



Impact of the Use of Interactive Learning Media Based on Articulation 3 to Improve Student Learning Results on Plant Network Structure and Functional Materials

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Abstract: The purpose of this research is to know the impact of the use of interactive learning media Articulate Storyline 3 on the learning results of students on the material of plant network systems in High School 1 Kabila. This type of research uses the form of true experimental design as a pretest-posttest control group design. The instrument used is a question of double choice to measure learning outcomes, implementation sheets and leaflets of students' activities as well as responses to the use of media articulate storyline 3. The study results were analyzed using an independent sample t-test based on the N-Gain acquisition. The results of the study showed that there was an increase in the student's learning outcomes seen from the N-gain result obtained on average for the experimental class of 0.78 and the control class is 0.50. The performance of the expression class has an average of good categories with the largest number with the highest score of 89%, and the activity of the students in the exhibition class acquires a very active category with the greatest number of nials of 88%. Based on the results of the test of the hypothesis in the experimental class and control class obtained a Sign (2 tailed) value of 0.001 with a signification level (α) 0.05, so that the Sign value (2 tailing) is smaller than the signation level (α) 0.05, thus it can be concluded that there is an influence of the use of Articulate Storyline 3 media on the study results of participants on the structure and function of tissue materials in plants.

Keywords: Articulate storyline 3; Structure and function of plant networks

Introduction

Education is a very important learning activity as the main spire in terms of running the curriculum in the teaching learning process so that learning can run effectively and efficiently. Curriculum is a guide to the implementation of the learning process at all levels of education in improving the quality of potential students. Learning biology in the curriculum 2013 is a compulsory subject taught to the level of high school, one of the materials taught is the system of plant tissue class XI that carries the basic competence to analyze the relationship of cell structure on plant tissues with the function of organs in plants. Basic competencies have been incorporated in syllabus to facilitate the process of direct

material delivery (Makaborang, 2019). Curriculum becomes the main driver in the teaching learning process, so that the educational process in the learning activities can be implemented smoothly and conducive to interaction (Azizah et al., 2021).

The structure of the plant network is one of the materials that should enable teachers to have creativity in developing the skill they possess, so that students can easily understand the material that will be taught one can by using interesting learning media as a teacher's effort in improving the learning results of students (Susilawati et al., 2020). Based on the results of observations in the school, the material given by the teacher to the pupils is supplied only with student worksheet and books packages provided by the school

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in a limited amount, so it is necessary for several small groups to distribute the book evenly. The limitation of package books and the lack of variation of learning media provided by teachers have a saturated impact on the students in understanding the material. The application can also use Augmented Reality, which has various functions and parts. Augmented Reality refers to a technology that superimposes a computer-generated image and provides a composite view (Novaliendry et al., 2022). Lack of learning media is also one of the impacts on the learning spirit that affects the learning outcomes of students.

The use of educational media in the digital age at the moment is very influential to human life especially the use of technology can be done to support the educational process especially in learning activities so that it can help teachers in packaging and presenting information to students (Rachmawati et al., 2023). The use of learning media is very diverse, especially in the era of current technological development, one of the learning media that can be used is Articulate Storyline 3 is an interactive learning media where there is a practical menu to add text, images, animations, videos, to the quiz, so that students in using the media can directly interact and show the materials being studied (Hapsari et al., 2021). Interactive learning media is a media display that is designed to display messages and have interactivity with users (Aliyah et al., 2020).

Based on the above problems, the researchers are driven to carry out research on the impact of the use of interactive learning media Articulate Storyline 3 to improve the learning results of students on the structure and function of plant networks in State High School 1 Kabila. To see the Use of Interactive Learning Media Articulate Storyline 3 in providing facility for the delivery of materials by teachers to students and is expected this research can be useful for teachers as a reference for the selection of appropriate interactive learning media and according to the needs of students and can improve the learning results of students.

Method

The research method used is quantitative research with the type of experimental research. The research design of the experiment used in this study is using the form True Experimental Design of Pretest-Posttest Control Group Design.

Table 1. Pretest-Posttest Control Group Design (Sugiyono, 2019)

R	O ₁	X	O ₂
R	O ₃		O ₄

Information:

- R = Random determines the sample in a drawn way
- O₁ = Pre-test, Experimental class (Learning using media Articulate Storyline 3)
- O₂ = Post-test, Experimental class (Learning using media Articulate Storyline 3)
- O₃ = Pret-test, Class of Control (Learning using book packages)
- O₄ = Post-test, Class of Control (Learning using book packages)
- X = Media Treatment Articulate Storyline 3

The research was carried out at the State High School 1 Kabila in the strange semester of the teaching year 2022/2023 with the population coming from the XI IPA class. Sampling was done randomly using the simple random sampling technique of the results obtained two classes that became the experimental class namely class XI IPA 2 and XI IPA 4 as the control class with the number of each class consisting of over 36 people.

Data collection is done by providing a test of learning results that have previously been tested to try to see the validity and reliability of the matter. This is done before the treatment (pretest) and after the treatment (posttest). The question instrument consists of 15 numbers of double-choice questions with themes of the structure and function of plant tissue. Study results are analyzed using the individual learning using equation 1 (Rosdiana et al., 2015).

$$Student\ Values = \frac{Score\ obtained\ by\ students}{Maximum\ score} \times 100 \tag{1}$$

After calculating the data analysis of learning outcomes, the N Gain test is carried out to find out the increase in the value of each student and the N-gain rate of the class after the treatment is given. To obtain the n-gain value on each meeting using equation 2 (Nirmalasari et al., 2016).

$$g = \frac{X\ posttest - X\ pretest}{X\ maksimum - X\ pretest} \tag{2}$$

The post-test results of N gain will then pass through the test phase of the prerequisite analysis, namely the normality test and the homogeneity test. The normality test aims to measure the normality of data distribution, using the Liliefors test formula, and its using equation 3 (Mufarrikoh, 2019).

$$Lo = F (Zi) - S (Zi) \tag{3}$$

Information:

- Lo = The highest absolute price
- F (Zi) = Opportunity numbers

S (Zi) = Proportion of numbers

The homogeneity test is used to measure the homogeneity or non-dispersion of the data obtained (Sumiyati et al., 2018). Testing homogeneity using the Fisher using equation 4 (Usman et al., 2008).

$$F = Sg2 / Ss2 \tag{4}$$

Information:

F = Values used to test population variance homogeneity

Sg2 = A larger sample variance

Ss2 = Sample variants are smaller

Subsequent testing of the hypothesis was carried out using the parametric statistical test Independent Sample t-Test to measure the impact of the use of interactive media Articulate Storyline 3 on the learning results obtained. Test the hypothesis using the t test, using equation 5 (Simbolon, 2013).

$$t_{hit} = \frac{\bar{x}_1 - \bar{x}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \tag{5}$$

Information:

t_{hit} = t-test

\bar{x}_1 = Average Experimental Value

\bar{x}_2 = Average Control Value

S = The Standard Deviation

n₁ = Number of experimental students

n₂ = Number of control class students

Result and Discussion

Descriptions of Data Implementation Learning Class Experiment

Based on Figure 1 shows the percentage of learning achievement in the experimental class that for meeting 1 obtained 85% percent with good criteria. For the 2nd meeting learning achievement percentage obtained 80% with good criteria. For the 3rd meeting learning achievement percentage obtained a 84% result with good criteria. For the 4th meeting obtained a percentage of learning achievement of 89% with excellent criteria. From the results obtained for the implementation of learning in the experimental class obtain criteria both at three meetings and criteria excellent at one meeting. It can be seen from the results that the use of interactive learning media can provide facilities for students to understand the material by seeing interesting images and animations and give students freedom to operate the media (Maulidiyah et al., 2022). Through learning media, educators not only explain learning verbally, but can be done with images, videos, text, and voice. In

addition, the media can also be used by pupils in independent learning, both at school and outside school. One example of interactive media is the learning media Articulate Storyline 3 (Juniantari et al., 2021). Articulate Storyline 3 can be used as a learning medium that is expected to help teachers display material that is difficult to describe with conventional media and make the learning atmosphere enjoyable (Salsabila et al., 2023).

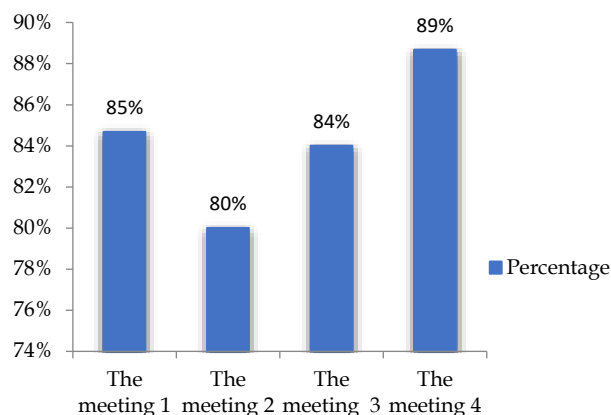


Figure 1. Graphics of percentage implementation of experimental class learning

Learning media can help teachers in delivering material, making abstract material more concrete, and complicated material becomes easy to understand. The benefits of learning media including to clarify the presentation of messages in the material, improve and direct the attention of students to focus, overcome the limitations of space and time, and provide similar experiences about events in the student environment (Pujiastuti et al., 2020). Changes as a result of the learning process can be shown in various forms such as changing knowledge, understanding, attitudes and skills, whose behavior, skills and ability, power reaction, power reception and other aspects on the individual (Fahmi et al., 2019).

The instructional media is the things that could be used as the tools to deliver the message to the students. It created a good for the learning environment and an effective and efficient learning process so it could attract the students' interest. It could motivate students to learn as well. In order to the media could be used optimally, the interactive media need to be developed (Kurniawati et al., 2020).

Well-designed learning utilizing multimedia technology enables students to learn more, understand what is learned better, and improve the quality of learning. One use of multimedia technology in learning is the use of learning media (Rahdiyanta et al., 2020).

Description of Data Sheet Implementation Learning Class Control

Based on Figure 2 shows the percentage of implementation of learning in the control class, i.e. at meetings obtained 60% percentages with less good criteria. For the 2nd meeting learning achievement percentage obtained 61% with poor criteria. For the third meeting learning achievement percentage obtained a 63% result with less favorable criteria. For the fourth meeting obtained a percentage of learning achievement of 62% with less good criteria. From the results obtained for the implementation of learning in the control class gained less good criteria in four meetings. The use of books and student worksheet provides a disruptive impact and difficulties for students to understand the material quickly because of the lack of attractive media. Learning media is usually used by teachers at the time of presentation of material with the aim of making material that is difficult to understand, material that was abstract becomes easier to understand (Panjaitan et al., 2020).

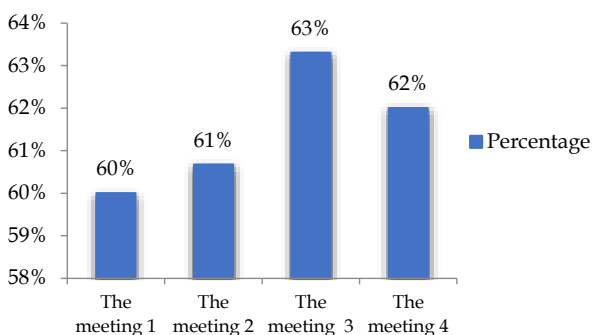


Figure 2. Graphics of percentage implementation of control class learning

Descriptive Data Activity Participant Students Experimental Class

Based on the figure 3 obtained the result of the percentage of the activity of the student in the experimental class that at the first meeting achieved 86% percent with highly active criteria. For the percentage of student activity participants at the 2nd meeting obtained 87% with highly active criteria. For the percentage of student activity participants at the 3rd meeting obtained a 88% result with highly active criteria. For the 4th meeting obtained the student activity of 88% with very active criteria. From the results obtained for the activity of the learners in the experimental class obtain very active criteria at four meetings.

From the results can be seen that interactive multimedia based on Articulate Storyline 3 is said to

have utility to make it easier for students to understand the material submitted by teachers because in it present important ideas so that students can access information from various sources or references relevant to the material, further can facilitate students to concentrate in learning so students can adapt intelligently and freely both inside and outside the classroom (Jais et al., 2021). Learning media is designed to help students understand a material in a more efficient and fun way (Lukman et al., 2022).

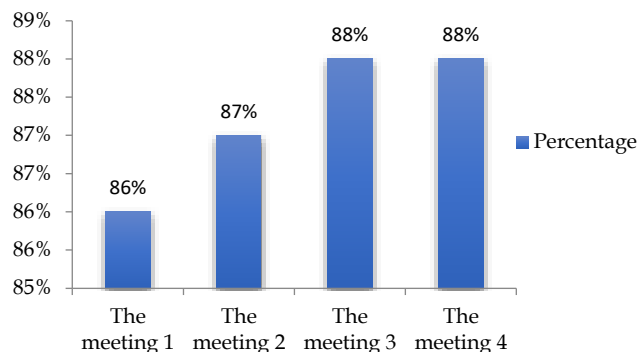


Figure 3. Experimental class participant activity graphics

Then it can be said that the learning media is a tool used with the purpose of channeling the sending message to the recipient, so that it can stimulate the interests, thoughts, feelings and attention of the students to learn more vigorously (Rianto, 2020). Learning media that can increase the activity of students should have control to the content and interaction between media users and media applications (Nurhafifah et al., 2020). Learning with visual techniques will attract students' interest and turn them from passive learners to active learners. Students' understanding of the lesson will increase with visualization in learning (Purwinarko et al., 2021).

Description Data Activity Participant Students Control Class

Based on Figure 4, the result is obtained from the percentage of the activity of the student in the control class, that is, at the first meeting obtains 68% with active criteria. For the percentage of student activity participants at the 2nd meeting obtained 66% with active criteria. For the percentage of student activity participants at the 3rd meeting obtained a 59 percent result with active criteria. For the 4th meeting obtained student activity of 60% with active criteria. From the results obtained for the activity of the students in the control class obtain active criteria at four meetings. The enthusiasm and activity of the students in studying the

material of network systems is very influential in the mastery of material (Alfitani, 2022).

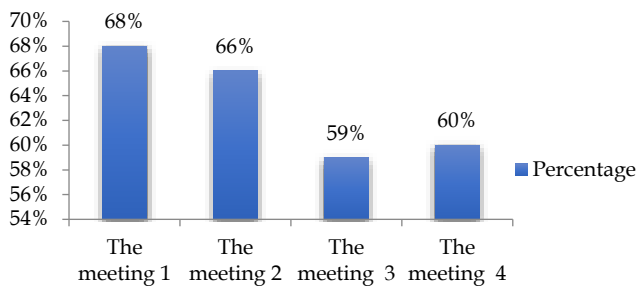


Figure 4. Activity graphics of control class participants

Results of the N Gain Test

According to figure 5, there is an increase in the learning outcomes of students, both in experimental and control classes. The highest normal gain is in the experimental class while the lowest normal gains are in the control class. This is due to the existence of different treatments, namely in the experimental learning class using the media Articulate Storyline 3, which allows students to more easily understand the material and improve the learning activity compared to the control class that only uses the book of biological packages. As explained by Asyhari et al. (2022), Articulate Storyline 3 is used to improve students' learning outcomes cognitive, emotional, and psychomotorally, improving students' motivation, understanding, and mathematical communication skills.

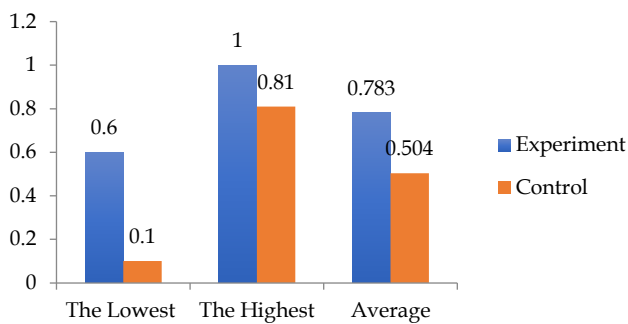


Figure 5. Graphics of test n gain

Changes as a result of the learning process can be shown in various forms such as changing knowledge, understanding, attitudes and skills, whose behavior, skills and ability, power reaction, power reception and other aspects on the individual (Fahmi et al., 2019).

Test of Normality

Based on Table 2, the results of the normality test were obtained in both the experimental class and the control class tested with Kolmogorov Smirnov and

Shapiro Wilk using SPSS 25 normal distribution, because the test results showed that both classes had a sign value greater than the level of significance (α) with a provision of 0.05.

Table 2. Test of Normality

Class	Kolmogorov Smirnov		Shapiro Wilk		Results
	Sign. side	Sig.	Sign. side	Sig.	
Experiment	0.05	0.188	0.05	0.053	Normal
Control	0.05	0.062	0.05	0.142	Normal

Test of Homogeneity

Based on table 3, the value obtained from the learning results of Pretest and Posttest for the experimental class and the control class has a significance value of .118 at the level of meaning greater than the level sign (α) 0.05. From the data, both classes show homogeneous data, meaning that both populations have the same sign value greater than the sign level (α) 0.05.

Table 3. Test of Homogeneity

Based on Mean	Levene Statistic	df1	df2	Sig.
	1.398	1	70	0.118

Testing the Hypothesis

Based on the table 4, it is obtained that on the data of the posttest results in the experimental class obtain the Sign (2 tailed) value of 0,001 with the level of signification (α) 0.05. So that the Sign value (2 tailed) is smaller than the signification level (α) 0.05, H_0 is rejected and H_1 is accepted. Thus it can be concluded that there is an influence of the use of Articulate Storyline 3 media on the study results of participants on the structure and function of tissue materials in plants. The use of interactive multimedia affects student activity and knowledge in biology learning. This is consistent with the relevant research findings that interactive multimedia as a learning medium affects students' cognitive learning outcomes (Oktavia, 2020). There is such an influence because the use of media Articulate Storyline 3 makes it easier for students to operate the media so that it is easier to understand the learning material. Articulate Storyline 3 itself is a software that can be used to create presentations similar to Microsoft Power Point. Articulate Storyline can be said with software that combines text, images, video, animation and sound so it can provide an attractive virtual presentation form (Neliati, 2022).

Table 4. Testing the Hypothesis

N	Sign (2 tailed)	(α)	Conclusion
36	0.001	0.05	H_0 is rejected and H_1 is accepted.

Describes Data Questionnaire Response of Students on Interactive Media Use Articulate Storyline 3

Based on the results of the calculation in Table 5 that 3 indicators of lifting consisting of 20 statements were obtained a result of 75.3%, the results obtaining such indicates that the interactive learning media Articulate Storyline 3 according to the view of the student has a positive or good response. With the application of animated media, the participation of the participants in

the study is excellent, the students listen to the teacher's explanation seriously and view the animated video footage presented by the teacher. During the learning process, students are interested in attending classes and feel happy when the teacher displays interesting animations and images (Husna et al., 2021).

Table 5. Results of Reply

Indicators	Number of samples	Number of Scores	Average (%)
Statement on the material of plant tissue systems			
Response to the Preaching Method (Not using Articulate Storyline 3 media)	36 students	2168	75.30
Use of Articulate Storyline 3 media on plant tissue system materials			

Interactive learning media can improve student activity skills and can increase teacher motivation in the learning process (Fitra et al., 2021). The potential of using Articulate Storyline 3.6 based e-learning to improve learning outcomes in the cognitive realm, i.e., interpretation, analysis, and grouping in the emotional realm can improve cognition and response to the psychomotor realm (Fatihaturahmi, 2022).

Conclusion

Based on the analysis of the data of the study and the discussion described above, it can be concluded that the results of this study showed that the average calculation of the post-test values in the experimental group was 86.31 higher than the control group was 69.39. The test results of the hypothesis showed that the posttest results in the experimental class obtained a Sign (2 tailed) value of 0,001 with a signification level (α) of 0.05. So that the Sign value (2 tailed) is smaller than the signification level (α) 0.05, H_0 is rejected and H_1 is accepted. Thus it can be concluded that there is an influence of the use of Articulate Storyline 3 media on the learning results of students on the structure and function of tissue materials in plants.

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Author Contributions

Conceptualization, Frida Maryati Yusuf, Jusna Ahmad, Lilan Dama, Herinda Mardin, and Febriyanti.; data curation, Irhamna Inaku; formal analysis, Irhamna Inaku.; funding acquisition, Irhamna Inaku.; investigation, Irhamna Inaku; methodology, Frida Maryati Yusuf, Jusna Ahmad, Lilan Dama, Herinda Mardin, Febriyanti; project administration, Frida

Maryati Yusuf and Irhamna Inaku.; software, Irhamna Inaku.; supervision, Frida Maryati Yusuf.; validation, Frida Maryati Yusuf.; visualization, Frida Maryati Yusuf, Jusna Ahmad and Irhamna Inaku.; writing - original draft, Irhamna Inaku.; writing - review & editing, Irhamna Inaku. All authors have read and agreed to the published version of manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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