The Use of Videoscribe Animation-Based Science E-Modules on Learning Retention of Junior High School

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Abstract: Learning retention is the ability of students to remember learning material after some time. The use of videoscribe animation-based science e-modules that can increase learning retention is rarely developed. The research aims to determine students' learning retention after using the videoscribe animation-based science E-module. This research is quantitative descriptive. The sample selection using cluster random sampling selected students from class VII.B of SMPN 5 Depok, Yogyakarta with a total of 32 students. The data collection technique is a test technique using a pretest and posttest question instrument totaling 6 questions. The test instrument is in the form of multiple-choice questions, to determine student retention, a retest is carried out one week after the posttest activity. The data analysis technique is quantitative descriptive to determine the score presentation. The pretest score percentage was 43.31% in the fair category, the posttest was 79.17% in the good category, and the retest score was 91.14% in the very good category. The use of videoscribe animation-based science e-modules influences student learning retention with the average being in the good category, indicating that student retention has increased after being taught using videoscribe animation-based e-modules.

Keywords: E-module; Science education; Learning Retention; Videoscribe

Introduction

The advances in information and communication technology in the world of education must also continue to be developed, both in terms of the use of technological tools and the creation of innovative and interesting teaching materials (Lestari & Parmiti, 2020). E-learning resources such as e-modules are one of the innovative products of the development of ICT in the field of education. E-modules are a format that presents independent teaching materials that are regularly arranged and packaged in simple learning units to achieve certain learning objectives (Susilawati et al., 2020). Apart from that, the availability of features such as images, audio, video, animation, and questions for practice in e-modules gives students the opportunity to find out more about the material independently (Cahyanto & Afifulloh, 2020; Sugihartini et al., 2017).

The developments in technology and information have indeed supported the use of electronic teaching materials and learning media. However, during the science learning process, there are still some schools that use printed books more often and the teacher dominates the students so that the students are less active and independent, as a result learning only becomes a process of transferring information without any meaningful experience in learning (Dhitareka et al., 2022; Khasani et al., 2019; Yanindah & Ratu, 2021). Even though right now, we have entered the era of digitalization, which indicates that the use of electronic teaching materials is important considering that the majority of students prefer to use mobile phones. Apart from that, students also prefer a variety of electronic teaching materials so that it is possible to collaborate with digital devices such as e-modules in the learning process (Akram & Mercuriani, 2023; Cahyanto & Afifulloh, 2020).

E-modules have several advantages, such as exploratory material coverage that can encourage students to seek as much information as possible from various sources, and innovative because they can be presented with videos, animations, and interactive simulations (Logan et al., 2021). Using e-modules as teaching materials that use technology can make it easier for teachers to deliver learning material. This will facilitate both teachers and students in carrying out learning and provide a positive impact because the learning process is more interesting and seems more real so that students do not feel bored with the ongoing learning (Asrial et al., 2020).

Learning that is integrated with technology will provide a more enjoyable learning atmosphere, especially in science learning which has abstract material (Niileksela et al., 2016). The use of electronic learning resources has an important role in achieving the teaching and learning process because as a tool, electronic learning resources can convey abstract science content (Riwu et al., 2018). Animated video is one of the media that can be presented in e-modules, the visual and audio nature of the video attracts a wider audience by allowing students to process information in a natural way. Observation through the senses of hearing and sight will enable students to create relevant connections to help memory and recall (Bevan, 2020).

Animation can make science content easier to understand and entertain while still conveying the material according to learning objectives. A more pleasant classroom atmosphere will make it easier for students to understand the material so that learning is more meaningful (Kogila et al., 2020; Sukri & Jailani, 2023). Through the animations presented in the E-module, abstract material can be visualized and with the practice questions in the e-module students can actively improve their own competence (Islamiyati et al., 2021).

The learning process will be meaningful when the material presented can make students associate it with previous knowledge and experience which functions as a root when acquiring new knowledge. Through meaningful learning, information related to the material presented can be stored in long-term memory so that learning retention is more significant and long-lasting (de Leeuw et al., 2023; Kärki et al., 2018). Learning retention is the ability of students to retain their memories regarding the material they have studied within a certain time. The amount of information that students are still able to remember two weeks after the information is received is called the retention level, the higher the retention means the learning process can be said to be meaningful learning (Degeng, 2013; Oliveira, 2017; Sasinggala, 2012).

Thinking as an activity that involves mental processes requires the ability to remember and understand, the ability to think is definitely followed by the ability to remember and understand. Some memories are able to last for a long time because they are immediately transferred to long-term memory when the information is received (Bahri, 2016; Mehta, 2018). Retention is the ability to remember information obtained for a certain period. In learning, retention is related to the amount of material that can be learned and stored in students' long-term storage memory. The memory process is an activity in the brain caused by meaningful experiences that students have gone through that can be related to everyday life (Palennari, 2016).

Retention emphasizes the retention of newly acquired information and the transfer of information from short-term memory to long-term memory. This can happen due to repetition of material, practice, and elaboration. The importance of using multiple senses in the learning process is to maintain students' retention power in learning, especially in science (Aulia et al., 2021; Sasinggala, 2012). The principle of retention in learning is that clear and concrete material will be easier for students to remember compared to abstract material and is assisted by student involvement in the learning process (Safira & Ifadah, 2020; Shofiah et al., 2017).

Videoscribe is an application that can be used to create animated learning videos. Displays such as the teacher's activities while writing on the blackboard and pasting pictures, as well as users who can dub and insert sound as needed to make the video unique from the videoscribe application (Pamungkas et al., 2018; Sukarini et al., 2021). Videoscribe can present learning content by combining images, sound, and attractive design so that it can make learning more interesting and meaningful (Monhartini et al., 2023; Simanjuntak & Hospital, 2021). Apart from that, creating interesting animated videos in the Videoscribe application is very easy, teachers can create visual simulations from abstract material and enable students to have meaningful learning experiences (Septianti et al., 2020). Meaningful learning experiences will leave an impression on the learning process and the material presented will remain in students' memories. The relationship between student achievement and cognitive abilities can be influenced by the quality of supporting resources, student involvement during the learning process, cognitive learning outcomes, and student satisfaction during the learning process (Pyun et al., 2020).

Based on the results of interviews with science teachers at SMPN 5 Depok, Yogyakarta, it shows that student learning outcomes are still lacking because during the learning process, some students lack focus when the teacher delivers lesson material so that information cannot be stored in the students' long-term

memory resulting in learning retention. low level students. One effort to increase student learning retention is to create learning media that can facilitate long-term storage such as e-modules (Mukarramah et al., 2021)). In line with research by Aulia, *et al.* (2021) which explains that enjoyable learning will improve long-term memory abilities, thus having an influence on students' learning retention.

The material of physical and chemical changes is one of the materials in science that has difficult terms and abstract concepts that express concrete properties, processes and concepts (Dwipayana et al., 2020). Through teaching materials that have media that utilize information and communication technology, students will have a more meaningful learning experience and can store the material in long-term memory to increase learning retention. Videoscribe animation can convey abstract material in an interesting and interactive way, thereby helping a meaningful learning process (Septianti et al., 2020). The aim of this research is to determine students' learning retention after using the videoscribe animation-based science E-module.

Method

This research is a type of quantitative descriptive research conducted at SMPN 5 Depok, Yogyakarta. The sample selection using cluster random sampling selected students from class VII.B with a total of 32 students. The instrument used in this research is a type of test. The data collection technique is in the form of pretest and posttest questions totaling 6 questions to measure student learning retention. The retest was carried out one week after giving the posttest to determine student retention. The data analysis technique uses quantitative descriptive to determine the score percentage. Score percentage categories are presented in table 1.

$$Persentase\ Score\ \% = \frac{total\ score}{total\ score\ of\ ideal\ answer} \times 100\% \quad (1)$$

Table 1. Score percentage category

Score (%)	Category
82-100	Very good
63-81	Good
47-62	Enough
25-46	Less

Results and Discussion

Information continuously enters the mind through the various senses. Without realizing it, most of this information will be thrown away and others will be stored for a while and then disappear. Others cannot be forgotten. Retention is the ability to remember material obtained for a certain period (Palennari, 2016). After receiving material through the learning process, students need to retain the material in memory. Long-term storage of material is carried out through special events, providing images, or abstract things obtained by students. Forgetting can occur if the material received is not impressive or does not attract attention, repetition is not carried out or there is no coding when receiving the material (Tambunan et al., 2020).

The science learning retention results of class VII students at SMPN 5 Depok before and after being taught using the videoscribe animation-based E-module obtained by pretest, posttest and retest scores in class VII.C on the material on physical and chemical changes are presented in Figure 1.

Based on the graph above, the pretest score percentage is 43.31% in the fair category, the posttest is 79.17% in the good category, and the retest score is 91.14% in the very good category. This shows that student test results continue to improve and the average learning retention of students scores in the very good category.
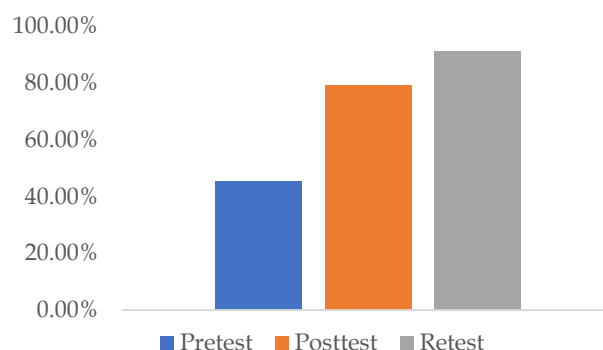

Figure 1. Retention Score Percentage

Videoscribe animation-based science e-modules are used to explain physical and chemical properties and their changes and identify physical and chemical changes in substances in everyday life. The selected concepts are presented sequentially in an animated video. Questions and reflections for students are also provided in the e-module. The following is what the e-module looks like Figure 2.

The animated videos contained in the e-module make it easier for students to understand the material on physical and chemical properties and their changes because, in these videos, the material is summarized systematically and presented in animated form. Students can observe physical and chemical change events through the animations displayed, thereby providing a more real learning experience. Videoscribe media can support students in gaining more real

knowledge and experience, making it easier for students to understand the material. Videoscribe animation makes the science learning process more effective (Monhartini et al., 2023; Sukarini et al., 2021).

Figure 2. Initial view of the E-module

Figure 3. Animation display in E-module

E-modules are innovative teaching materials equipped with interactive videos, audio, images, and animations that can be used online and offline, thereby helping students to repeat lessons at home (Irdawati et al., 2023). Videos and animations will provide an active learning experience and make it easier for students to understand the material so that they can provide positive learning outcomes (Respati & Atun, 2023; Yildiz et al., 2018).

Learning retention is the ability of students to remember material after a certain time interval.

Memories can last a long time when the process of newly acquired information is passed from short-term memory to long-term memory (Palennari, 2016; Sudirman & Yusnaeni, 2022). Retention has several functions for teachers, namely being able to determine the quality of learning and improving the learning process, providing learning according to student's ability to remember material, and maximizing study time. Learning that involves all five senses will provide a meaningful learning experience and make students interested in listening to the material that will be presented. Increasing students' ability to learn will provide strength in processing the information received. (Aulia et al., 2021; Mehta, 2018; Mukarramah et al., 2021).

Based on the results of the analysis that has been carried out, it shows that learning using the Videoscribe animation-based E-module provides differences in scores on the pretest, posttest, and retest. This difference is because students have a more enjoyable impression of learning it increases their long-term memory abilities and the application of information has an influence on students' learning retention. In line with research conducted by Aktas & Yurt (2017) learning using animated videos not only increases motivation and academic achievement but also increases the ability to remember lessons for a long time. In the meaningful learning process, there is a process of linking newly received material with material that has been stored in students' memories. The remembering process becomes easier because there are visual markers such as images and sounds. Presenting material through animation can make a good contribution to remembering (Bevan, 2020; Kärki et al., 2018; Ozkaya & Coskun, 2019).

The pretest score percentage was 43.31% in the sufficient category, the posttest was 79.17% in the good category, and the retest score was 91.14% in the very good category. The retest carried out one week after the posttest showed that almost all students answered the questions correctly. This shows that even though it is within a period of time that allows students to get new material, they can still remember the previous material because one factor is the process of retrieving material that has been stored in their memory which is related to the new material received by students (Hasanah et al., 2017). Students can store material in memory, not only because the material relates to facts, but also how the material is presented and the ease of accessing the information. E-Modules are flexible teaching materials, easy to access anywhere and anytime and cost effective. The material is also presented systematically and interestingly so that students have an interest in repeating the material anytime and anywhere (Asrial et al., 2020; Nazifah & Asrizal, 2022; Yanindah & Ratu, 2021).

Conclusion

The use of videoscribe animation-based science e-modules influences student learning retention with the average pretest, posttest, and retest scores getting different results. The results of the retest conducted one week after the post-test yielded the highest average score, which was in the good category, indicating an increase in student retention after using electronic modules based on video animation for instruction. This research still has shortcomings so it is hoped that future researchers who study a similar formulation can develop retention questions that are different from the posttest questions to get better results.

Author Contributions
The main author, Khamsiah Mawar Fatmah, contributed to designing the instrument conducting research and writing the article. The second author, Sri Arwini Bahrun, contributed to assisting the research implementation process and designing research products. The third author, Insih Wilujeng, contributed to guiding the research and writing the article. The fourth and fifth authors, Suyanta and Sri Rejeki contributed in guiding the writing of the article until completion. All authors have approved the version of the manuscript to be published.

Conflict of Interest
There is no conflict of interest in this research.

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