



Development of videoscribe-based learning media for biodiversity material with the environmental potential of Rahmat Zoo and Park

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Abstract

Biodiversity is often considered a complex topic for students to understand. Therefore, media connecting the material with the environment's potential is needed. With the development of technology, interactive learning media such as videoscribe is one solution. Videoscribe is a video media that uses the concept of a blackboard, where virtual hands appear to draw or write on the screen. This research aims to develop videoscribe media that is valid, practical, and effective. Researchers used the Research and Development (R&D) method with the Borg & Gall model consisting of seven stages: identification of potential problems, data collection, product design, design validation, design revision, product trial, and final revision. The research instruments included interviews with teachers, student needs questionnaires, media and material expert validation sheets, and teacher and student response questionnaires. To measure the effectiveness of the media, 10 multiple choice questions were used. The results showed that the validity of videoscribe according to media experts reached 97.5%, and according to material experts 100%, both in the very valid category. This media is also considered very practical, with 97.72% teacher response and 92.86% student response. The effectiveness of the media was measured using N-Gain from the pretest and posttest results, which showed a score of 0.76, including in the effective category. The videoscribe media developed is considered valid, practical, and effective for use in the learning process.

Abstrak. Keanekaragaman hayati sering dianggap sebagai topik yang sulit dipahami oleh siswa. Oleh karena itu, dibutuhkan media yang dapat menghubungkan materi dengan potensi lingkungan. Dengan perkembangan teknologi, media pembelajaran interaktif seperti videoscribe menjadi salah satu solusi. Videoscribe adalah media video yang menggunakan konsep papan tulis, di mana tangan virtual tampak menggambar atau menulis di layar. Penelitian ini bertujuan untuk mengembangkan media videoscribe yang valid, praktis, dan efektif. Peneliti menggunakan metode Research and Development (R&D) dengan model Borg & Gall yang terdiri dari tujuh tahap, yaitu identifikasi potensi dan masalah, pengumpulan data, desain produk, validasi desain, revisi desain, uji coba produk, dan revisi akhir. Instrumen penelitian meliputi wawancara dengan guru, kuesioner kebutuhan siswa, lembar validasi ahli media dan materi, serta angket respon guru dan siswa. Untuk mengukur keefektifan media, digunakan 10 soal pilihan ganda. Hasil penelitian menunjukkan bahwa validitas videoscribe menurut ahli media mencapai 97,5%, dan menurut ahli materi 100%, keduanya dalam kategori sangat valid. Media ini juga dinilai sangat praktis, dengan respon guru 97,72% dan respon siswa 92,86%. Keefektifan media diukur menggunakan N-Gain dari hasil pretest dan posttest, yang menunjukkan skor 0,76, termasuk dalam kategori efektif. Jadi, media videoscribe yang dikembangkan ini dinilai valid, praktis, dan efektif untuk digunakan dalam proses pembelajaran.

A. Introduction

Advances in science and technology encourage innovation in various fields, including education (Ritonga et al., 2023). Education is increasingly supported by sophisticated learning tools that attract students (Palennari et al., 2018). Teachers must adapt to technological developments for successful learning, especially in developing relevant learning media (Thahira & Jayanti, 2024). Habibah & Salamah (2022) emphasized that learning media is essential to successful teaching and learning activities.

At this time, learning media functions as an intermediary, tool, means, and connector to convey various messages or ideas by utilizing existing technology (Rizalia et al., 2022). According to Nurdiana et al. (2021), learning media is a tool that assists teachers in delivering content or subject matter. Learning media plays a vital role in the teaching and learning process and is an integral part of the world of education. Another definition explains that learning media includes everything that can be used to convey messages from senders to students, to stimulate students' thoughts, feelings, attention, and interest in learning to the fullest (Wulandari et al., 2023).

Along with current technological advances, it is essential to adapt digital technology to teachers' pedagogical beliefs and their teaching methods in the learning process (Borte & Lillejord, 2024). One learning media that can be developed according to these technological advances is interactive learning media. According to Rahayu et al. (2023), "Interactive media is media that can be operated by users so that they can choose what they want for the next step." Another definition states that interactive media combines text, graphics, animation, and sound (Putra et al., 2023). This interactive media can help teachers improve learning effectiveness because learners actively involved with interactive media and its subject matter will learn more efficiently and achieve the desired competencies (Munawir et al., 2024).

Interactive media comes in many forms, and one of the popular ones today is videoscribe. Videoscribe is created using the Sparkol app, which produces videos with simulated hands drawing animations. This application was first developed by Sparkol, a company in the UK, in 2012 (Endah, 2020). Later, videoscribe was further developed using Adobe Flash and Flash Video. According to Al Munawarah (2019), videoscribe is a form of video media with the blackboard concept, where hand drawings appear to be drawing or writing on a blackboard. This concept is often used in presentation videos, promotions, learning, and others.

In biology teaching, it is hoped that teachers can improve students' understanding of concepts and skills, one of which is through the use of learning media. Media is essential, but in biology learning it often only focuses on memorizing concepts without linking them to real situations, which ultimately has an impact on low student understanding due to lack of

interaction with learning objects (Irawan et al., 2017). This is by the observations and interviews at MAS SKB 3 Minister Sei Tontong, where teachers use the lecture method and media such as PowerPoint in teaching. Based on interviews, the methods and media used are less attractive, the explanation of the material needs to be shorter, as a result, students need help understanding the material and often feel bored during the learning process.

In the biology learning process, understanding the concepts to be taught is very important, because it affects student understanding. Suppose the understanding or formation of this concept is different from the correct concept. In that case, it will hinder the teaching and learning process, not least in biodiversity material because the material is one of the essential materials and has a relationship and relationship with other materials. From the results of observations and interviews conducted at MAS SKB 3 Minister Sei Tontong class X students, especially in biodiversity material, 70% of students have difficulty in determining the level of diversity and understanding the concepts and material taught because the material has a vast scope and continues to grow along with discoveries and understanding of life. The difficulties experienced by students are also due to shortcomings that occur during the learning process. This is evidenced by the observation that the lecture method still dominates the teaching process, and learning activities rely only on textbooks. Based on interviews with students, several areas for improvement were found during the learning process. This is caused by the teaching methods and media used by the teacher.

This is in line with research conducted by Angraini et al. (2022) which states that "in biodiversity material students often have difficulty in determining the appropriate level of diversity, both the level of diversity of genes, species and ecosystems from the examples given". This is because teachers tend to use learning with lecture method that is teacher-centered rather than student-centered, without being supported by the use of learning media or teaching materials that can help students understand better and clarify the learning material being delivered.

This development research also wants to integrate the potential of the local environment. Previous research has utilized the potential of the environment to be developed as a learning resource or media (Fahmi et al., 2021; Irhasyurna et al., 2022; Fajeriadi et al., 2024). However, there is still a lack of previous research that combines environmental potential in the Zoo and Rahmat Park in Pegajahan District. This research aims to overcome these shortcomings by developing videoscribe-based learning media containing local environmental potential to improve students' understanding of biodiversity.

One solution to the existing problems is using learning media such as videoscribe that contains the potential of the local environment. This media can provide concrete examples to help students understand biology concepts, especially in biodiversity material, starting from the level of genes and species to ecosystems and ecological processes. These concepts will be more accessible when learned through real examples presented in the learning media (Zega et al., 2022).

Research on the development of videoscribe learning media has been done a lot. However, the development of videoscribe learning media has yet to be developed on biodiversity material with the environmental potential of Zoo and Park. such as research conducted by Agustini & Ngarti, (2020) who developed learning videos to increase student learning motivation using the R&D model. Furthermore, research conducted by Angraini et al. (2022) who developed learning media using the sparkol videoscribe application on Biodiversity material for high school. Research conducted by Sirih & Erniwati (2017) who developed a science learning video based on the potential of the local environment as a learning resource for junior high school/MTs students in Southeast Sulawesi. Therefore, it opens up opportunities for researchers to develop videoscribe learning media on biodiversity material with the environmental potential of Rahmat Zoo and Park in the pegajahan sub-district area.

Based on the description of the problem and empirical evidence that has been presented, this study aims to develop learning media that are feasible, practical, and effective to use. Videoscribe learning media on biodiversity material that integrates environmental potential was developed to assist teachers in explaining material during the learning process, by linking environmental potential as an example of natural objects. This media also makes learning more enjoyable, interactive, and able to hone students' awareness, thus encouraging their creativity in preserving, utilizing, and developing environmental potential in their area (Setyaningish et al., 2019). In addition, this videoscribe media also helps students understand biodiversity material practically and excitingly, because it is presented in an audio-visual format that makes it easy for students to learn independently at home and school.

B. Material and method

The method used in this research is the research and development (R&D) method with the Borg & Gall model which consists of 10 stages (Borg & Gall, 1983). However, in this study, the stages have been modified to seven stages based on the reference from Sugiyono (2009). The reason for limiting to seven stages is because the problems formulated in the research can already be answered through these stages. Borg & Gall (1983) also stated that the development research

procedure consists of two main objectives, namely: developing the product, and testing the effectiveness of the product in achieving the objectives. The following are the seven stages of the Borg & Gall model as shown in Figure 1.

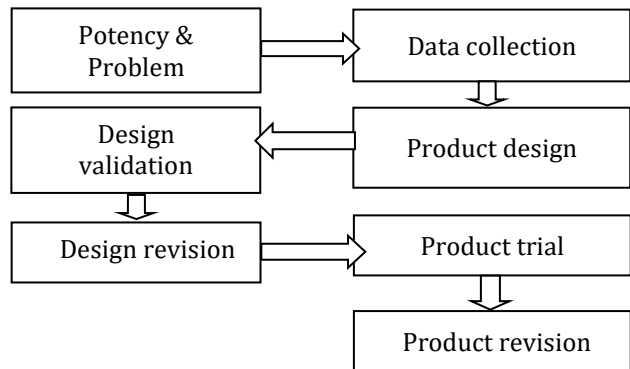


Figure 1 Research and development model by Borg & Gall

The test subjects in this study were grade X students at MAS SKB 3 Minister Sei Tontong. The instruments used include teacher interview guidelines and student questionnaires, which aim to collect data regarding the applied learning media. In addition, validation sheets, which include media expert validation sheets and material expert validation sheets, are used to assess the feasibility of learning media products. A practicality sheet in the form of a student response questionnaire was also used to collect student responses regarding the attractiveness of the learning media.

This learning media development procedure involves 7 stages, namely: Identification of Potential and Problems, Data Collection, Product Design, Design Validation, Design Revision, Product Trial, and Product Revision.

The potential and problem phase are the first step before learning media development begins. In this phase, researchers conducted observations to identify school problems. Using a questionnaire distribution guide, researchers evaluated the media used in learning, school facilities and infrastructure, and the needs of biology teachers and students.

In the data collection stage, researchers identified problems during the pre-research and collected information on solutions to these problems. Researchers created storyboard designs, compiled materials, and edited videos in the product design stage. The design validation stage is assessing the feasibility of the product design, which involves validation by material and media experts. Furthermore, the validation results are discussed with the validators at the design revision stage. If the validation results are considered unsatisfactory, the product will be improved to achieve better results. If the validation results are satisfactory, then proceed with product trials.

At the product trial stage, the media that has been developed is tested on students in related schools. The purpose of this trial is to collect data that can determine the feasibility and attractiveness of the product. The last stage is product revision. After the trial, researchers will evaluate whether the learning media developed is suitable for use or still requires improvement. If there are still areas for improvement in some parts of the product, the researcher will make revisions until the product is ready to be used as the final learning media. The data analysis technique in this research aims to produce valid, practical, and effective learning media. The research data includes qualitative and quantitative data. Qualitative data is obtained from comments, criticisms, and suggestions, while quantitative data is obtained through assessment with validation sheets and response questionnaires from teachers and students. Validity was analyzed based on the assessment from material and media experts, while practicality was measured based on the assessment scores given by teachers and students. The results of validation and practicality were analyzed using a Likert scale (see Table 1).

Table 1 Likert scale criteria

Criteria	Score
Very good	4
Good	3
Less	2
Not good	1

(Source: Sugiyono, 2015)

The validation and practicality sheets were calculated using the Formula 1. The validation is calculated based on the percentage criteria, as shown in Table 2, and then the practicality criteria in Table 3.

$$P = \frac{X_i}{X} \times 100 \% \dots \dots \dots \text{Formula 1}$$

Description:

- P = Percentage value
- X_i = Total score obtained
- X = Maximum score

Table 2 Criteria for validation assessment results

Percentage (%)	Criteria
85-100	Very valid
65-84	Valid
45-64	Less valid
0-44	Not valid

(Source: Sugiyono, 2015)

Table 3 Criteria for practicality assessment results

Percentage (%)	Criteria
85-100	Very practical
70-84	Practical
50-69	Less practical
0-50	Not practical

(Source: Sugiyono, 2015)

Meanwhile, data regarding the effectiveness of videoscribe learning media were obtained from pretest and posttest scores, which were calculated using N-Gain. The purpose of this calculation is to determine the extent to which improvement occurs before and after the use of videoscribe learning media. The effectiveness of this learning media is calculated with the Formula 2. The interpretation of the results of the N-Gain calculation refers to Table 4.

$$\text{Gain} = \frac{\text{post test scores} - \text{pretest scores}}{\text{maximum value} - \text{pretest scores}} \times 100\% \dots \dots \dots \text{Formula 2}$$

Table 4 Criteria N-Gain

N-Gain	Criteria
N-Gain > 0.7	High
0.3 < N-Gain < 0.7	Medium
N-Gain < 0.3	Low

(Source: Hake, 1999)

C. Results and discussion

The result of this development research is learning media in the form of videoscribe that raises biodiversity material, focusing on the environmental potential of Zoos and Parks. This media development follows the Borg & Gall model includes seven steps.

The first stage is potential and problems. This step is essential to ensure the results and development are as expected. At this stage, the researcher found that in the biology learning process, the media used by the teacher was only a Power Point presentation, which was less attractive in delivering the material. Another problem that arises is that students feel bored and saturated, especially in biodiversity material. The development of videoscribe is expected to make the learning process more enjoyable. In addition, some students need help determining the diversity level because the material has a vast scope and continues to grow along with discoveries and understanding of life.

The second stage is data collection. The data collection results obtained from teacher and student questionnaires showed that the learning media used lacked attractiveness, so videoscribe learning media was developed using biodiversity material with the environmental potential of Rahmat Zoo and Park.

The third stage is product design. Researchers began to design the media design to be developed. The first step is for researchers to compile the material. The material to be developed is Biodiversity. This material is obtained from the source of student books, relevant journals and books on the wealth of biodiversity. Researchers collected images from personal documentation that researchers conducted at Rahmat Zoo and Park in Pegajahan District—moreover, the preparation of video slideshow. In the sub display there are two sub points in the form of a display and description containing biodiversity material. In the sub display start sketching animated images and sub descriptions. Then for the font shape, font size, color,

background is chosen as enjoyable as possible to produce media that suits the needs of students.

Furthermore, the images were compiled into a slideshow. These images were obtained from personal documentation conducted in the environment of the Zoo and Taman Rahmat in Pegajahan Sub-district. Finally, researchers insert audio into the slideshow so that students easily convey the material explanation and adds to the attractiveness of this media.

The media design or design that has been made is then validated by media experts and material experts. This validation test aims to evaluate the extent to which the videoscribe media developed meets the validity standards. The results of validation by media experts on the videoscribe developed can be seen in Table 5. Then, the results of validation by learning material experts on the videoscribe developed can be seen in Table 6.

Table 5 Results of media expert validation

No.	Section name	Score obtained	Maximum score	Percentage	Criteria
1.	Compositional balance of text, images, sounds, and video	7	8	87.5%	Very valid
2.	Color selection	12	12	100%	Very valid
3.	Physical criteria	4	4	100%	Very valid
4.	Practicality	8	8	100%	Very valid
5.	Long term use	8	8	100%	Very valid
Amount		39	40	97.5%	Very valid

Table 6 Results of teaching material expert validation

No.	Section name	Score obtained	Maximum score	Percentage	Criteria
1.	Content eligibility aspect	24	24	100%	Very valid
2.	Linguistic aspects	32	32	100%	Very valid
3.	Presentation aspects	32	32	100%	Very valid
Amount		88	88	100%	Very valid

Based on the results of media and material validation that has been carried out, this videoscribe obtained an average score of 97.5% from media experts, which is considered very valid. Meanwhile, validation from material experts received an average score of 100%, with very valid criteria. The validators gave such a high rating because the media experts considered that videoscribe has an interactive and innovative design, which makes it different from conventional learning media. The use of hand animations, a combination of text, images and sound makes the presentation of the material more enjoyable

and easier to understand. Meanwhile, the material expert assessed that the content presented aligns with the curriculum, learning targets, and students' needs.

Nevertheless, both experts made some suggestions. Responding to these suggestions, the researcher proceeded to the fourth stage, revising the product. The difference between the product before and after revision can be seen in the following figure. Figure 2 shows the results of revisions made to make the product look stronger by changing the layout between images and text, as well as adding the agency logo.



Figure 2

The results of the revision were made to look powerful, changed the layout between images and text, addition of agency logo (in Indonesian)

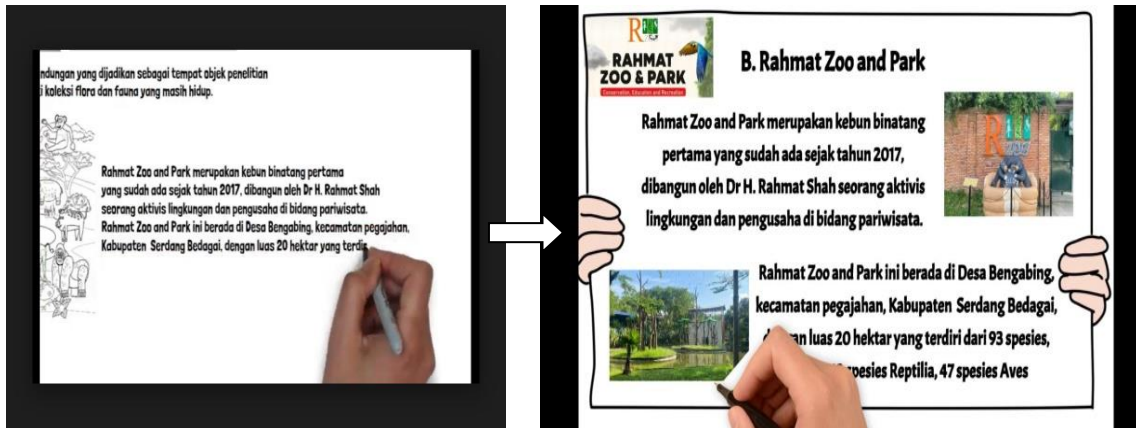


Figure 3

The revision results from the validator added a picture of Rahmat Zoo and Park, not fulltext and made to look powerful (in Indonesian)

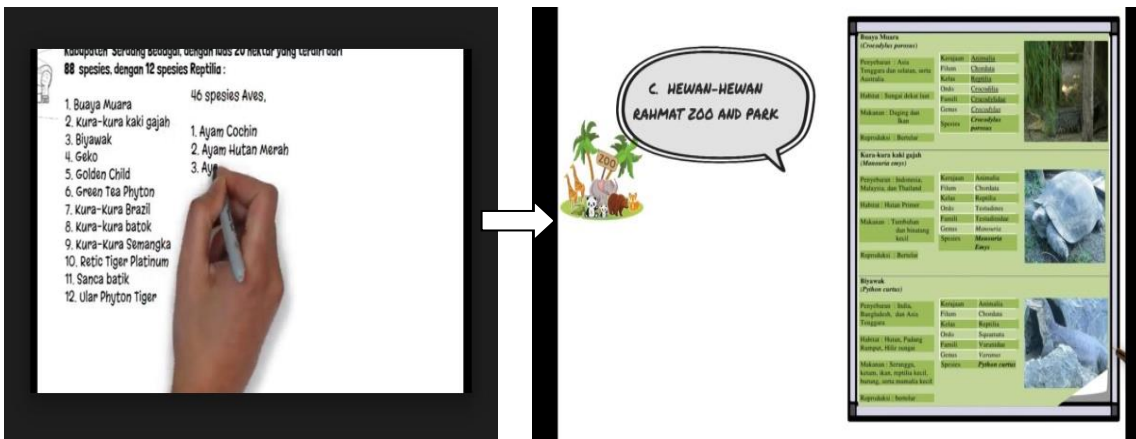


Figure 4

In the animal introduction section, it is not only in the form of text, but there are additions such as images, classification, description in the form of, distribution, habitat, food, and reproduction (in Indonesian)

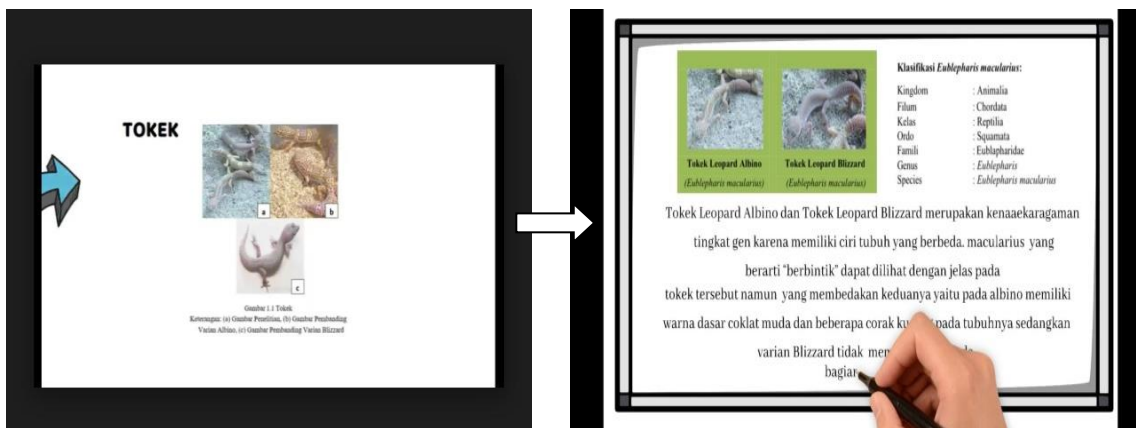


Figure 5

In the example section of gene-level diversity at Rahmat Zoo and Park, the classification and explanation of why the animal is included in gene-level diversity are also added (in Indonesian)

Figure 3 is also the result of a revision from a validator who added an image of Rahmat Zoo and Park. The final product is made more attractive with strong visuals and not just full text. In Figure 4, in the animal introduction section, it is not only in the form of text, but also equipped with images, classification,

description, distribution, habitat, food, and animal reproduction. Furthermore, Figure 5 shows an example of gene-level diversity at Rahmat Zoo and Park, where the classification and explanation of why the animal is included in gene-level diversity are also added.

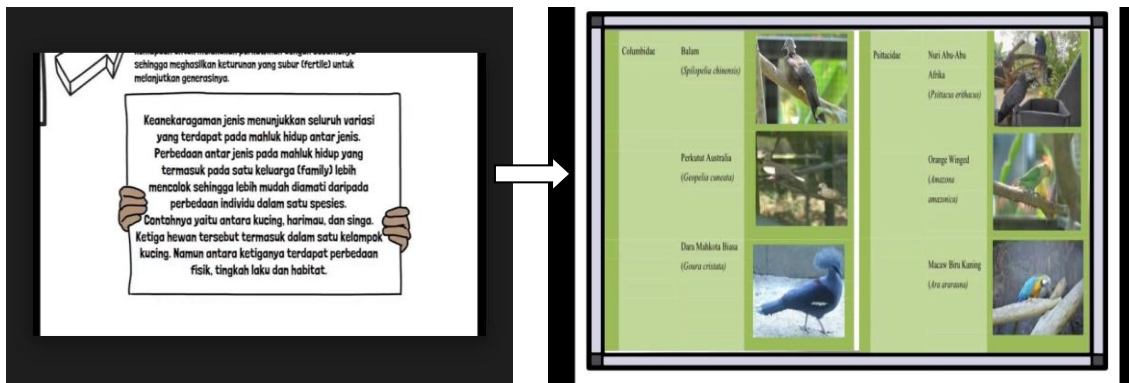


Figure 6

In the material section of species level diversity, not only fulltext but there are additions such as pictures, regional names, Latin names, and the family classification level of the animal (in Indonesian)

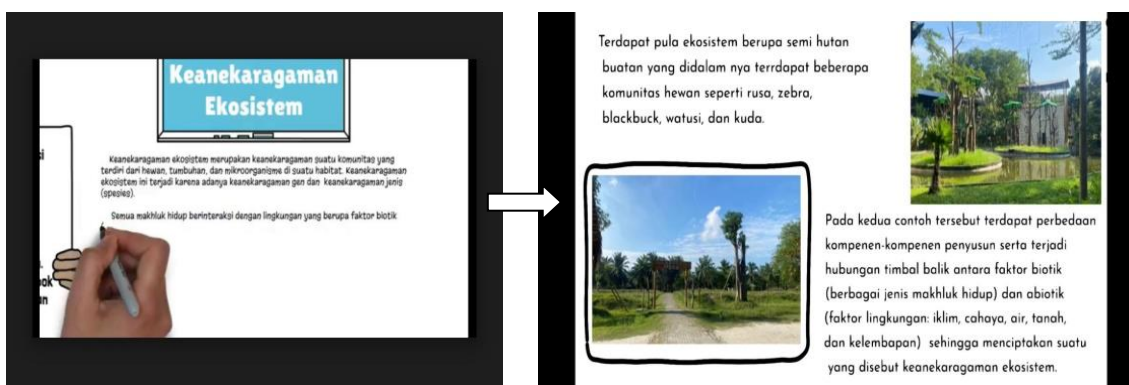


Figure 7

In the ecosystem diversity material, examples of ecosystems and pictures of ecosystems are also added (in Indonesian)

Figure 6 illustrates material about species-level diversity which is not only full text, but also has additional images, regional names, Latin names, and family classifications of the animals. In Figure 7, the material on ecosystem diversity is complemented with examples of ecosystems as well as pictures of relevant ecosystems.

After revisions based on the validation of media and material experts, researchers made adjustments to the design according to the validators' assessment, input, or suggestions. Although major revisions were unnecessary because the media developed had

received good ratings, researchers still made minor improvements to maximize product quality. After revising the media, it was tested by distributing questionnaires to teachers and students to assess its practicality and effectiveness. This trial aims to evaluate the extent to which the development product functions correctly and to determine the effectiveness of videoscribe media in biodiversity material related to the environmental potential of Zoo and Park. The results regarding practicality can be seen in Table 7 and Table 8, while the effectiveness of videoscribe media can be seen in Table 9.

Table 7 Teacher response questionnaire results

No.	Section name	Score obtained	Maximum score	Percentage	Criteria
1.	Interest	20	20	100%	Very practical
2.	Material	11	12	91.67%	Very practical
3.	Language	12	12	100%	Very practical
Amount		43	44	97.72%	Very practical

Table 8 Results of student response questionnaires

Number of respondents	Score obtained	Maximum score	Percentage	Criteria
35 Students	2.340	2.520	92,86%	Very practical

Table 9 Effectiveness test results N-Gain

Pretest	Posttest	N-Gain	Percentage	Criteria
50.29	87.71	0.76	76%	High

Table 7 shows that the response questionnaire from biology teachers obtained an average of 97.72%, which indicates very practical criteria. While the student response questionnaire from 35 students, shown in Table 8, received an average of 92.86% with very practical criteria. This media is practical because it has met the criteria of practicality. This is in line with research conducted by Sitepu & Siregar (2023) which states that sparkol videoscribe-based learning animation videos are considered practical if they meet the criteria of practicality as measured by two things: (1) students' assessment of the developed device, which was declared as practical or very practical, and (2) teachers' responses to the device, which also fell into the practical or very practical category. This shows that the developed media meets the criteria of practicality. The media received positive responses from teachers and students. Teachers stated that this media can be used as a tool or learning resource that makes it easier for students to understand the material and helps them better remember and understand the concepts taught. Students also felt that videoscribe media made them more interested in the learning process, because videoscribe has its exciting elements

Furthermore, the effectiveness test results can be seen in Table 9. This test shows students' scores increased before and after using videoscribe media. This increase is evidenced by comparing the pretest and posttest analyzed using N-Gain. The N-Gain calculation shows that students' pretest scores are lower than their posttest scores. The average N-Gain obtained is 0.76, included in the high or effective category. These pretest and posttest results indicate that the videoscribe media developed is effective as a tool in the learning process in the classroom.

Based on the stages of product testing, this videoscribe media does not need a further product revision process because this media has reached the desired level of perfection or satisfaction based on the results of trials and evaluations. Therefore, the stage only reaches the product test stage. This is by research conducted by Rulyansah et al. (2019) which says that if the feedback from participants in the trial is very positive and no significant problems are found, then the product development is good enough to be implemented or applied without further revision.

The videoscribe media developed significantly differs from other learning resources such as textbooks or PowerPoint presentations. Firstly, it uses moving hand animations not found in printed books or PowerPoint. This animation helps students to be more focused and interested during the learning process as it presents the material dynamically and interactively. Secondly, this videoscribe media utilizes personal

documentation taken directly from Rahmat Zoo and Park, which provides real examples of the potential of the local environment. This makes the material more relevant to students as they can see the biodiversity around them first-hand. Textbooks or PowerPoints usually use generic images or illustrations that are not always appropriate to the local context. Thirdly, videoscribe combines various elements such as animations, images, text, and audio that are presented interactively. This makes it easier for students to understand complex material, such as biodiversity, as the information is delivered more concisely and directly. Unlike the lecture method or textbook-based learning, which tends to be monotonous, this media is more interactive and can increase students' absorption of the presented material. With this visual and interactive approach, videoscribe becomes a more exciting and effective learning media, helping students better understand abstract concepts such as species, ecosystems and ecological interactions.

Wahyuni & Lazuardi (2024) argue that videoscribe can present learning material content from a combination of images/illustrations, sound, and exciting creations so that students can enjoy the learning process and provide an accurate picture of the material presented. Therefore, this makes it easier for students to understand complex concepts about biodiversity and the environment's potential at Rahmat Zoo and Park. In addition, with the combination of audio, text and images, videoscribe can create a more interactive and easy-to-follow learning experience, helping students better understand and remember the material. Biodiversity material includes much information about different species, habitats and ecological interactions. This overwhelms students by the many details that must be learned and remembered. Therefore, this media is beneficial in the student learning process.

This is by research conducted by Rahayu et al. (2023) which explains that learning using pictorial media (video and audiovisual) is better than learning in verbal conditions (audio). However, the difference is this previous research used sources derived from printed books. Meanwhile, the research developed here is that the images come from direct documentation. This is the advantage of videoscribe, which is developed to allow interactive learning that students can digest more easily. Complex material, such as biodiversity, can be visualized dynamically with moving illustrations, students can easily understand how these elements are interrelated in a sustainable ecological system. This developed media provides an excellent opportunity for educators to increase environmental awareness through a more

evocative visual approach. This developed videoscribe offers an effective way to introduce the concept of biodiversity to students. With a visual approach, students can understand the variety of species and their essential role in maintaining the balance of the ecosystem. With the ability to present interactive and engaging content, this product enhances student absorption and supports the formation of more profound knowledge. Thus, videoscribe not only excels in design and ease of use, but also contributes positively to the delivery of materials relevant to environmental conservation and the formation of students' knowledge of ecosystems.

Using local environmental potential, such as the Zoo and Mercy Park, differentiates the videoscribe media developed from other learning media. Students can see the biodiversity around them by displaying real examples from the local environment. This helps them relate abstract concepts such as species, ecosystems and interactions between living things with examples they recognize in the real world. Thus, students more easily understand and remember the material because the concepts taught come from books or verbal explanations and visualizations that they consider relevant to their daily lives. In addition, the images taken from personal documentation provide specific details that are more accurate and truer to the conditions on the ground, making the material richer and more in-depth. These advantages create a more contextualized learning experience, so that students learn about biodiversity theoretically and feel a direct connection to their surrounding environment. This differs from other media that usually only use illustrations or general images from textbooks without directly connecting to local potential.

The application of videoscribe learning media on biodiversity material loaded with the environmental potential of Rahmat Zoo and Park can help students understand concepts. Not only that, at the time of application of the product, it can be seen that students' assistance in understanding the material that has been presented in the learning videos that have been developed. Surveys show a significant increase in students' interest in topics such as local species, ecosystems, and conservation after using videoscribe media that is interactive and relevant to their environment. In addition, with more concrete and relevant visualizations, students may feel more confident in understanding and explaining these concepts.

videoscribe also increased student engagement during the learning process. Students seemed more focused and actively asked questions, which showed a higher interest in discussing the material presented in videoscribe. This proves that this media produces a positive impact on student learning outcomes. This research is in line with research conducted by Hasanah et al. (2022), which states that Sparkol videoscribe

learning media is effective in promoting concept understanding and positive attitudes among students.

The success of this medium in visualizing abstract scientific concepts suggests that a similar approach can be used to teach topics that are difficult to understand with traditional methods. Take Climate Change for example: videoscribe can be used to illustrate complex processes such as global warming, the carbon cycle, and the impact of greenhouse gas emissions. With interactive animations and engaging visualizations, students can more easily understand the cause-and-effect of climate change and its effects on the global ecosystem. In addition, Evolution and Genetics: The concepts of evolution, natural selection, and genetic mutations are often complex for students to understand with text alone. Videoscribe can help by showing dynamic illustrations of changes in species over time, genetic relationships, and interactions between environmental factors and genetics. Not only that, in physics and chemistry, videoscribe can also facilitate the understanding of fundamental laws, such as Newton's laws of motion, quantum theory, or chemical processes such as combustion reactions. With animations depicting forces, energy, and reactions, students can better understand physical and chemical phenomena that are not always visible in everyday life. Thus, videoscribe media excels in teaching biology and biodiversity and can also be adapted for various disciplines, especially in conveying concepts that require a deep visual understanding and depiction of complex processes.

However, the application of this media will also experience obstacles. Technical barriers to using videoscribe in schools may vary depending on technology infrastructure, hardware availability and teachers' technical skills. Videoscribe requires software that may need to be downloaded or accessed online, so limited stable internet access in some schools could be an obstacle. In addition, not all teachers have sufficient skills in using software such as videoscribe. Training and introduction to teachers on the use of this application may be necessary. Limited technological skills among teachers could be a barrier in implementing this media. Although media such as videoscribe has great potential in improving learning effectiveness, these technical barriers need to be overcome so that its implementation in schools can run smoothly.

D. Conclusion

videoscribe media developed has high quality based on practical assessments from teachers and students and effectiveness test results that show a significant increase in student understanding. With an average N-Gain of 0.76, this media is classified as effective in helping students understand complex material such as biodiversity. The engaging quality of the visualizations, the use of personal documentation from the local environment such as Rahmat Zoo and Park, and the

interactive presentation make videoscribe superior to traditional learning resources such as textbooks or PowerPoint. The role of this media in long-term learning is significant. Videoscribe can make abstract concepts such as species, ecosystems and interactions between living things more accessible for students to understand and remember. Visualizations relevant to the students' environment help them relate the lessons to the real world, thus strengthening their understanding in the long run. In addition, this interactive and contextual learning method can increase students' motivation to learn. Suggestions for future research could be to apply videoscribe to other subjects, Future research could also examine the effectiveness of videoscribe on groups of students with diverse backgrounds, such as students with learning difficulties, or at different levels of education, to see the extent to which this media can help various types of learners.

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F. References

- Agustini, K., & Ngarti, J. G. (2020). Pengembangan video pembelajaran untuk meningkatkan motivasi belajar siswa menggunakan model R&D. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, 4(1), 62–78. DOI: <https://doi.org/10.23887/jipp.v4i1.18403>
- Al Munawarah, R. (2019). Sparkol videoscribe sebagai media pembelajaran. *Inspiratif Pendidikan*, 8(2), 430–437. DOI: <https://doi.org/10.24252/ip.v8i2.12412>
- Angraini, D., Alberida, H., & Rahmi, Y. L. (2022). Pengembangan media pembelajaran menggunakan aplikasi sparkol videoscribe pada materi keanekaragaman hayati untuk SMA. *Indonesia Journal of Education Research*, 3(1), 1–6. DOI: <https://doi.org/10.24036/edunesia.v3i1.20>
- Borg, W. R., & Gall, M. D. (1983) *Educational research: An introduction*. New York: Longman Inc.
- Børte, K., & Lillejord, S. (2024). Learning to teach: Aligning pedagogy and technology in a learning design tool. *Teaching and Teacher Education*, 148, 104693. DOI: <https://doi.org/10.1016/j.tate.2024.104693>
- Endah, K. (2020). Pemberdayaan masyarakat: Menggali potensi lokal desa. *Moderat: Jurnal Ilmiah Ilmu Pemerintahan*, 6(1), 135–143. DOI: <http://dx.doi.org/10.25157/moderat.v6i1.3319>
- Fahmi, F., Fajeriadi, H., & Irhasyuarna, Y. (2021). Feasibility of the prototype of teaching materials on the topic of classification of living things based on the advantage of local wetland. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 3(2), 113–118. DOI: <http://dx.doi.org/10.20527/bino.v3i2.10322>
- Fajeriadi, H., Zaini, M., Dharmono, D., Nugroho, B. A., Fahmi, F., & Fitriani, A. (2024). The popular scientific book-based coastal gastropod's diversity as local potential: Practicality and effectiveness on student's critical thinking ability. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 10(2), 580–590. DOI: <https://doi.org/10.22219/jpbi.v10i2.32255>
- Habibah, A., & Salamah, Z. (2022). Penyusunan videoscribe sebagai media pembelajaran biologi SMA kelas XII materi pertumbuhan dan perkembangan. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 6(2), 381–393. DOI: <https://doi.org/10.20961/jdc.v6i2.65124>
- Hake, R. R. (1999). *Analyzing change/gain scores*. Bloomington: Dept. of Physics Indiana University. Retrieved from <https://web.physics.indiana.edu/sdi/AnalyzingChange-Gain.pdf>
- Hasanah, I. S. N., Quthny, A. Y. A., & Pratama, L. D. (2022). Efektivitas media pembelajaran sparkol videoscribe terhadap pemahaman konsep dan sikap positif siswa indah. *Jurnal Pendidikan dan Konseling*, 4(4), 1349–1358. DOI: <https://doi.org/10.31004/jpdk.v4i4.5192>
- Irawan, A., Sihkabuden, S., & Sulthoni, S. (2017). Pemanfaatan video pembelajaran biologi pembuatan tempe dan yoghurt. *Jinotep*, 3(2), 105–109. DOI: <http://dx.doi.org/10.17977/um031v3i22017p105>
- Irhasyuarna, Y., Kusasi, M., Fahmi, F., Fajeriadi, H., Aulia, W. R., Nikmah, S., & Rahili, Z. (2022). Integrated science teaching materials with local wisdom insights to improve students' critical thinking ability. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 4(3), 328–334. DOI: <http://dx.doi.org/10.20527/bino.v4i3.14148>
- Munawir, M., Rofiqoh, A., & Khairani, I. (2024). Peran media interaktif dalam meningkatkan motivasi belajar siswa pada mata pelajaran SKI di Madrasah Ibtidaiyah. *Jurnal AL-Azhar Indonesia Seri Humaniora*, 9(1), 63–71. DOI: <http://dx.doi.org/10.36722/sh.v9i1.2828>
- Nurdiana, A. S., Hanafi, S., & Nulhakim, L. (2021). Pengembangan media video pembelajaran animasi berbasis kinemaster untuk meningkatkan efektivitas pada mata pelajaran IPA siswa kelas IV SDN Kedaleman IV. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 10(6), 1554–1564. DOI: <https://doi.org/10.33578/jpkip.v10i6.8395>
- Palennari, M., Adnan, A., & Fajrianti, N. (2018). Pembelajaran sistem reproduksi manusia menggunakan blended learning terintegrasi

- discovery learning. *Jurnal Sainsmat*, 7(1), 47–56. DOI: <https://doi.org/10.35580/sainsmat7164762018>
- Putra, I. A., Russitta, N., & Wulandari, K. (2023). Rekonstruksi video pembelajaran project based learning (PjBL) berbasis pendekatan science, technology, engineering and mathematic (STEM). *DIFFRACTION: Journal for Physics Education and Applied Physics*, 5(1), 8–16. DOI: <https://doi.org/10.37058/diffraction.v5i1.6248>
- Rahayu, S., Tanjung, I. F., & Syahputra, I. (2023). Pengembangan video pembelajaran berbasis sparkol videoscribe pada materi fungsi untuk siswa kelas X SMA Muhammadiyah 9 Kualuh Hulu. *Jurnal Bionatural*, 10(1), 77–88. DOI: <https://doi.org/10.61290/bio.v10i1.504>
- Ritonga, I., Suryani, I., Pima, E., & Tambunan, S. (2023). Pengembangan media pembelajaran interaktif berbasis android materi keanekaragaman hayati untuk siswa SMA. *Pendidikan Sains & Biologi*, 10(2), 184–194. DOI: <https://doi.org/10.33059/jj.v10i2.7708>
- Rizalia, S., Susilawati, S., Adi, W. C., & Parlin, P. (2022). Pengembangan media video pembelajaran biologi sebagai alternatif peningkatan kompetensi dasar siswa saat pandemi covid-19. *Al-TA'DIB: Jurnal Kajian Ilmu Kependidikan*, 15(2), 63–78. DOI: <https://doi.org/10.31332/atdbwv15i2.4242>
- Rulyansah, A., Wardana, L. A., & Hasanah, I. U. (2019). Pengembangan media pembelajaran pop up dengan menggunakan model STAD dalam meningkatkan hasil belajar siswa (materi lingkungan sekitar kelas III SDI Darul Hidayah. *Pedagogy: Jurnal Ilmiah Ilmu Pendidikan*, 6(1), 53–59. Retrieved from <https://ejournal.upm.ac.id/index.php/pedagogy/article/view/330>
- Setyaningish, E., Sunandar, A., & Anandita, E. S. (2019). Pengembangan media booklet berbasis potensi lokal Kalimantan Barat pada materi keanekaragaman hayati pada siswa kelas X di SMA Muhammadiyah 1 Pontianak. *Pedagogi Hayati*, 3(1), 1–23. DOI: <https://doi.org/10.31629/ph.v3i1.1068>
- Sirih, M., & Erniwati, E. (2017). Video pembelajaran IPA berbasis potensi lingkungan lokal sebagai sumber belajar siswa SMP/MTS di Sulawesi Tenggara. In *Prosiding SNPS (Seminar Nasional Pendidikan Sains)* (pp. 274–280).
- Sitepu, E. G., & Siregar, T. M. (2023). Development of learning animation videos using the sparkol videoscribe application to improve students' understanding of mathematical concepts at smps sultan iskandar muda. *Formosa Journal of Multidisciplinary Research*, 2(1), 287–302. DOI: <https://doi.org/10.55927/fjmr.v2i1.2592>
- Sugiyono, S. (2009). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.
- Sugiyono, S. (2015). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.
- Thahira, N., & Jayanti, U. (2024). Digital interactive module based on team games tournament to develop collaboration and student's critical thinking skills on respiratory system material. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 6(2), 125–136. DOI: <http://dx.doi.org/10.20527/bino.v6i2.19062>
- Wahyuni, E. S., & Lazuardi, R. (2024). Pengembangan video pembelajaran menggunakan sparkol videoscribe pada materi pencemaran lingkungan. *Jurnal Pendidikan dan Pembelajaran Sains Indonesia (JPPSI)*, 7(1), 16–24. DOI: <https://doi.org/10.23887/jppsi.v7i1.73340>
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya media pembelajaran dalam proses belajar mengajar. *Journal on Education*, 5(2), 3928–3936. DOI: <https://doi.org/10.31004/joe.v5i2.1074>
- Zega, I. D., Ziliwu, D., & Lase, N. K. (2022). Pengembangan media pembelajaran multimedia interaktif berbasis web pada materi keanekaragaman hayati. In *Educativo: Jurnal Pendidikan* (Vol. 1, Issue 2, pp. 430–439). DOI: <https://doi.org/10.56248/educativo.v1i2.60>