



## Digital Technology Development in the Form of YouTube Videos as Science Learning Media in Ecosystem Material on Learning Motivation

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### Abstract

The development of digital technology is the result of engineering human reason, mind, and intelligence, which describes the progress of science and provides benefits in various aspects of human life. The research methods used were the ADDIE model. The ADDIE model is a methodically constructed learning design with certain stages in an effort to overcome learning problems and create reliable results. The results obtained were in the form of validity test results from several media, IT, material, and individual experts. The validity test results stated that animation-based YouTube video media was worth using. This YouTube video media could be used as a learning medium for grade VII students, creating a conducive learning atmosphere and motivate student learning.

**Keywords:** Digital Technology, Learning Media, Learning Motivation, Video YouTube.

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## INTRODUCTION

Technology uses digital as a result of recent advances in science and technology. Technology is now being used as a means of communication. It is the quality of this time period, the ease of obtaining information, and the speed at which things can be done, like traveling at the speed of light, that make their impacts on this world seem so limited in scope and time. Surprisingly, as technology has advanced, we can now establish relationships quickly via devices, and it's easy to find teaching resources using a web browser and login email account. Emails can be sent to other people via email, which can be done not only through internet cafes but also through digital media such as mobile phones. Currently, many people in rural areas use mobile phones to meet everyone's needs, including adults, teenagers (students), and elementary school children. Mobile phones are no longer luxury items owned by people like city dwellers.

The number of people using digital technology, such as the internet, was based on data from the research journal J. Voogt, O, et al in 2013 regarding the number of people using digital technology, such as the internet. Although it was less than in 2016 when 132.7 million of them, a total population of 256.2 million people in Indonesia, used it. It can be concluded from the presentation of research data that local residents used the internet 80% of the time. In addition, research conducted by the Association of Internet Operators (APJII) revealed that 67.2 million people, or 50.7%, access the internet via computers and mobile devices. And Java, which has 86.3 million inhabitants and accounts for 65 percent of all internet users, has the highest population.

From these data, it shows that as students, we must be able to master or be able to follow the development of digital science and technology. The emergence of digital technology is estimated in the 80s, which can be marked by changes in mechanical analog-electronic technology to digital electronic technology. Defining digital technology in learning media to become a creative convergence of digital art, science, technology, and business for human expression in interaction. The use of digital technology today is not as difficult as before using tools that use a manual system. Currently, the development of digital technology is developing this tool by using an automatic system, which makes it faster and easier to carry wherever we go. With the use of digital technology, you can do things quickly, easily, and practically without spending a lot of energy and money.

The development of digital technology has made its use more convenient by enabling automatic, fast, high-quality, efficient, and easy transfer of data and rapid retrieval of information from other electronic media. The internet is one of the products of this digital technology development that can be used. For example, because it is simpler, faster, and more dynamic to get information and communicate, we use the internet to do so, giving the impression that humans live in a small world with wide access. People who have the ability to quickly and in large and varied quantities obtain information from very distant places on earth and communicate with third parties. The ways in which people engage with one another, both privately and publicly, in the economic spheres of a diverse world have been transformed by the internet and online systems.

We are no strangers to digital technology that is thought to have arrived suddenly but has actually been in use since the 1980s. And in the twenty-first century, there was a name change, namely with the term of digital rea. Digital technology is now a necessity, and not only adults but teenagers and even small children are aware of the existence of Android phones. We can access windows to the world thanks to digital devices that use Google, Yahoo, blogging, email, and YouTube. Students who can quickly find the educational materials they need are also examples of quality education personnel, including lecturers, teachers, educators, *widyaiswara*, counselors, tutors, and facilitators.

Digital technology has become even more significant in the twenty-first century because, in the midst of a pandemic that has affected us for about two years, we need to understand technology, so kids can learn and innovate in today's classroom. Digital technology prowess accelerates knowledge acquisition, enhances life skills as working capital, and makes it easier for educators to create lesson plans. The adoption of a new online curriculum and system as well as the development of education with the aim of creative Indonesia by the Indonesian Ministry of Education and Culture is proof that digital technology has now become a bubble in the world of education (Sudjana & Rivai, n.d.)

Indonesia uses digital technology, such as the internet, through gadgets or internet cafes, with features such as web browsers and others. Digital technology can make it easier for people to obtain information and carry out all daily tasks, including those related to education. As a result, the authors used video-based educational resources such as YouTube, which was one of the hallmarks of the internet. Video is a type of electronic media that combines audio and visual technology to create dynamic presentations that attract the attention of viewers. In addition, videos can be packaged into portable DVDs and VCDs that we can

carry with us. However, due to advances in technology, we can now easily share the videos we make on YouTube for everyone to view on smartphones, laptops, PCs, and other internet-connected devices.

Learning media with attention, affective function, cognitive function, and compensatory function is one of the many functions of video media, according to Arsyad's research in 2005. Video with attention function focuses on getting someone's attention to make them pay attention to the information presented. Video media that evoke strong emotions and encourage receptive responses from viewers are said to have an effective function. The cognitive function of video media is to accelerate the achievement of learning objectives that have been created to help viewers understand and remember the information or messages contained in the images and audio that have been explained in the video. Meanwhile, the task of compensating learning media is to provide context to viewers who are less able to react and recall information they have learned from watching videos. Several interpretations can be concluded from the description of this function, one of which is that visual media can help students who are weak and slow to understand the information that the teacher is trying to convey. Due to the ability to mix visuals (images) and audible cues, students can easily understand the ideas presented by the teacher in these instructional films (sounds).

The use of video as a learning tool has gained popularity because, apart from combining visuals and audio, it can also be packaged in a variety of ways. For example, it can combine face-to-face communication with group communication while also including text, audio, and music. According to opinions in their research (Sudjana & Rivai, n.d.), videos have the advantage of increasing student motivation to learn and making the content more understandable for students, facilitating mastery, and making the delivery simple.

Although not always in accordance with the needs and preferences of students, the learning videos that are intended to be displayed aim to make it easier for students to understand the subject matter. Hauff and Laaser (1996) finding stated that not all instructional media systems, such as YouTube videos, were expertly prepared to present material as a whole but also only served as additional material for handout material.

Based on the results of interviews conducted by researchers with class VII teachers at SMP Negeri 2 Ngadiluwih, it was known that the use of learning media in the learning process was very low. This was proven when the teacher explained the material using only worksheets and did practical work with

limited tools. Meanwhile, based on the results of interviews with teachers, it was found that the students were less enthusiastic about learning the theory taught by their teachers. They were more likely to play or chat with their peers. In addition, participants felt difficulty understanding the material. One of them was found in ecosystem material.

This was evident from the results of the daily test scores that did not meet the Minimum Completeness Criteria. There were only 10 of 36 students in class VII C achieved the Minimum Completeness Criteria. In addition, there were 26 students who did not reach the Minimum Completeness Criteria. It is worth to know that the Minimum Completeness Criteria in science subjects at SMP Negeri 2 Ngadiluwih was 70 (Utari, 2022).

Based on the results of these interviews, several conclusions could be drawn, including class VII students having difficulty understanding the concept of ecosystems. According to Hamzah and Muhlisraini, there was no good understanding from a student, so there would be difficulties in recalling the information conveyed.

Learning science at SMP Negeri 2 Ngadiluwih needs interesting learning methods, so the students are more active and creative with an increased enthusiasm for learning. One of the learning methods that can support activeness and cognitive learning outcomes is to use an interactive video learning method that depicts the material being explained by the teacher. Animation-based video learning can usually accommodate students to be skilled in existing problem-solving activities and improve a student's cognitive thinking, and currently, it is still rare to use this method.

Many previous research resulted regarding the development of digital technology in the form of YouTube videos on student learning motivation. The application of this YouTube video was carried out by (Kurniawan et al., 2018). The purpose of this development was to produce a valid and effective Science Learning Video Media product about the Properties and Changes in Shape of Objects for Class IV students at SDN Merjosari 5 Malang. This development had gone through the stages of identifying needs, formulating learning objectives, developing materials, developing evaluation tools, writing manuscripts, media production, compiling guidelines for utilization, validation/testing, and revision according to the development model (Sadiman, 2010). This study explained that video media in learning would help teachers to make it easier conveying material and creating learning situations that were understandable and not monotonous.

Iwantara et al., (2014) also carried out the application of YouTube video learning media. This study discussed the effect of using YouTube video media in science learning on students' learning motivation and understanding of concepts. This research was a quasi-experimental study with a pretest-posttest non-equivalent control group design. The population was class IX students at SMPN 1 Abiansema with a sample of 105 students consisting of 2 experimental classes and 1 control class. The data obtained was in the form of an N-gain score on learning motivation and understanding of concepts. The instruments used were motivational questionnaires and concept comprehension tests. The results showed that the real media and video media Youtube was superior to Charta media in instilling an understanding of concepts in students.

Yudianto (2017) also performed research entitled Application of Video As A Learning Media that discussed 1) There were elements of video, namely text, images, sound, and animation. 2) Using video, students could witness an event that could not be witnessed live, dangerous or past events that could be brought directly into the classroom. Students could also play back the video according to their needs and necessities. Learning with video media fostered interest and motivates them to always pay attention to the lesson. 3) Video media was the most appropriate and accurate learning media for conveying messages and would greatly help students' understanding. The results obtained were in the form of video media that made students more familiar with the material presented by educators through the screening of a film that was played.

Based on the three studies described above, the researcher draws conclusions about the importance of video media in everyday life based on the definitions given above, including the fact that these media can convey more sophisticated and timely information. Other entertaining and educational videos could also be used as teaching tools. The goal is that students can understand it more quickly during the learning process. In addition, teachers will find it easier to present lessons using video media. It goes without saying that for this operation to be successful, scientific and technological expertise must be in full force. Ecosystem related readings from grade 7 are used in this investigation. Researchers will try to make instructional videos as interesting as possible before posting them to a YouTube channel. The difference between this research and previous research is that the video made has been adjusted to the material needed by Class VII regarding the ecosystem chapter. And the advantages of this research also minimize the storage space used to access the video.



## **METHOD**

Using the ADDIE model, this study examined how development occurs. The ADDIE model is a learning design model that is built methodically with certain stages in an effort to overcome learning problems and create reliable results (Widiyasanti & Ayriza, 2018). This model was chosen because it used a systems approach, the main component of which was to break down the learning planning process into a number of phases, arrange the steps into a logical sequence, and then use the output of each step as input for the following step.

### **Research Design**

The ADDIE model was divided into five stages, the first of which was analysis. At this stage, the work environment and other factors were analyzed to determine what products needed to be developed. The second stage was the design phase. Before starting to develop goal requirements, researchers had to first have the resources needed to understand the problem. After agreeing on the research objectives, the researcher would decide how to state the problem. The next step in achieving the desired or anticipated result was the implementation phase. Creating a product validation questionnaire, validating by the validator, and creating pretest and posttest questions were all included in the third stage of development. The fourth stage was implementation, which involved carrying out individual trials as well as validation and expert judgment. The fifth stage was evaluation, in which a formative assessment of the product being developed was carried out before moving on to adjustments as necessary.

### **Population and Sample**

This research was conducted at SMP Negeri 2 Ngadiluwih, Kediri Regency in 2<sup>nd</sup> semester of the academic year 2021/2022. The population in this study were all students of class VII SMP Negeri 2 Ngadiluwih, which had 4 classes, ranging from class VII A to VII D. The researchers used class VII C as a research sample from 4 existing classes.

### **Instruments**

Class 7-C students, IT experts, materials experts, and learning media experts were the research subjects. The instruments used in the data collection process included questionnaires or questions, interviews, and questionnaires/questions. The information collected for this study came in the form of questionnaire responses, ratings, comments, and ideas for the resulting items. Utilizing quantitative descriptive statistical analysis techniques was the analytical approach adopted in this investigation. This analytical method was used to process quantitative data from the questionnaire, which was presented

as a score and then translated using conversion for the level of attainment on a scale of five.

### Data Analysis

In processing the data, the researchers used the formula (ARIKUNTORO & JABAR, 2018) as follows:

$$P = \frac{\sum X}{\sum Xi} \times 100\%$$

Information :

P = Percentage

$\sum X$  = Respondent's score in one item

$\sum Xi$  = Total ideal score in one item

100% = Constant

The results of the data collection above would be seen if the following criteria were met:

Table 1. Criteria for the Level of Validity

Category	Presentase	Information	Score
A	81% - 100%	Valid	4
B	61% - 80%	Valid Enough	3
C	41% - 60%	Invalid	2
D	<40%	Invalid	1

## FINDINGS AND DISCUSSION

### Results

The results of this study were Youtube video media which was equipped with animation in accordance with the selected content, which was Natural Sciences (IPA) with the main subject of Ecosystems. This material was science subject material for class VII junior high school students, especially in science content according to the 2013 curriculum used at SMPN 2 Ngadiluwih, Kediri Regency. The design of the Youtube video media, which was equipped with this animation, used the stages of the ADDIE model, which consisted of five stages.

The first stage was the analysis stage. At this stage, an analysis was carried out regarding the needs of students at SMPN 2 Ngadiluwih, Kediri Regency, by observing and interviewing class VII teachers at SMPN 2 Ngadiluwih, Kediri Regency regarding the obstacles faced in learning.



The second stage was the design stage. At the stage based on the information obtained at the analysis stage and then used to design the product to be developed, the design of Youtube video media, which was equipped with animation, was first designed in the form of a storyboard.

The third stage was the development stage. At this stage, the learning videos that have been designed in the form of a storyboard were developed according to the designs that had been made and adapted to the material that had been prepared. The creation of this animated video was designed using the help of Adobe Premiere Pro CC 2018 software.

The fourth stage was the implementation stage. At this stage, product testing was carried out before being given to students. Testing this product consisted of testing learning media experts, IT experts, material content experts, and individual trials. This test was carried out to determine the feasibility of the animated video being developed. The fifth stage was the evaluation stage. At this stage, an evaluation was carried out using formative evaluation to assess the product being developed. The formative evaluation carried out includes validation by experts and individual trials.

Testing the validity of YouTube video media products equipped with animations was carried out by learning media expert tests, IT experts and material content experts, and individual trials. The results of the validity test of the development of animation-based YouTube video media according to the tests of learning media experts, IT experts and content experts, and individual trials are presented in Table 2 below.

Table 2. Validation Test Results for YouTube Video Media Development

No	Trial Subjects	Validity Results	Information
1	Test the Learning Media Member	84%	A
2	Test IT Professionals	71%	B
3	Material Expert Test	84%	A
4	Individual Test	88,5%	A

Table 2 shows that the results of the validity of animation-based YouTube video media obtains good qualifications from the learning media expert tests, material content experts, and individual trials. This can be seen from the validity test results of the learning media experts that get a percentage of 84% (very good),

validity test results of IT experts that get a percentage of 71% (good), subject matter expert test results get a percentage of 84% (very good), and the results of individual trials get a percentage of 88.5% (very good).

The results of the validity test states that animation-based YouTube video media is feasible to use, but there are some inputs or suggestions from experts to improve the project-based animated video media being developed. The input or suggestions given by experts are presented in Table 3, and the results of the development of animation-based YouTube video media are presented in Figure 1.

Table 3. Input and Suggestions from Expert Trial Subjects

No	Trial Subjects	Feedback, Suggestions, and Comments
1	Test the Learning Media Member	The use of letters that are even more varied and the size is also adjusted to the design.
2	Test IT Professionals	The video resolution is further increased so that viewing is more comfortable.
3	Material Expert Test	-
4	Individual Test	-



Figure 1. A combination of audio, images, and writing in YouTube videos as learning media

## Discussion

Based on the results obtained, the percentage of trial data was 88.5%. The findings of the data analysis further supported the statement that YouTube videos used to educate science for class VII C ecosystem content in 2<sup>nd</sup> semester

were evaluated based on the audience or students, with favorable and interesting feedback for students. Of the 36 test takers, 26 (85%) of them successfully met the KKM (Minimum Completion Criteria) and were considered complete. Ten (15%) individuals are currently awaiting completion. As a result, it can be concluded that students who use YouTube videos to study do so more effectively.

The work of a subject matter expert served as the basis for this version of the content. In accordance with the questionnaire submitted to subject matter experts, who received responses in the form of using language and terms according to the level of the student experience, the information offered is quite comprehensive and concise, although the sound quality in YouTube videos can be improved.

Two media professionals were consulted to modify this media. Using the provided questionnaire as a guide, selecting visuals for the film to represent responses is sufficient and can hold the viewer's attention. In addition, it is imprecise for the movement of images and sounds so that children can understand them more quickly. Updating the data collected and the findings of the trial with 36 audiences are student modifications. Analysis was performed using data from validation findings. According to a thorough investigation, students find YouTube videos very interesting as a learning resource within the ecosystem and are eager to learn by watching them.

The message is communicated through the media. According to (Susilana & Riyana, 2009), Messages from learning sources are transmitted through this channel to the learning process in learning media. The tool that successfully and efficiently assists students in achieving their educational goals. Video is one of the learning media that can be entertaining to use in learning exercises. A form of educational media called video includes visual and auditory components.

The combination of the contents of audio and video visual files is created through a knowledge transfer process. It is noteworthy that it is the animation in the video that motivates the viewer to learn is what draws attention to it. Interests that operate silently can accelerate learning compared to previous biases. According to (Amarulloh et al., 2020), currently, in the 2019 school year, the use of videos can be combined with the use of models and teaching methods in the class.

The final video content can be displayed online, especially using the YouTube application, for students to access online whenever and wherever they like. This learning paradigm is used in online teaching because it can facilitate learning for students. In addition, it can increase students' academic independence.

This animated video media makes students happy and motivated to listen to the learning given. The use of learning media will greatly assist in learning activities, and delivering learning material in an interesting way can increase students' understanding (Lukman et al., 2019).

This is in line with research conducted (Widiyasanti & Ayriza, 2018) that learning using animated video media is more effective than learning using image media in increasing student learning motivation. The usage of animated videos makes students enthusiastic and interested in learning so that students easier to understand the material. Implementing animated video media as a support for teaching materials in learning, of course, will make students feel enthusiastic and interested in learning so that it can increase student motivation and learning outcomes. This is in accordance with the opinion (Geni et al., 2020), which states the use of teaching materials or media that have convenience and practicality in their use can directly provide comfort and attractiveness and not cause confusion for users. The positive impact of implementing Digital Technology in motivating student learning.

The following objectives are intended to be achieved by students through the use of digital literacy, according to research by Jimoyiannis & Gravani, in 2011, in the form of students; acquiring the knowledge and technical skills necessary for efficient digital media, feeling competent when using digital media or technology to solve problems in everyday life, having an understanding of the social implications and influence of digital media on contemporary society, can encourage a good attitude towards the use of digital technology in the classroom through inspiring student learning, and equipping people to meet the needs of today's world.

Based on the findings of this discussion, it is possible to further support the analysis of digital technology, which is based on the theory of reason from research (Fishbein & Ajzen, 1975), which claims that a person's behavior is an estimate of the extent and actions in which a person's use of information technology is appropriate and beneficial and improve performance, and vice versa. Student motivation is strongly influenced by the use of the internet. According to the experts' examination findings, it is more persuasive than the use of modern technology.

Advances in science and technology today are often associated with the Indonesian education system because it is a developing country that must follow the trend of globalization. The infrastructure used by the Indonesian people

continues to grow. Advances in technology that are increasingly easy to find are one example.

With the aim of facilitating all human life activities that carry out work and access some information at this time, technology is being developed that can provide various facilities, features, and benefits offered by digital technology. Changes in activities in the workplace, entertainment, religion, and education will result from these technological advances.

Advances in technology have a significant positive impact on education, both in terms of how teachers are able to communicate content to students and how students are able to understand it. Several schools that utilize digital media as a teaching tool are required for all schools. Students get teaching and learning through digital learning media via the internet and other networking media. Leveraging the internet and other social media, a high-quality digital learning environment can enhance student learning.

The quality of student learning has improved, and students are more motivated to participate in learning activities thanks to digital learning media devices. Self-awareness of the value of learning to grow oneself with the aim of living one's future results in the formation of this motivation. External variables may also be in the form of stimuli that come from other people or the environment.

Therefore, we must take advantage of opportunities for advances in digital technology in all areas of life, including the provision of education. Opportunity from the best scenario to increase students' desire to learn as part of a campaign to improve Indonesia's education standards.

Before learning using technology, the learning used in the world of Indonesian education was a conventional learning model. Teachers only use oral learning of facts or principles, so students tend to be passive and less motivated to respond to the subject matter presented by the teacher.

From the description above, it can be seen that learning video media has a positive influence on student learning achievement. This learning video media is also better than conventional learning media. Therefore, learning video media needs to be applied in teaching and learning activities so that student learning achievement is maximized.

## CONCLUSION

The application of media is one of the most crucial aspects of the learning process. Maximum learning outcomes will be greatly determined by the choice of learning media. In addition, utilizing educational resources such as YouTube videos is very beneficial for sustaining learning. The most effective and appropriate learning media for communicating ideas and increasing student understanding is YouTube video content. The students will understand the information provided by the teacher through film screenings using YouTube video media that includes music, text, motion, and graphics.

Referring to the findings in this research, it can be concluded that the availability of YouTube video learning resources for students helped them develop their cognitive, practical, and psychomotor domain abilities and increased their motivation to learn. Also, the researchers' suggestions for further researchers is that they should pay more attention to further developments regarding learning videos that use emerging technology in today's era, like 3D-based visual audio learning that attract the students. Especially, the literature review should be strengthened to create the more valid and trusted findings.

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