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Article

**DE-ASIGION (Digital Plotagon Animation Video) as a Middle Science Learning Media Towards SDGs 2030**Alfi Mufidah<sup>1\*</sup>, Wahyu Laila Agustina<sup>2</sup>, Rahmi Faradisya Ekapti<sup>3</sup><sup>1,2,3</sup>Institut Agama Islam Negeri Ponorogo, Indonesia*\*Corresponding Address: [alfimufidah11@gmail.com](mailto:alfimufidah11@gmail.com)***Article Info**

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**ABSTRACT**

The existence of technological developments accompanied by the demands of the times, requires the quality of education that is effective and efficient for the realization of advanced human resources. Therefore Indonesia plans to implement the Sustainable Development Goals (SDGs) to address education problems. One of the things that can be done is through the development of animated video-based learning media through the plotagon application. The existence of animated video learning media is expected to improve the quality of student learning outcomes. The purpose of this study was to determine the effectiveness of the plotagon animated video learning media on science subjects in junior high school class IX on biotechnology in the food sector. The method used in this research is R&D (Research and Development), which is a method that can produce certain products and is tested for its effectiveness through the development of science learning media in the form of biotechnology animation videos. The results of this study indicate that animated video-based learning media through the plotagon application are preferred by students because they are easy to understand. It can be concluded that if the animated plotagon video is used as a learning medium and applied in the learning process, it can improve learning and education outcomes in the future, so that it can meet SDGs 2030 in Indonesia in particular.

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**INTRODUCTION**

Education is an activity that has an important role in developing and improving the quality of human resources especially shaping the quality of the nation's generation (Zayas & Rofi'ah, 2022). This is because education can affect the growth of the people of a nation so as to make human resources more alert in dealing with changes in the education system which can be accessed anywhere. Quality education can produce quality human resources. If quality education is produced, young potential workers will be realized.

The quality of education in Indonesia is still relatively low. In accordance with the UNESCO report on the 2012 Education For All Global Monitoring Report which said that Indonesia was ranked 64th out of 120 countries around the world. The quality of Indonesian education is caused by a low learning process (Nuralawiah, Fitriyana & Ramlah, 2018).

Especially in science learning which is often seen by students as a difficult and complicated subject. Based on the PISA results released by the OECD (Organization for Economic Co-operation and Development) in 2018, Indonesia's score in the science field was 389 with the OECD average score of 489 (Ministry of Education and Culture, 2019). Based on these results, it proves that the quality of Indonesian science education outcomes is still very low. This can be caused by the lack of maximum learning outcomes received by students.

Based on this, Indonesia is planning a Sustainable Development Goals (SDGs) program to address education problems. The goals carried out for education are "ensuring education that is of equal quality, inclusive and supports lifelong learning opportunities for all" (Safitri, 2022). Teachers as educational staff need to participate in welcoming the SDGs program. One thing that can be done by teachers, especially in science learning is to maximize the learning process by using optimal strategies and facilities to improve student learning outcomes. The establishment of education represents a unique opportunity to give birth to a virtuous positive interaction between creation and dissemination of knowledge, hence also assuring the acquisition of required technical skills to develop and maintain a sustainable society interconnected from an economic, healthcare, social and environmental point of view. As affirmed by UNESCO, the role of a proper education, and more specifically of education, for the interpretation and implementation of the SDGs is essential to realize the 2030 Agenda (Smaniotto etc, 2020).

Therefore, to be able to improve the quality of science learning outcomes for students, supporting facilities are needed. One of the important means to facilitate students in obtaining education is through learning media. Learning media is a repository of information from senders/makers (teachers) that can be well received by recipients (students) (Sari & Ananda, 2018). The correct use of learning media in education is needed to support the effective and efficient delivery of learning materials to students (Utami & Mustari, 2020). The use of learning media certainly pays attention to the material that will be delivered as well. For science learning materials, interesting learning media are needed so that students can be interested.

Natural Sciences is part of science that is scientifically born and develops. Natural Science is a science that consists of knowledge itself and the process of being able to understand the concepts in that science. The direction of learning activities in the field of science is enabling students to be able to get information through the scientific activities they do so that it is not only centered on thinking skills about facts, laws, principles and theories (Syahwati & Arif, 2022).

The emergence of the digital world in the world of education greatly influences communication between students and teachers. When learning takes place conventionally, the average student tends to feel bored. When examining knowledge and demanding student participation, the teacher-centered paradigm is less effective, especially in the current independent curriculum, student-centered learning. Therefore, teachers must have creativity in using media that involves students. Media in the form of visual, auditory, audiovisual are the main categories of learning media (Saraswati, 2022).

One of the learning media that can be used by teachers is animated videos which are categorized as audiovisual media. So that the delivery of information and elements of images and sounds can be conveyed directly. The advantages of animated videos are first, the combination of auditory and visual elements which allows students to learn how to use two senses simultaneously, namely sight and hearing. Second, students see real actions related to subject matter through videos. Third, students become motivated to learn. Fourth, students can more quickly understand the subject matter. Fifth, through animated videos that are presented in accordance with the world of children so as to give students the impression that they are watching an animated film even though it contains the material being studied

(Lukman et al, 2019). The use of audio-visual-based learning media in science learning really supports the delivery of information from the teacher to students, because it has the ability to explain something that is complicated, complex, and difficult if explained only with pictures so that it can support an interesting, fun, and meaningful learning process for students (Nofida & Arif, 2020).

One alternative learning media that can be used is through the use of the plotagon application to create learning animation videos that are interesting for students. The plotagon application is a technology that can be used to create an animated video that can be accessed on a smartphone or computer, and can also be displayed in classrooms with adequate facilities. Re-facilitation of classrooms with new learning technologies, namely the emergence of digital educational resources such as the application of these animated videos in student-oriented learning, can also challenge teachers' ways of teaching that are considered traditional (Ostereng, 2022). Utilization of digital animated video media has an important role in supporting science learning. Students will get direct experience through videos that they see and understand. Through a good understanding of learning material, student learning outcomes increase (Suryaman & Suryanti, 2022). One of the industrial revolution 4.0 program is IoT (Internet of Thing) or IoE (Internet of Everything). It shows that the use of internet is widely used in industrial revolution 4.0. Therefore, animation media 3D is made as online learning media so that the students can access it every time and everywhere (Oktavianingtyas et al, 2018).

The novelty of this research is the integration of the role of learning media that utilizes the plotagon application to support the 2030 sustainable development goals, which are utilized especially in science subjects within the scope of applying biotechnology in the food sector for grade 9 junior high schools. The plotagon application is used to create learning animation videos that are packaged according to what students experience in everyday life. Through this it is hoped that it can add to students' understanding which is packaged more attractively through the plotagon application. The existence of the plotagon application can be used by teachers in making interesting science learning media. So that students can understand the learning material delivered easily.

If students can understand the material presented, the learning outcomes obtained will increase. This is in accordance with the results of previous studies which have proven the role of multimedia (including video) can facilitate understanding of concepts and can increase children's concentration. This is in accordance with the results of previous studies which have proven the role of multimedia (including video) can facilitate understanding of concepts and can increase children's concentration (Hasanah et al, 2023). Based on these problems, this study aims to determine the effectiveness of the plotagon animated video learning media in class IX junior high school science subjects.

## METHODS

This research uses research and development methods or commonly referred to as Research and Development (R&D). This study uses the Borg and Gall model which is summarized into five stages including 1) product draft, 2) validation, 3) prototyping, 4) limited trials, and 5) final product (Putra, D et al, 2020). In this study, an animated video was made containing science learning materials for class IX SMP/MTs, namely biotechnology. The curriculum used is the 2013 curriculum, animated videos are made using an application called plotagon.

The sampling technique uses the Probability Sampling technique, namely Proportional Stratified Random Sampling. The sample used was class IX students of SMP/MTs in Wonogiri District. The animated video that was made was tested by uploading the video on YouTube. The data collection technique used in this study was a questionnaire survey with

the help of google from, which was attached with a YouTube video link. The questionnaire survey contained several questions related to the satisfaction and practicality of animated videos after students watched on YouTube. There were 30 students from various SMP/MTs in the Wonogiri District who filled out the google form survey.

Data analysis techniques using descriptive quantitative and qualitative. The survey results obtained through google from were analyzed using descriptive statistics, namely the mean and mode of each question in the distributed questionnaire. From the results of the questionnaire survey data analysis, it was then re-analyzed and adjusted to the practical criteria for developing the learning videos. The criteria for the level of practicality of plotagon animation video development can be seen in table 1.

**Table 1.** Guidelines for evaluating the practicality of plotagon animation video development

No	Presentage	Practicality Criteria
1.	75-100	Very practical
2.	50-74	Practical
3.	26-49	Less practical
4.	0-25	Impractical

(Arikunto, 2019)

After being tested and getting responses and input from students through the Google Form page, it needs to be revised if it needs to be revised, revisions made according to input from students. If the response from students is good, then the animated video is not required to be revised and can be directly used for trials during learning and can be published.

## RESULTS AND DISCUSSION

This research was carried out from 3 January 2023 to 25 January 2023 through the discovery of problems that arise in the world of education and learning experienced by various schools, especially the SMP/MTs level, in Wonogiri District. Data collection processes are also needed in making animated videos, such as curriculum, material/subject matter, video scripts, and applications for preparing animated videos. In this study, the animated video that was made contained science learning material for class IX SMP/MTs, namely biotechnology material in the food sector. The curriculum used is the 2013 curriculum, animated videos are made using an application called plotagon.

The data in making the video that has been collected is then carried out in the process of designing an animated video using the plotagon application. The video is designed according to the script that was made before. The video script is more emphasized on the application of material in everyday life played by several characters, but still does not forget the material to be delivered. After the animated video was finished, validation of the animated video was carried out to the validator, namely the IAIN Ponorogo lecturer. Furthermore, the animation video was repaired based on suggestions and input from the validator. Animated videos that have undergone improvements can be tested on students. This is because animated videos contain clear audio, images, and text communications so that the information conveyed is interesting, easy to understand, and effective.

This study tested an animated video on biotechnology material in the food sector to Grade IX SMP/MTs students in Wonogiri District by distributing an animated video link from YouTube. In addition, students filled out a questionnaire survey with the help of the Google form. The following are the results obtained from research on the plotagon animation video in class XI in Wonogiri District which will be described as follows. Education being fundamental plays important roles in the Sustainable Development Goals because it directly contributes to the SDGs (Uleanya & Akintohu, 2021). To meet the SDGs, currently students are being intensified to use technology in their education process, due to the demands of an increasingly developing era. Application of learning using animated videos via YouTube can improve literacy skills in students. If students' literacy skills increase through the use of

learning animation videos, they can participate in fulfilling the SDGs, especially in technology literacy.

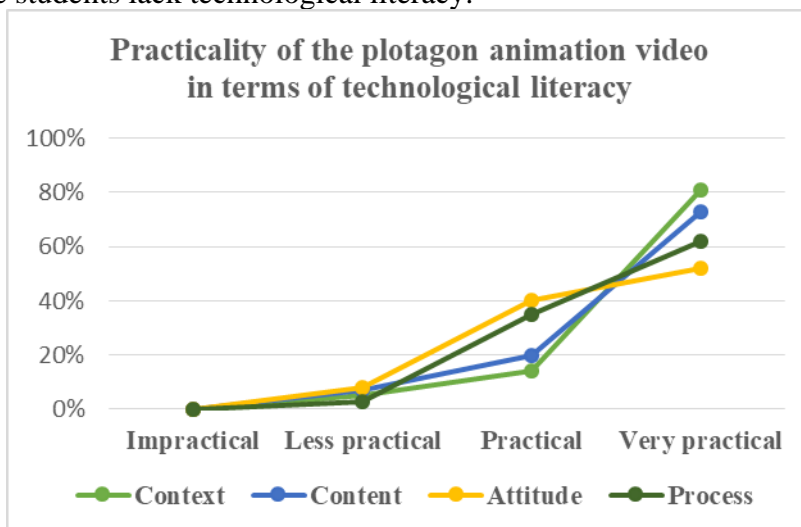
Digital literacy is one of the challenges of technology integration in the academic field. Digitally literate populations can help policy makers in the field of education. Based on previous research mentioned digital literacy groups are the following groups: (a) finding and consuming digital content; (b) create digital content; (c) communicate or share digital content (Timnaz et al, 2022). Where digital literacy has 4 indicators, namely as follows:

**Table 2.** Indicators of technological literacy ability

No	Indicators of technological literacy ability	Technology literacy sub-indicator
1.	Content	Ability to understand hardware and software.
2.	Process	Ability to use hardware and software.
3.	Context	Ability to use technological concepts in learning.
4.	Attitude	Good understanding in responding to information and attitudes in dealing with technological developments in learning.

(Nofrion, 2021)

In the research questionnaire "DE-ASIGION (Digital Plotagon Animation Video) as a Middle Science Learning Media to Avoid SDGs 2030" it can be seen that through animated video learning media in terms of technological literacy the highest percentage is found in the context indicator while the indicator with the lowest percentage is attitude indicator. In context indicators that contain technological concepts in learning that are carried out optimally. This can be proven by the statements of students who tend to choose a point score of 4. Meanwhile, the attitude indicator obtained the lowest percentage. The attitude indicator contains understanding in responding to information and technological developments in learning, therefore students lack technological literacy.



**Figure 1.** Graph of the practicality of the plotagon animation video in terms of technological literacy.

According to the graph of the practicality of the plotagon animated video in terms of technological literacy, it can be described as follows:

a. Content

On indicators of technological literacy capabilities, namely content indicators where students and teachers can understand hardware such as computers, laptops, projectors, smartphones, keyboards, mice, scanners, and software Mozilla, YouTube, Google, PowerPoint, Word and so on (Nofrion , 2021). From this study, the results obtained

from 30 samples of students 73% fall into the "practical" practicality category. This shows that most students have sufficient literacy skills, namely content indicators, both understanding hardware and software. For example, when students understand the content of the animated plotagon video about tempe bacem-the application of biotechnology in the field of science food, grade IX junior high school.

b. Process

The indicators of technological literacy are process indicators, where students can use hardware such as smartphones, computers, laptops, projectors, printers, keyboards, mice, scanners and software such as Google, Mozilla, YouTube, Power Point, Word, and so on. (Nofrion, 2021). From this study, the results obtained from 30 samples of students 62% fall into the "practical" practicality category. This shows that students are sufficiently able to use hardware and software. Likewise, when students use the plotagon animated video learning media about tempeh bacem - the application of biotechnology in the field of food, science, junior high school grade IX.

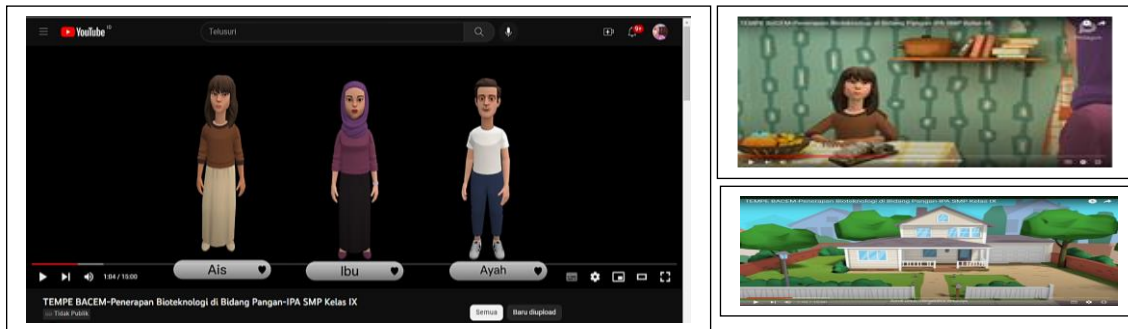
c. Context

In terms of technological literacy ability indicators, namely context, students can use technological concepts in learning (Nofrion, 2021). From this study, the results obtained from 30 samples of students 81% fall into the "very practical" category of practicality. This shows that students can use technology in learning, especially in using the plotagon animation video learning media regarding tempe bacem-the application of biotechnology in the field of food Science, SMP class IX.

d. Attitude

The indicator of technological literacy ability, namely attitude, can be seen from students who can have a good understanding of using information and attitudes towards technological developments towards learning (Nofrion, 2021). From this study, the results obtained from 30 samples of students 52% fall into the "practical" practicality category. This shows that students have sufficient understanding in using information and attitudes towards technological developments towards learning. Most students use technology and the internet as a medium of learning resources. While some other students prefer to use books as a medium of learning resources. Due to the lack of technological literacy by students.

Based on the results of the student response questionnaire to the plotagon animation video as a learning medium, it showed that most students were interested in learning based on this plotagon animated video. What's more, how to use animated video-based learning media is relatively easy to use for all groups with the internet and smartphones or technological media such as laptops, and so on. This can be proven through the argument of one of the students in the research questionnaire which stated that "I prefer to use this plotagon animation video, because it makes it easier to understand the material and it is fun to see the good animation". Through one of the students' arguments, information can also be obtained that through this animated video, the plotagon can help students understand the material that has been taught at school.



**Figure 2.** Animated video display on YouTube "tempe bacem-application of biotechnology in the science food field of class IX junior high school"

The picture above is a display on the YouTube video of tempe bacem animation - the application of biotechnology in the science food sector for class IX junior high school. It can be seen that the video contains an animation that begins with the introduction of the characters in the video. In addition, animated videos use language that is easy to understand and more interactive so that students can understand the meaning or content of the animated videos made. This can be proven through questionnaire responses of students who like using animated video learning media by stating the reason that "I am more interested in using animated videos because they look interesting and the language used in the videos is easy to understand". There were some students who also had positive arguments, namely "The video is good because there is animation so it's not boring". From several arguments the students' questionnaire responses further strengthened that learning animated videos can increase students' interest and motivation to learn.

Learning motivation is the overall psychic driving force which includes expectations, values, and affectivity in students which can generate enthusiasm in learning activities (Yushan et al, 2022). Learning motivation has a close relationship with learning outcomes. Learning motivation can be grown in several ways, one of which is by using interactive language, interesting animations, fun learning, and not monotonous. So that students feel happy when carrying out the learning process can bring up learning motivation. The mindset appears in students that learning is not boring if you use interesting methods, such as using animated video-based multimedia. In accordance with the results of previous research which stated that multimedia that combines text, graphics, audio, video, and animation can inform messages clearly and interestingly, so that it can motivate students to learn in a more contextual and fun way (Hasanah et al, 2023).

This is in accordance with the statement from Permendiknas RI No. 41 of 2007 which states that the learning process in primary and secondary education units must contain elements of interactive, challenging, fun, motivating and increasing creativity according to the interests and talents of students (Rahayu et al, 2019). Moreover, many students complain about learning science because it is too difficult and difficult to understand. The use of instructional media greatly influences student motivation and learning outcomes. Utilization of learning media can help students achieve learning success. The important role of learning media is learning media in supporting the quality of the teaching and learning process so that it can make learning more interesting and fun. So that learning media as a tool in the teaching and learning process encourages the learning process from the learning that has been given by the teacher (Tafonao, 2018).

Reviewing the arguments submitted by students in the animated video response questionnaire which gave a positive response and led to an increase in learning motivation, so that the learning outcomes obtained by students could increase. This is in line with research conducted by Yushan (2022) that the lower the value of learning motivation, the lower the

student learning outcomes. If the use of animated video learning media can increase student interest and motivation, then the learning outcomes obtained will increase. In addition, based on research student learning activities are still relatively low from the standard, around 66% of students are still relatively passive in class. Only 5-8 students were able to answer the questions given by the teacher. In addition, about 34% of students do not get good grades. So from this exposure it can be said that student learning activity is still low. Moreover, there are still many teachers who rely on lecture learning methods only. If this continues, it will have an impact on hindering student development (Rahayu et al, 2019).

Based on research, student learning activities are still relatively low from the standard, around 66% of students are still classified as passive in class. Only 5-8 students were able to answer the questions given by the teacher. In addition, about 34% of students do not get good grades. So from this exposure it can be said that student learning activity is still low. Moreover, there are still many teachers who rely on lecture learning methods only. If this continues, it will have an impact on hindering student development (Rahayu et al, 2019). Therefore, animated plotagon videos have a very important role, especially for today's younger generation who tend to learn by using audiovisual learning media that emphasize sound and visuals in conveying complex learning concepts and ideas (Fridayanti et al, 2022). The animated video for plotagon learning is also feasible to be applied to various learning models, so that teachers can use it in various learning models. Therefore the quality of educational outcomes will be further improved and can support the 2030 SDGs in Indonesia.

The concept of quality education is based on the premise that educational aims are met and purposes fulfilled, with quality seen “in light of how societies define the purpose of education”. While education, including formal, informal and non-formal awareness and training has been recognised as “a process by which human beings and societies can reach their fullest potential”, for years, the purpose of education in industrialized countries has been to educate a workforce, aiming at excellence in a few core disciplines. A study conducted recently in 22 Asian countries showed that education places emphasis on preparing students for competitive participation in the global economy, rather than to become critical and responsible members of society in alignment with the objectives of ESD. Today, although economic well-being remains an important educational outcome, there have been increasing calls for education to focus also towards global citizenship, social justice and sustainability. The Aichi-Nagoya Declaration 2014 on ESD invites all education systems, from preschool to higher education, to revisit and clarify their purpose, mission and goals and consider educating for a sustainable future. Sustainable Development Goal and Sustainability (SDGs) is a Agenda of the United Nations adopted by world leaders in 2015 include poverty eradication, climate change mitigation and universal access to education. The SDGs provide a framework of sustainability goals and targets that is universally accepted and summarise priority action areas to help society achieve justice, prosperity and environmental security. The UN 2030 Agenda acknowledges Quality Education as a means for achieving the remaining SDGs, with sustainability as a goal for Education. Despite these aspirations, what education for sustainability aims to achieve is not clear (Kioupi & Voulvoulis, 2019). If the SDGs are to succeed, they must promote an inclusive approach to growth, and mobilize innovative sources of financing while phasing out investment in unsustainable activities in all countries (Stafford-Smith etc, 2017).

## CONCLUSION

Based on research on the DE-ASIGION plotagon animation video, it can be used as a learning medium in science subjects which are often considered difficult by most junior high school students. The animated video viewed from technological literacy gets the highest percentage in the context indicator while the indicator with the lowest percentage is in the



attitude indicator. In addition, animated videos can make it easier for students to understand the material, because animated videos use interactive and more interesting language. Therefore, the animated plotagon video can increase students' interest and motivation in learning.

Judging from the practicality of animated videos in the field of scientific literacy, from this study the results obtained from 30 samples of students 81% fall into the "very practical" practicality category. This shows that students can use technology in learning, especially in using the plotagon animated video learning media regarding tempe bacem-the application of biotechnology in the field of science food in junior high school class IX. Thus the existence of this animated video can be applied as a medium for learning science in junior high schools by adjusting the learning model used by the teacher. One of them is the SAVI (Somatic, Auditory, Visual and Intellectual) learning model which can be an alternative in improving the quality of education to support the 2030 SDGs.

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