A. (2018). *Comparative analysis between blogger and google site.* Undergraduate S1 thesis: University of Muhammadiyah Surakarta.

Wartono, W., Takaria, J., Batlolona, J., Grusche, S., Hudha, M., &; Jayanti, Y. (2018). Inquiry-discovery empowering high order thinking skills and scientific literacy on substance pressure topic. *Scientific Journal of Physics Education Al-Biruni*, 7(2), 139-151. https://doi.org/10.24042/jipfalbiruni.v7i2.2629.

Yuniansyah, Y., &; Saputra, A. (2017). The influence of perceived benefits and perceived ease of use on the intention to use multimedia computer graphics learning. *National Seminar on Information Technology, Business, and Design,* 2(1), 471-476.