# Development of Animated Learning Video Media Subtheme 2: Interrelationship Among Living Organisms

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**Abstract:** The results of observations at SDN 1 Bono show that students like interesting audio and visuals, but teachers are lacking in utilizing the media. This study aims to provide information about the validity of learning video media, teacher and student response data about learning video media for food webs for Class V SDN 1 Bono Tulungagung. Video media has been developed in the form of animations that can be used on food chains and food web material. The ADDIE model was used as a development method in the research. The research trial subjects are material experts, media experts, fifth-grade students of SDN 1 Bono, and fifth-grade teachers of SDN 1 Bono. Questionnaires were used as a data collection technique to determine the responses of media and material experts, students, and teachers. Likert scale was used as a data analysis technique. The results showed that, in the limited trial and field trial, the learning video media for food webs were included in the very feasible criteria and based on the results of the teacher and student response questionnaires, it can be said that the media is practical to be applied.

**Keywords:** development, learning media, food webs.

## A. Introduction

Education is one of the efforts carried out fundamentally and systematically to achieve progress in developing human beings as a whole into competent, capable, independent, and responsible human beings. The quality of human resources is influenced by the role of education. The development of science and technology requires teachers to be creative in learning. The success of the learning process is influenced by the use of media (Puspitaningrum, Purnamasari, & Purnamasari, 2020). Students' needs and characteristics must be considered in developing learning media. Because of this, learning will be more effective and efficient. Therefore, teachers can realize creative and innovative learning media. Learning media is anything that can help teachers deliver material during the learning process so that it can facilitate the achievement of predetermined learning objectives (Novita, Sukmanasa, & Pratama, 2019). In the learning process, the media acts as an information intermediary, to prevent

obstacles, stimulate student and teacher motivation, and maximize the learning process (Hasan, 2021). types of learning media including visual media, audio media, and audio-visual media (Wisada, Sudarma, & Yuda S, 2019). One form of audio-visual media is video.

Video media is a medium that utilizes the functions of the senses of sight and hearing. According to KBBI, a video is a moving picture accompanied by sound. At the same time, Kurniawan, Kuswandi, & Husna (2018) the state of learning video media is a media that displays a combination of audio and visual that contains the theory of knowledge to help students understand learning material. Video media can be used as a means of entertainment for students to avoid boredom and optimize the learning process. The advantages of video media include: (1) can attract the attention of students (2) information is quickly conveyed (3) makes it easier for students to understand learning material (4) educators can prepare the material well in advance (5) save time and can play repeatedly (Karisma, Mudzanatun, & Arisyanto, 2019). Making video media requires more effort for educators because this media needs to be accompanied by knowledge in terms of animation, communication, and editing.

This video media can be applied to learning Theme 5 Subtheme 2 Relationships Between Living Things in Ecosystems Food Web Material. Food webs are a collection of interconnected food chains in an ecosystem while food chains are the process of eating and eating fellow living things in a certain order that occurs in terrestrial and aquatic ecosystems. Food web video media is developed in the form of animation. Animation is formed from a collection of images that are processed into motion by giving certain effects so that it looks realistic and interesting (Mashuri & Budiyono, 2020). Animated videos are very suitable for elementary school children because they are interesting and seem funny.

Based on preliminary observations at SDN 1 Bono, teachers still rarely use media as learning aids. Learning about the material of food webs nailed to the blackboard, teacher explanations, and student handbooks were known during initial observations carried out. Students are asked to observe the picture made by the teacher on the blackboard then students are asked to listen to the explanation delivered. After that, the teacher asked questions related to food chain events. However, some students answered randomly, citing difficulty and confusion regarding the order of the food chain. This affects students' cognitive learning outcomes on food web material. 40% of students have not been able to achieve minimum completeness in the material, so they have to follow a remedial program.

Based on the observation process conducted by the researcher, it was found that the material explanation and examples provided in the guidebook were considered incomplete and the pictures were black and white so students were less interested in reading the guidebook. In addition, the researcher also interviewed the fifth-grade teacher regarding the number of students who did not understand the material, and it

turned out that the main cause was the inability of students to motivate themselves to read and look for answers from them.

Basically, during evaluation, teachers still have difficulty overcoming these problems, one of the causes is the teacher's limitation in presenting when developing a learning environment that is suitable for the material. The development of animated video media was initiated by researchers based on the characteristics of students who like interesting audiovisuals. This is expected to increase interest, enthusiasm, and ease of understanding of the material presented.

This animated video environment has some innovations such as increasing the number of objects and adding more moving animations to give the impression of animation similar to the cartoons they used to watch on TV. In addition, the background and bright colors have been adjusted to the preferences of elementary school children who like bright colors. This media is also more interactive because it begins with questions or examples as suggestions to increase their interest in learning before the teacher provides further explanation.

Research conducted by Lukman, Hayati, & Hakim (2019) entitled Development of Local Wisdom-Based Animated Video Media in Grade V Science Learning in Elementary Schools states that with the use of animated video media, the learning process becomes more interesting and practical. Furthermore, it is supported by research conducted Isti, Agustiningsih, & Wardoyo (2022) with the title Development of Animated Video Media on the Properties of Light for Class IV Elementary School Students states that the validity of the media is 86.5% very feasible category and the effectiveness of the animated video media developed shows effective evidence with a percentage of 84.61%. These two studies have relevance to the planned research, especially in the context of curriculum and student characteristics.

First, relevance to the curriculum: this research emphasizes the development of educational media according to the current curriculum. An animated video environment developed through a curriculum-based approach should effectively fulfill the learning standards set out in the national curriculum. This ensures the material presented in the educational media meets the needs of the curriculum, thus assisting teachers in carrying out appropriate and comprehensive teaching. Secondly, relevance to students' characteristics: this research also pays attention to students' characteristics, namely interest in media, and interesting audiovisuals. By understanding students' preferences, the purpose of developing an animated video environment is to better attract students' attention and maintain their participation in the learning process. In addition, interactive multimedia technology can accommodate students' different learning styles, thus improving the understanding and retention of learning materials.

Therefore, these two studies provide a strong foundation to support the importance of the proposed research. The research further supports researchers in developing video media in the form of animation because the results obtained are in the category of very feasible, effective, very interesting, and practical. This research is

expected to make a positive contribution to further researchers so that they can create research results on other materials with video media that are useful for the learning process in schools.

**B. Methods**

Development research is a process of improving existing products or developing new products where the results can be accounted for (Prananda, Wardana, & Darniyanti, 2021). The research conducted used the ADDIE research model, namely Analysis, Design, Development, Implementation, and Evaluation. This model was chosen because it is easy to understand and each step is explained in detail so that researchers understand what to do for the product to be developed.

The analysis stage is carried out through observation and interviews at SDN 1 Bono in class V to find out the problems in the learning process. Furthermore, researchers identify problems and try to develop animated learning video media as a problem solver. At this stage, the researchers conducted a needs analysis including KD, KI, learning objectives, and learning materials for food webs and food chains.

The design of learning video media for food chain material is carried out at the design stage. There are several steps at this stage, namely: preparation of software that will be used, namely Flipa and Caput, preparation of image designs and music that will be used, preparation of sound recordings for voice filling in the video to be developed, designing animations and backgrounds that will be used, and making a description of food chain material and food webs according to KI, KD and learning objectives.

The next step is to develop the product design that has been prepared by producing, editing, and finishing the video based on the design as interesting as possible. The software used is Flipaclip, Cap Cut, and Zepeto. Furthermore, at the implementation stage, the finished product will be validated to determine the level of validity of a product. The validation test action was tested by material experts and media experts. The assessment of this validator determines the validity of the product developed so that researchers can trial the product to respondents. The results of this stage can be in the form of revisions that are improvements so that the product developed is maximized. The evaluation stage is carried out at each stage to ensure the effectiveness and success of the product being developed.

The test subjects in this study were all grade V students of SDN 1 Bono, totaling 23 students. The small group trial was conducted on 6 students who were taken randomly while the field trial was conducted by 17 students, of which 17 students were students who did not take part in the small group trial. The data subjects in this study are expert validators who are competent in animation-based video media, namely material experts and media experts.

Data collection techniques are an important element in research. Data collection in the study used questionnaires for media experts, material experts, student responses, and teacher responses. The media expert questionnaire is used to determine the feasibility level of the developed media. The selection of validators was carried out through a

purposive sampling technique. According to Sugiyono in Sari, Syamswisna, & Yokhebed (2019), *purposive sampling* is a sampling technique with certain considerations. The selection of material experts and media experts, namely lecturers or teachers who are competent in the material and media developed. Student response questionnaires were used to determine student responses to the media developed. This student response questionnaire was distributed to all fifth-grade students. The teacher response questionnaire is used to find out how the teacher responds to the media developed. The teacher response questionnaire was given to the fifth-grade teacher who taught thematic subjects.

The instruments in this development research are media expert validation sheets (table 3), material expert validation sheets (table 4), student response validation sheets (table 5), and teacher response questionnaire instrument lattice (table 6). Media expert assessment is used to determine the level of validity of the developed media. The following are the guidelines for the questionnaire instrument used in this study.

Qualitative data analysis in this study was obtained from criticisms, suggestions, and responses from material experts, media experts, student responses, and teacher responses. Quantitative data analysis was obtained from the angeket sheet and then the data was converted into qualitative data using a Likert scale with a score range of 1-5. The calculation of the final score is calculated using the following formula (figure 1).

$$P = \frac{\text{sum of total scores (x)}}{\text{maximum score}} \times 100\%$$

Figure 1. Final Grade Calculation Formula
Source: Candrawaty et al. (2022)

The results of the questionnaire assessment are then adjusted to the assessment criteria in Tables 1 and 2.

Table 1. Criteria for Assessment of Media Experts and Material Experts

| Percentage | Assessment Criteria |
|---|---|
| 81 – 100 % | Highly valid |
| 61 – 80 % | Valid |
| ,41 – 60 % | Valid enough |
| 21 – 40 % | Less than Valid |
| 0 – 20 % | Invalid |

Source: Harahap, Mujib, & Nasution (2022)

Table 2. Student Response and Teacher Response Assessment Criteria

| Percentage | Assessment Criteria |
|---|---|
| 81 – 100 % | Very good |
| 61 – 80 % | Good |
| 41 – 60 % | Good enough |
| 21 – 40 % | Not good |
| 0 – 20 % | Very unfavourable |

Source: Tania (2017)

Table 3. Media Expert Questionnaire Instrument Grid

| Aspects | Indicators | Number |
|---|---|---|
| Presentation Aspect | Learning video media on food chains and food webs are presented in an interesting way | 1 |
| | The design, images, size, and shape of the food web and food chain videos are well-presented | 2 |
| | Video media of food webs and food chains can increase students' curiosity | 3 |
| Aspects of video usage | Food web and food chain video media can be used safely | 4 |
| | Food web and food chain video media are easy to apply in the learning process | 5 |
| | Food web and food chain video media can be used inside and outside the classroom | 6 |
| | Food web and food chain video media are easily accessible | 7 |
| | The language used is easy to understand | 8 |
| | Voice/dubbing is clear | 9 |
| | The selection of sound effects is appropriate | 10 |

Adapted from: Pangestu, Tisngati, & Aristya (2022) and Kumar dkk. (2021)

Table 4. Material Expert Questionnaire Instrument Lattice

| Aspects | Indicators | Number |
|---|---|---|
| Subject matter | Completeness of material | 1 |
| | Correctness of material | 2 |
| | Clarity of material | 3 |
| | The questions presented are relevant to the material | 4 |
| Appropriateness to the theme | Suitability material with basic competencies | 5 |
| | The suitability material with core competencies | 6 |
| | Suitability of material with learning objectives | 7 |
| | Suitability of material with media | 8 |
| Presentation of material | Presentation of material is arranged systematically | 9 |
| | Presentation of food chains and food webs encourages student engagement in the learning process | 10 |
| | The images presented are by the food chain and food web material | 11 |
| | Providing examples to clarify the material by the food chain and food web material | 12 |

Adapted from: Pangestu dkk. (2022) dan Ismawati (2021)

Table 5. Grid of Student Response Questionnaire Instruments

| Indicators | Statement Number |
|---|---|
| Enjoyment in using video media | 1 |
| A sense of not being bored in using video media | 2 |
| Understanding of the material with video media | 3 |
| Ease of language to understand in video media | 4 |
| Fostering enthusiasm for learning by using video media | 5 |
| Ease of understanding the material in the video | 6 |
| Ease of accessing videos | 7 |
| Font and image size on video media | 8 |
| Sound and music on video media | 9 |
| Independence in learning with video media | 10 |
| Ease of working on questions after using video media | 11 |
| Suitability of media to student needs | 12 |

Adapted from: Mashuri & Budiyono (2020) dan Kusumawardhani, Prihandono, & Anggraeni (2022)

Table 6. Teacher Response Questionnaire Instrument Lattice

| Indicators | Statement Number |
|---|---|
| The attractiveness of the learning video media display | 1 |
| The material presented in the media is easy to understand | 2 |
| Easy to use and durable | 3 |
| Music is not distracting | 4 |
| The animation in the learning video is interesting | 5 |
| Make it easier for teachers to deliver teaching materials | 6 |
| Media's ability to help students understand learning materials | 7 |
| The questions presented are by the material | 8 |
| Writing is visible | 9 |
| Time-efficient learning implementation | 10 |

Adapted from: Candrawaty, Damariswara, & Aka (2022) dan Khusnah, Sulasteri, Suharti, & Nur (2020)

## C. Result and Discussion

In the first stage, namely the analysis stage, researchers conducted a needs analysis in the form of analyzing KI, KD, learning objectives, and learning materials. At this stage, researchers conducted a needs analysis including KD, KI, learning objectives, and learning materials for food webs and food chains. Just like other themes, theme 5 Ecosystem also has 4 KIs in general, namely KI 1 (spiritual), KI 2 (social), KI 3 (knowledge), and KI 4 (skills). The research took KD in KI 3 and KI 4 in theme 5 subtheme 2. There are 5 KD in theme 5 subthemes 2 including KD PPKn, Indonesian Language, Social Studies, SBdP, and Science. In learning 1 there are 2 KD, namely Indonesian Language and Science. In this study, we took the science KD which includes KD 3.5 Analyse the relationship between ecosystem components and food webs in the surrounding environment and KD 4.5 Make work on the concept of food webs in an ecosystem. The next step is to analyze the learning objectives. The results of the analysis of learning objectives are that through the explanation in the learning video media, students can: (1) detail the components of the food chain appropriately, (2) analyze the difference between food webs and food chains correctly, (3) draw up food webs systematically, and (4) present report results with confidence. The last step is the analysis of learning materials. In subtheme 2 science learning, there is food chain material and material on the relationship between living things in the ecosystem. Based on the results of the analysis of KI, KD, and learning objectives, the material of the food chain and food webs becomes the main material in the developed learning video. The development of learning videos must pay attention to the balance in the amount of material presented. The material must be sufficient to achieve the Basic Competencies (KD) and learning objectives. The optimal amount ensures that the material can effectively contribute to the achievement of the KD and learning objectives, while excess material can cause a waste of time and effort during learning (Magdalena, Khofifah, & Auliyah, 2023).

At the design stage, researchers take several steps such as preparing software, preparing image designs, preparing sound recordings, preparing animations and backgrounds then making a description of the material used. At the stage of designing learning videos on ecosystem material, several steps are taken to ensure that the material taught is effective and interesting for students. Mayer (2001) states that when multimedia elements such as images, audio, animation, and text are used together, information is better understood and remembered.

Next, develop the product based on the design that has been designed. After the video was completed, there were suggestions for improvement from the validators as follows in table 7. Suggestions for improvement from media experts in the form of changing the initial uppercase. While suggestions from material experts in the form of improvements to quiz questions because they are not by learning objectives, should not display answers to quiz questions so that students think more, the second revision is the

addition of images on the difference between food chains and food webs and the addition of identity to the video opener. These validator suggestions were used as revision materials for the existing design. As part of the development of learning videos, the suggestions of media experts and material experts play an important role in ensuring the quality and effectiveness of learning. This is in line with the formative evaluation theory by Scriven (1967) which emphasizes the importance of external feedback in developing and improving a product.

Table 7. Media Display Before and After Revised

| Before Revision | After Revision | Description |
|---|---|---|
|  |  | Uppercase change |
|  |  | Addition of researcher identity |
|  |  | Adding pictures on the difference between food webs and food chains |
|  |  | It does not display answers to quiz questions |
|  |  | Adjustment of quiz questions to the learning objectives used |

Implementation on respondents was carried out at stage four. However, before this stage, the developed media is assessed by material and media experts. When the

learning media is said to be valid, then the trial stage is carried out for the respondents. The following table 9 and 10, presents the percentage of assessment results from media and material experts, and student and teacher responses.

The result of this development research is a food web educational video. Good educational video media is defined as a resource that can activate students to provide answers, provide suggestions, and encourage students to practice correctly (Arwudarachman, Setiadarma, & Marsudi, 2015). The average result of the media expert assessment is 94.5% while the average result of the material expert is 88%, the video media developed is very feasible to use. First, the assessment given by media experts on the presentation aspect scored very well, namely 2 indicators with an average validation result of 100%. Furthermore, in the aspect of video use with indicators of voice clarity and sound effect suitability scored 80% and 86%. Second, the assessment given by material experts on the aspect of material presentation with the lowest average validation result of 73% is on the indicator of systematically arranged material presentation and the highest average result assessment is on the indicator of material presentation encouraging learner involvement with a score of 100%. The material presented in the development of video media must be by the demands of KI, KD, indicators, and learning objectives used. This statement is by the material expert questionnaire sheet on the aspect of suitability for the theme.

Table 9. Percentage of Assessment of Media Experts and Material Experts

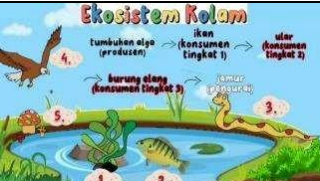| No | Validators | Validity Results (%) | Description |
|----|------------|----------------------|-------------|
| 1. | Learning media expert | 94,5 % | Highly valid |
| 2. | Learning material expert | 88,0 % | Highly valid |

Table 10. Percentage Assessment of Student Response and Teacher Response

| No | Trial Subject | Percentages (%) | Description |
|----|---------------|-----------------|-------------|
| 1. | Response of Class V Students in the Small Group Trial | 91 % | Very good |
| 2. | Response of Class V Students in the Large Group Trial | 89 % | Very good |
| 3. | Class V Teacher's Response | 98 % | Very good |

Based on the percentage of media evaluation developed by researchers, the product is in the very good category. From this statement, it can be concluded that the educational video media for food webs developed by researchers is of sufficient quality and can be used effectively in learning. The average result of student responses in the small group trial was 91% while the average result in the large group trial was 89%. Although in the large group trial, there was a decrease, it was still in the category of very high use. From the results of student responses, it can be seen that the development of video media can reduce student boredom during learning hours and can increase

student enthusiasm for learning. This can be seen from the questionnaire assessment that has been filled in by students. In addition, there is a teacher's response which obtained a percentage of 98% with the category "very good to use" and the video media developed is good and can be used as learning media, the statement was obtained from the notes column on the teacher's response questionnaire sheet.

Table 11. Display of Media Development Results

| No. | Picture | No | Picture |
|---|---|---|---|
| 1 |  Opening greeting display | 7 |  Marine ecosystem food chain display |
| 2 |  Display of prayer to start learning | 8 |  Display of material explanations and examples of food webs |
| 3 |  Basic competency display | 9 |  Learner worksheet display |
| 4 |  Display of learning objectives | 10 |  Quiz view 1 |
| 5 |  Display of garden ecosystem food chain material | 11 |  Quiz view 2 |
| 6 |  Pond ecosystem food chain display | 12 |  Display of closing prayer |

From both trials, if adjusted to the assessment criteria table 1 and 2, it is included in the criteria very feasible to use. Furthermore, the average result obtained from the teacher's response is 98%. In the teacher response questionnaire, the lowest value is on the indicator of learning media developed that can reduce learning time. This learning video media development research is supported by previous research Prasetyo, Aka, & Primasatya (2023) with food chain material. This research shows that the videos developed are proven to be valid and meet the criteria of practicality. Thus, the results of previous studies strongly support the success of learning video media development related to food web material. That with the development of video media is declared valid and has met the criteria of practicality. This research makes an important contribution to the literature on educational media development, especially environmental science learning at the elementary school level. With promising results and support from previous studies, it is hoped that this food web learning video media (see table 11) can be an effective means of increasing students' understanding and interest in learning this material. Access link:

https://drive.google.com/file/d/1ipJY0LnI0Q0xG3dXIxeSBfp9CejMRnDY/view?usp=drivesdk.

The evaluation stage is carried out to improve product development at each stage carried out. After going through this evaluation stage, the final results of the development of food web video media are described as follows. The quality of the final product is greatly influenced by the yield. Through evaluation, developers can assess how well learning objectives are achieved, identify weaknesses in video design and content, and adjust learning strategies to the needs of learners (Scriven, 1967). In addition, through evaluation, developers can also ensure that their learning videos adhere to the principles of effective learning design, such as clarity of information, relevance of content, and learner engagement.

## D. Summary

The animated video media for learning food webs obtained 94% validity from media experts with the criteria 'very valid to use'. The level of feasibility obtained from the material expert validation test is 88%, which is on the criteria "very valid worth using". Product trials were conducted on grade V students. The questionnaire results in the small-scale trial obtained a percentage of 91% in the 'very good to use' category. While the large group trial obtained a percentage of 89% in the 'very good to use' category. Based on the results of this questionnaire, it can be seen that the media developed is practical to use.

The learning media developed by researchers are very limited, and can only be used on food chain and food web material. Researchers hope that future researchers can present a more complete explanation of the material apply it to other learning materials and design video learning media more interestingly. The sound/dubbing and selection of sound effects used received a less-than-optimal score. Researchers hope that researchers

in the next video media development can fill in the doubling clearly and choose sound effects that are more appropriate. Judging from the material expert assessment obtained by researchers, there are still many shortcomings in the material presented. Researchers hope that the next researcher will present the material more systematically and provide questions that are more relevant to the material presented. Based on the large group trial, the percentage result is 89% with the reasons explained in chapter IV. Therefore, researchers hope that the next development of learning video media accommodates large group trials.

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