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The Effectiveness of Using Cells at Work Anime Media on Students' Learning Outcomes in the Material of Cells in Blood Circulation and Immunity

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Abstract

Indonesian society can easily access information and media through the internet. One of the animation video media easily accessible to all segments of Indonesian society is Japanese Animation, known as Anime. Anime has various interesting stories, one of which is Hataraku Saibou, which tells the activities of cells in the human body in the form of a narrative. This raises the question of whether anime with themes depicting the lives of working cell characters in the body can be used as a learning media for students to understand the explanation of cell activities in the body in a narrative form in the anime. Research has been conducted on the Hataraku Saibou Anime among the general public. It is said that this anime effectively increases public understanding of the human body system. However, there has been no study on the effectiveness of this anime when used in the learning process for students. Therefore, a study was conducted on Hataraku Saibou Anime, with the research objective of determining the effectiveness of the animation media of Hataraku Saibou anime. The research method used a Non-equivalent Control Group Design, an experimental class research with the treatment of watching Hataraku Saibou anime, and the control class with PowerPoint learning selected under certain conditions. Data was collected using pre-test and post-test question evaluation with validated RPP Instruments. The research results, analyzed by comparing the improvement of experimental and control class scores, were calculated using hypothesis testing with SPSS 21. It was found that using the t-test, the value obtained was 2.087 with a significance of 0.000. The critical value (t-crit) is 1.986. So it can be concluded that t-value is greater than t-crit (2.087 > 1.986). From this result, it can be concluded that the animation media of Hataraku Saibou anime is effective in the material of cells in the bloodstream and immune system.

Keywords: effectiveness; hataraku saibou anime; learning media; value increase

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INTRODUCTION

Indonesian society can easily access information and media from various countries with the advancement of time and the introduction of the internet. The ease of access to media in today's era can allow teachers to utilize media from various countries as learning tools. In achieving the learning objectives, teachers require a supporting element as teaching materials, which is achieved by using media in the learning process. With the aid of instructional media, students can gain a better understanding of the learning material

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compared to simply reading books. In utilizing instructional media as learning support, teachers need to carefully select media that aligns with the learning material and can engage students' interest, as the key to the success of the learning process lies in captivating and focusing students' attention on the presented material (Rahmatullah et al., 2020).

It has become a significant task for educators, particularly secondary school teachers, to create an educational environment that is more creative, innovative, and meaningful (Neni & Hildayah, 2020). The selection of instructional media greatly influences the success of the learning process (Idhayani et al., 2020). In realizing the learning objectives with the hope of engaging students and facilitating their understanding of the material, visual instructional media such as animation videos are employed; as according to Sari & Lestari (2018), visual instructional media is more effective than without visual aids. Animation videos are moving images with a story or narrative. The use of animation videos is believed to create a more enjoyable and attention-grabbing learning environment, thus facilitating teachers in delivering lessons. One of the animation video media easily accessible to all segments of Indonesian society is a distinctive animation medium from Japan known as anime. From children to adults, anime can be entertaining anytime (Nugroho & Hendrastomo, 2017). According to Toi (2020), the accessibility of anime has contributed to its popularity among the public, as observed in various media formats. The media commonly used by Indonesians when enjoying anime are films (64.8%), YouTube (48.8%), and the internet (24.4%). If YouTube is included as an internet format, the total percentage reaches 73.2%. Thus, internet-based media services are the most preferred means for Indonesians to enjoy anime. With the popularity of anime, which is easily accessible through the internet, utilizing anime related to education can be one of the options to find engaging instructional media that captures students' interest. An anime considered suitable to these criteria as a learning medium is *Hataraku Saibou. Anime.*

Hataraku Saibou Anime is deemed suitable for instructional media criteria because it revolves around educational themes delivered through engaging narratives and characters. *Hataraku Saibou* is a manga series by Akane Shimizu adapted into an anime by David Production studio. This anime portrays the life of cells working within the human body. Besides serving as entertainment, it also imparts knowledge by explaining the names and functions of cells within the body, packaged within a story or narrative (Wardani et al., 2021). Valdez statement in Salamoon's research (2021) highlights the positive response to *Hataraku Saibou* from various circles, with academics praising its accuracy in depicting human body cells. This anime is commended for its educational explanations in a medical context for the general public. Valdez explained that praise for this anime came from Dr. Satoru Otsuka, a molecular neuro-oncologist in Atlanta, Georgia. *Hataraku Saibou* Anime has the potential to define engaging instructional media with its visualization in media and has the potential to generate a learning process that captures students' interest and attention. However, unfortunately, *Hataraku Saibou* anime is often observed only for its characters without understanding the educational content it contains. Some people even consider anime viewers odd and negatively perceive them because they view anime as cartoons meant for children (Yelvita, 2022), a notion reinforced by Sitepu & Afini (2023), who note that anime is often regarded as mere entertainment. Nevertheless, the emergence of *Hataraku Saibou* anime can serve as a study of how visualization in media has the potential to facilitate knowledge transfer to the public. Based on this condition arises the question of the effectiveness of *Hataraku Saibou* anime on students' learning outcomes.

Effective learning is evidenced by an improvement in students' learning outcomes, as learning outcomes are the educational objectives that students must achieve, namely mastery of the material. Thus, students are considered successful with the use of instructional media. The factors influencing learning outcomes are teaching effectiveness

in the learning process. Learning effectiveness is the success of teachers and students in achieving the learning objectives, namely an increase in students' learning outcomes in the form of improved grades (Imama & Rochmawati, 2021). Improved learning outcomes can be interpreted as an increase after treatment. The increase in grades is due to students mastering a certain amount of material during the learning process (Santoso & Utomo, 2020). This research on *Hataraku Saibou* anime is aimed at the middle school education level. Thus the learning material to be examined in *Hataraku Saibou* anime is the material from the first semester of Grade 8 middle school in Chapter 6 of the 2013 curriculum, which is the material on blood circulation and the immune system. The research is conducted to determine the effectiveness of using anime animation media in *Hataraku Saibou* anime on students' learning outcomes regarding the material on blood circulation and the immune system after being given instructional media in the form of an animated film titled *Hataraku Saibou*.

METHOD

This research was conducted using a quasi-experimental quantitative research design, a form of development research derived from true experimental research. The research design employed was the Non-equivalent Control Group Design, which involves an experimental class that is treated by watching *Hataraku Saibou* anime and a control class that is PowerPoint-based learning under specific conditions. Before the treatment, both classes underwent a pre-test to gather data on the test results of both classes before being subjected to the treatment. After the treatment, the experimental and control classes took a post-test to observe the differences in test results. The sample investigation involved two classes: a control class of 21 students in VIIIF and an experimental class of 24 students in VIIIE, totaling 45 students in both classes. The data collection technique involved administering an evaluation test to assess students' learning outcomes. The tests used in this research were the pre-test (initial test) and post-test (final test). The test in the research consisted of 25 multiple-choice questions related to the indicators in the Lesson Plan validated by experts. The validation sheet comprised three aspects: content/material, construction, and language, with ten statements. The following are the results of the validation of the test instrument:

Table 1 Result of validation of the test instrument

No	Aspect	Average of V	Information
1	Content/Material	0.95	Very Valid
2	Construction	0.88	Very Valid
3	Language	0.96	Very Valid

The techniques used to analyze the data involved descriptive analysis and inferential analysis. Descriptive data analysis employed mean, minimum, maximum, default, and variance values to determine the differences in data outcomes between the experimental and control classes (Sundayana, 2018). The inferential analysis examined the data with hypothesis testing to determine whether the research treatment resulted in significant differences in both classes after the treatment, indicating the benefits of *Hataraku Saibou* anime in improving learning outcomes. The inferential analysis data was first examined for normality and homogeneity to ascertain whether the data from the experimental and control classes were normally distributed and had equal variances (homogeneous). If both data tests proved to be normally distributed and homogenous in variance, hypothesis testing was conducted to determine the effectiveness of using *Hataraku Saibou* anime animation media on students' learning outcomes in the Grade 8 middle school level material on blood circulation and the immune system in Chapter 6 of the 2013 curriculum, specifically

episodes 1, 2, and 8. Hypothesis testing was performed using an independent t-test. Data was tested using software, namely SPSS version 21 (Sugiyono, 2015). The independent t-test aimed to determine whether there was a significant difference in mean scores between the two classes (Bina & Ramadhani, 2021). If the independent t-test indicated a significant difference with higher scores in the experimental class compared to the control class, then the effectiveness of Hataraku Saibou anime in improving learning outcomes could be considered effective.

RESULT AND DISCUSSION

Descriptive Analysis Results

Descriptive statistical analysis was conducted to describe the characteristics of students from the experimental and control classes before and after being subjected to the treatment of using *Hataraku Saibou* anime media in Grade VIII classrooms in the study.

Table 2 Experimental class learning outcomes

		Pre-test	***Post-test***
N	Valid	24	24
	Missing	0	0
Mean		42.83	59.83
Median		40	64
Std. Deviation		14.17	12.62
Range		60	48
Minimum		24	36
Maximum		84	84

In the experimental class's pre-test results (Before the treatment), a valid sample size of 24 was obtained, with an average score of 42.83, a median score of 40, the standard deviation of 14.17, a minimum score of 24, and a maximum score of 84. In the post-test results (After the treatment) calculation for the experimental class, a valid sample size of 24 was maintained, with an average score of 59.83, median score of 64, standard deviation of 12.62, minimum score of 36, and maximum score of 84.

Table 3 Control class learning outcomes

		Pre-test	***Post-test***
N	Valid	21	21
	Missing	0	0
Mean		39.42	50.09
Median		40	52
Std. Deviation		9.73	15.31
Range		36	52
Minimum		20	24
Maximum		56	76

For the pre-test results (Before the treatment) in the control class, a valid sample size of 21 was obtained, with an average score of 39.42, a median score of 40, the standard deviation of 9.73, a minimum score of 20, and a maximum score of 56. In the post-test results (After the treatment) calculation for the control class, a valid sample size of 21 was maintained, with an average score of 59.83, the median score of 64, the standard deviation of 12.62, a minimum score of 24, and a maximum score of 76.

Inferential Statistics Analysis

Normality Test

Based on the research data obtained, it can be noted that the significance (Sig) values for all research data, both in the Kolmogorov-Smirnov and Shapiro-Wilk tests, are > 0.05. Therefore, it can be concluded that the research data are normally distributed.

Table 4 Normality test

No	Group	Sig		Inf.
		Kolmogorov-Smirov	***Shapiro-Wilk***	
1	Pre-test in the experimental class	0.101	0.057	Normal
2	Post-test in the experimental class	0.060	0.099	Normal
3	Pre-test in the control class	0.200	0.785	Normal
4	Post-test in the control class	0.171	0.105	Normal

Homogeneity Test

Based on the research data obtained and the normality test conducted using SPSS 21, it was found that the calculated significance values for both the experimental and control classes were greater than 0.05. Hence, it can be concluded that the data in this research have homogeneous variances

Table 5 Homogeneity test

Class	T_{value}	Sig	Information
Experimental class	0.224	0.623	Homogeneous
Control class	2.246	0.142	Homogeneous

Hypothesis Testing

Once the data were found to be normally distributed and with homogeneous variances, hypothesis testing was conducted. The results of the hypothesis test using the t-test are as follows:

Table 6 T-test result

Class	Average	T_{value}	T_{Table}	P
Experimental class	51.33	2.08	1.98	0,00
Control class	44.76			

Based on the calculation results using SPSS 21 and the independent sample t-test, it was found that the average increase in scores for the experimental class was 51.33, while for the control class, it was 44.76. Thus, it is noted that the increase in learning scores for the experimental class was higher by 6.57 compared to the control class, with a significance value of 2.08 and significance of 0.000. The critical value is 1.98. Therefore, it can be concluded that the experimental class has a higher value than the control class $T_{value} > T_{table}$ (2.08 > 1.98), and the significance value is less than 0.05 (p = 0.000 < 0.05).

Based on the descriptive analysis results, it is evident that there is a higher increase in learning outcomes for the experimental class compared to the control class. Similarly, the inferential analysis results indicate a significant difference in learning outcomes between the experimental and control classes. This demonstrates that the *Hataraku Saibou* Anime animation media is more engaging for students with its visual presentation and narrative.

Students appear to grasp information more effectively and exhibit greater enthusiasm compared to the control class, where PowerPoint presentations and teacher explanations may lead to boredom. This finding aligns with statements by Andriyani & Kusmariyatni (2019) that learning without instructional media can lead to student boredom and difficulty in understanding the subject matter. Nowadays, relying solely on PowerPoint presentations is considered mundane and less comprehensible. This is supported by Azwar (2017), who suggests that PowerPoint presentations often display brief points on slides, making them less understandable and causing students to struggle with comprehension. Anggraeni et

al.,(2021) state that video-based learning through animated content is more captivating for students, as it incorporates moving images, sounds, and engaging visuals.

Student interest in learning is crucial for the effectiveness of educational media, as interested students are more likely to focus on the learning material. Concentration plays a significant role in learning. Students who can concentrate well are better learners, as they can focus their minds on the learning process. On the contrary, students who struggle to concentrate may lack interest in the subject matter, leading to distractions, boredom, and other issues (Slameto, 2012). For instance, when a teacher explains a concept, some students may appear to be paying attention but are daydreaming, feeling sleepy, or chatting with their peers. When asked a question or given an exercise, these students may struggle to respond because the information provided by the teacher did not register in their minds (Ardila & Hartanto, 2017).

Providing science lessons in a narrative format allows students to visualize concepts directly through stories presented in *Hataraku Saibou* Anime animation media. As stated by nature world news, according to Hardjana (2021),*Hataraku Saibou* Anime visualizes the workings of human cells in a manner easily understood by the general public and students. Researchers in Japan claim that this anime accurately depicts the processes of human cell function and delivers messages more objectively, making them easier to accept and understand. *Hataraku Saibou* anime portrays the functions of cells in the human body by depicting each cell's work as a character and narrating the life of the cells that are working according to their function. With visual and narrative explanations, students appear to be more focused and concentrated, better-absorbing information and exhibiting enthusiasm than learning in the class, where only PowerPoint presentations, reading texts, and teacher explanations are provided, resulting in student boredom. (Dessiane & Hardjono, 2020). With a story, students are provided with a desire to learn, allowing them to willingly engage in learning without coercion and creating a conducive learning environment that is creative and utilizes various teaching techniques to help individual students easily comprehend the material (Ratnawati & Asniawati, 2020). Learning media that fosters an enjoyable atmosphere can motivate students to participate in learning actively. When students are motivated and actively engaged in learning, they will construct their own learning experiences and curiosity about learning without necessarily requiring instruction from the teacher. Thus, students indirectly develop their potential, making learning more meaningful (Pangestu & Santi, 2016). Conversely, if learning is conducted passively without sparking curiosity, the learning atmosphere becomes less enjoyable for students, resulting in lower learning outcomes (Wali et al., 2020). The results of the study, with higher scores in learning using *Hataraku Saibou* Anime media compared to using PowerPoint alone and significant differences in scores according to hypothesis testing, provide evidence that learning about blood circulation with characteristics and narratives presented by *Hataraku Saibou* Anime is effective in education.

CONCLUSION

Based on the research to determine the effectiveness of using *Hataraku Saibou* Anime animation media on student learning outcomes in the experimental class compared to the control class, it can be seen from the descriptive analysis that the experimental class had a higher increase in scores than the control class. Furthermore, inferential analysis using hypothesis testing with a t-test yielded results of 2.08 with a significance of 0.000. The critical value is 1.986. Therefore, it can be concluded that $T_{value} > T_{table}$ (2.08 > 1.98) indicates a significant difference in scores between the experimental and control classes. *Hataraku Saibou* Anime animation media excels in engaging students' attention. *Hataraku Saibou* anime visualizes the workings of human cells in a manner easily understood by

students. With visual and narrative presentations, students seem more focused and concentrated, better-absorbing information and exhibiting enthusiasm than learning in the control class, where only PowerPoint presentations and teacher explanations are provided.

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