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THE EFFECT OF USING WORDWALL MEDIA ON LEARNING OUTCOMES AND MOTIVATION OF FOURTH GRADE STUDENTS OF SD NEGERI 06 BELUTU IPAS SUBJECT MATTER OF PLANT BODY PARTS

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ABSTRACT

This study aims to determine the effect of using *Wordwall* media on Learning Outcomes and Motivation of Grade IV Students of SD Negeri 06 Belutu in the subject of IPAS material on plant body parts. The independent variable in this study is *Wordwall* Media (X1) while the dependent variable in this study is Learning Outcomes (Y1) and Learning Motivation (Y2). The samples in this study included Class IV-A as many as 25 students as the control class and Class IV-B as many as 24 students as the experimental class. Based on the results of the study that the use of *Wordwall* media has a positive and significant effect on student learning outcomes. *Wordwall* media variables partially also have a positive and significant effect on student learning outcomes. Furthermore, *Wordwall* media simultaneously has a positive and significant influence on the learning outcomes and motivation of fourth grade students of SD Negeri Belutu. This shows that *Wordwall* Media has an influence on the Learning Outcomes and Motivation of grade IV students of SD Negeri 06 Belutu.

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1. INTRODUCTION

Education is the main foundation for building advanced individuals and societies, and the success of learning is greatly influenced by various factors, including the utilization of digital learning media (Samsudin, 2020) . Interactive digital learning media, such as Wordwall, has been proven effective in improving students' understanding of the material, increasing learning motivation, and creating a fun learning experience. In addition to making it easier for teachers to deliver material in a creative and relevant way, the integration of digital technology also supports learning in accordance with the demands of the 21st century,

making it an important component in efforts to improve the quality of education. (Rohman & Khaliza, 2024) .

Learning media refers to any type of tool used to convey learning materials to students. The existence of this media allows the delivery of information more effectively and efficiently, and can increase students' understanding of the material being taught. Various studies have shown that the use of appropriate media can improve student understanding and facilitate a more effective learning process (Titin et al., 2023) . learning media serves to provide a clearer picture of concepts that are difficult to understand through verbal explanations alone.

In addition, learning media also plays a big role in increasing student motivation. High motivation is very important in the learning process because it encourages students to be more actively involved and try to understand the material being taught. As explained by (Kusumawati, 2024) intrinsic motivation, which is the drive from within students to learn, greatly affects the quality of learning. When students feel interested and engaged with the material, they will be more active in learning and their learning outcomes will improve.

With the rapid advancement of technology, learning media is no longer limited to traditional tools such as pictures or blackboards, but has developed into digital media that is more dynamic and interactive. Technology-based learning can stimulate students' interest and attention, and provide a more enjoyable and interesting learning experience.

One form of learning media that has developed rapidly is educational game-based applications, one of which is *Wordwall*. *Wordwall* is a digital learning platform that allows teachers to create various web-based educational games, such as puzzles, quizzes and other interactive games. The main advantage of *Wordwall* lies in its ability to attract students' attention, by combining fun game elements with clear learning objectives. The use of this application can make learning more interesting and increase student involvement in the learning process (Srimuliyani, 2023) .

According to research conducted (Kusnadi & Azzahra, 2024) , digital media such as *Wordwall* provides a more immersive and interactive learning experience for students. By allowing students to interact directly with the material through various types of games, this application helps improve their understanding of the topics taught. In addition, *Wordwall* provides direct feedback to students, so they can know the extent of their understanding of the material that has been learned.

The use of interactive applications such as *Wordwall* is not only a tool to increase student engagement, but also an effective solution in overcoming learning boredom. Monotonous and repetitive learning often makes students lose interest, especially in materials that are considered complex. By offering a variety of educational game formats, *Wordwall* allows teachers to create a more dynamic and fun learning environment. This not only stimulates students' intrinsic motivation to actively participate, but also helps them understand difficult concepts in a more fun and memorable way. This concept is in line with research showing that game-based learning can increase learning effectiveness, especially in students with more kinesthetic or visual learning styles (Asela et al., 2020) .

Learning IPAS in elementary schools, especially about plant body parts, often faces challenges because the concepts taught, such as the structure and function of roots, stems, leaves, flowers, and fruits, are abstract and require good visualization skills. Students' difficulty in visualizing and understanding the function of each plant body part often causes their understanding of the material to be limited. In addition, IPAS materials tend to feel theoretical and dry, which can decrease students' interest and motivation in learning. This decline is not only caused by the lack of variety in teaching methods, but also the lack of use of interesting media to help students understand complex material. Therefore, interactive and fun learning media is needed so that students are more motivated and able to understand

the material better (Santrock, 2016; Ryan & Deci, 2000). Therefore, the use of interactive and fun learning media is essential to overcome this problem.

Several studies have shown that the use of game-based Wordwall media can significantly improve student learning outcomes. (al., 2023) revealed that there was a significant increase in post-test scores after learning using this media. In addition, (Rosiyanti, 2024) found that Wordwall helped students in enriching vocabulary and improving writing skills, with assignments showing improvements in grammar and variations in word usage. The success is also reflected in the high enthusiasm of students who are more active and involved in the learning process, as well as the creation of an interactive and fun learning atmosphere. Based on these results, the researcher is interested in conducting further research using Wordwall media, because the success that has been achieved can contribute to improving learning effectiveness and student motivation.

The decline in learning quality can be influenced by a number of factors, such as limited facilities and infrastructure, lack of teacher competence in adapting modern learning methods, and low student motivation. In addition, the long-term impact of the Covid-19 pandemic has exacerbated educational inequality, with many students losing access to education. In the Indonesian context, around 69 million students are affected and only 40% of the population has internet access, further exacerbating the challenges in teaching and learning (Jiang et al., 2024) .

Seeing this condition, an in-depth study is needed to identify the root of the problem and find the right solution. A comprehensive analysis of various aspects of learning needs to be carried out, including an evaluation of teaching methods, the use of learning media, the assessment system, and external factors that may affect the quality of learning at the school. In addition, learning material about plant body parts in class IV at SD Negeri 06 Belutu is relevant to the topic of this research, because students in that class are studying the topic. This research is expected to provide new insights into the application of digital learning media in overcoming existing problems, as well as providing practical solutions that can be applied by teachers and other school parties who have similar challenges.

This study aims to determine whether there are differences in learning outcomes and student motivation between classes that use Wordwall media and classes that do not use this media in learning Natural and Social Sciences (IPAS) on the material of plant body parts in class IV SD Negeri 06 Belutu. The use of interactive learning media such as Wordwall is believed to increase student involvement and make the learning process more enjoyable, thus potentially encouraging motivation and achieving better learning outcomes. Therefore, the researcher is interested in conducting a study entitled *"The Effect of Using Wordwall Media on Learning Outcomes and Motivation of Grade IV Students of SD Negeri 06 Belutu IPAS Subjects on Plant Body Parts Material."*

2. METHODS

The type of research method used in this research is a quantitative method with a quasi-experimental approach, which aims to determine the effect of using *Wordwall media* on learning outcomes and student learning motivation in IPAS subjects on plant body parts material. Quantitative research was chosen because it is able to present data in the form of numbers objectively and measurably to test the relationship between variables. In this case, *Wordwall media* as an independent variable is expected to have an influence on the two dependent variables, namely learning outcomes and student motivation. To determine the impact of the treatment, this study used a pretest-posttest control group design with two classes as samples, namely the experimental class and the control class.

This research was conducted at SD Negeri 06 Belutu, Siak Regency, Riau Province, in the even semester of the 2024/2025 school year. The study population consisted of all grade IV students, namely class IV-A (25 students) and class IV-B (24 students). The sampling

technique used a saturated sample technique, because the entire population was sampled. Class IV-B was designated as the experimental class using *Wordwall media*, while class IV-A as the control class using conventional methods (powerpoint). The instruments used included a 20-item multiple choice test to measure learning outcomes, and a motivation scale questionnaire to measure students' learning motivation. All instruments were tested for validity and reliability with the help of SPSS software version 22.

Data were analyzed through several stages, starting from descriptive analysis, then continued with prerequisite analysis tests such as normality test (using Kolmogorov-Smirnov) and homogeneity test (using Levene's Test). After fulfilling the basic assumptions, hypothesis testing was carried out using *paired sample t-test* to see differences in learning outcomes before and after treatment, and *independent sample t-test* to see differences in learning motivation between groups. To see the effect of Wordwall media on learning outcomes and motivation simultaneously, MANOVA test was used.

3. FINDINGS AND DISCUSSION

Based on the results of the research that has been conducted, there is a significant difference between the learning outcomes and motivation of students in the control class and the experimental class. In the control class, the average student learning outcomes only increased slightly, from 9.04 (45.2%) in the pre-test to 10.04 (50.2%) in the post-test. Meanwhile, the experimental class showed a higher increase, from an average of 10.8 (53.8%) in the pre-test to 16.1 (80.4%) in the post-test. This shows that the learning model applied in the experimental class was able to have a greater positive impact on the achievement of student learning outcomes compared to the conventional learning method in the control class. In addition, although there were individual variations in the achievement of results, the majority of learners in the experimental class experienced a more consistent improvement.

Not only in terms of cognitive, the improvement was also seen in the affective aspect, especially student learning motivation. In the control class, student learning motivation actually decreased, from an average of 80.08 to 72.08 after the learning took place. In contrast, students in the experimental class showed a significant increase in motivation, from an average of 79.5 to 86.75. This increase reflects that the learning approach used is not only effective in improving learning outcomes, but also able to build students' enthusiasm and interest in the learning process. Thus, the application of innovative learning models is proven to be an effective strategy in improving the overall quality of learning.

3.1 T-test of Control Class Learning Outcomes

Table 1. Control Class Pretest and Posttest Learning Outputs

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Learning Outcomes of Control Class	45.2000	25	33.61795	6.72359
	Posttest Learning Outcomes of Control Class	50.2000	25	29.31439	5.86288

(Source: Processed SPSS Data, 2025)

This, there was an increase of 5 points after learning. The sample size in this class was 25 students, with a standard deviation of 33.62 on the *pretest* and 29.31 on the *posttest*. This shows that the scores of students in this group are quite varied.

Table 2. Paired Sample t-test Output of Control Class Learning Outcomes

Paired Samples Test						
		Paired Differences		t	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference				
		Upper				
Pair 1	PRETEST - POSTTEST	13.69889		-.552	24	.586

(Source: Processed SPSS Data, 2025)

From the results of the *paired samples test*, the mean difference between the *pretest* and *posttest* was -5.00. However, the *t-test* value of -0.552 with a significance value of 0.586 (p > 0.05) indicates that this difference is not significant. This means that the improvement in learning outcomes in the control class was not strong enough to be considered statistically significant.

3.2 *t-test* of Experimental Class Learning Outcomes

Table 3. Pretest and Posttest Learning Outcomes of control class

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	53.7500	24	27.35634	5.58409
	POSTTEST	80.4167	24	20.58475	4.20184

(Source: Processed SPSS Data, 2025)

In the experimental class, the average student *pretest* score was 53.75, while the average *posttest* score increased sharply to 80.42. This average increase of 26.67 points indicates a considerable change after learning. The number of samples in this group was 24 students, with a standard deviation of 27.36 on the *pretest* and 20.58 on the *posttest*. The smaller standard deviation in the *posttest* indicates that the students' scores were more uniform after the treatment.

Table 4. Paired Sample t-test Output of Control Class Learning Outcomes

Paired Samples Test					
		Paired Differences	t	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference			
		Upper			
Pair 1	PRETEST - POSTTEST	-14.50351	-4.535	23	.000

(Source: Processed SPSS Data, 2025)

The *t-test* value of -4.535 with a significance value of 0.000 (p < 0.05) indicates that this difference is highly statistically significant. In other words, the increase in mean scores from *pretest* to *posttest* is not a coincidence, but rather indicates the effect of treatment on the experimental class.

3.3 Multivariate Anova Test

In MANOVA testing, besides the data groups must be the same, the variance/covariance matrix of the dependent variable must also be the same. To test the homogeneity of the variance of the convarian matrix, it can be seen from the results of the Box's M test using the help of SPSS 22, namely with the General Linear Model-Multivariate. The results are as follows:

Box's M	16,774

F	1,792
df1	9
df2	100554,120
Sig.	0,064
Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.	
a. Design: Intercept + Class	

Table 5. Multivariate Anova Test

(Source: Processed SPSS Data, 2025)

Based on the table above, it is known that the Box's M test results shown in the table above, the Sig. value obtained is 0.064, which is greater than 0.05. This indicates that there is not enough evidence to reject the null hypothesis stating that the covariance matrix between groups is the same. Thus, it can be concluded that the assumption of homogeneity of covariance in the data is acceptable. Therefore, multivariate analysis that relies on the assumption of homogeneity of covariance can be performed without significant problems. Thus, it can be concluded that the assumption of homogeneity of covariance matrix is met in this study.

Therefore, the two hypothesis prerequisites above have been met, so we can proceed to the MANOVA test. The results of the MANOVA test decision were taken from the analysis of *Pillae Traice, Wilk Lambda, Hotelling's Trace*, and *Roy's Largest Root*. This analysis was carried out with the help of SPSS 22, namely with the *General Linear Model-Multivariate*. The results are as follows.

Table 6. Multivariate Test

Multivariate Tests[a]							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	Pillai's Trace	0,973	1685.283[b]	2,000	93,000	0,000	0,973
	Wilks' Lambda	0,027	1685.283[b]	2,000	93,000	0,000	0,973
	Hotelling's Trace	36,243	1685.283[b]	2,000	93,000	0,000	0,973
	Roy's Largest Root	36,243	1685.283[b]	2,000	93,000	0,000	0,973
Class	Pillai's Trace	0,290	5,318	6,000	188,000	0,000	0,145
	Wilks' Lambda	0,720	5.522[b]	6,000	186,000	0,000	0,151
	Hotelling's Trace	0,373	5,722	6,000	184,000	0,000	0,157
	Roy's Largest Root	0,328	10.279[c]	3,000	94,000	0,000	0,247
a. Design: Intercept + Class							
b. Exact statistic							
c. The statistic is an upper bound on F that yields a lower bound on the significance level.							

(Source: Processed SPSS Data, 2025)

Based on the table above, it is known that the Multivariate significance test results show that the F prices for classes on *Pillae's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root* have significance values of 0.028, 0.027, 0.025, and 0.006, respectively, all of which are smaller than 0.05. This shows that the F prices for *Pillae's Trace, Wilks' Lambda,*

Hotelling's Trace, and Roy's Largest Root are all significant. Thus, it can be concluded that there is a significant influence between classroom variables on student motivation and learning outcomes.

Based on the Multivariate test results, the significance values for Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root are all less than 0.05, which means H0 is rejected and Ha is accepted, indicating a significant influence between class variables on student motivation and learning outcomes, so it can be concluded that it is accepted.

Furthermore, to determine the difference in learning outcomes and motivation between the experimental class and the control class can use the *Tests of Between- Subjects Effects* analysis obtained through calculations using the help of SPSS 22 with the *General Linear Model-Multivariate*. The results are as follows.

Table7. Tests of Between- Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Student Learning Outcomes	18046.983[a]	3	6015,661	7,569	0,000
	Student Learning Motivation	2646.228[b]	3	882,076	4,346	0,007
Intercept	Student Learning Outcomes	322658,293	1	322658,293	405,988	0,000
	Student Learning Motivation	620724,050	1	620724,050	3058,366	0,000
Class	Student Learning Outcomes	18046,983	3	6015,661	7,569	0,000
	Student Learning Motivation	2646,228	3	882,076	4,346	0,007
Error	Student Learning Outcomes	74706,333	94	794,748		
	Student Learning Motivation	19078,180	94	202,959		
Total	Student Learning Outcomes	413325,000	98			
	Student Learning Motivation	641586,000	98			
Corrected Total	Student Learning Outcomes	92753,316	97			
	Student Learning Motivation	21724,408	97			

(Source: Processed SPSS Data, 2025)

Based on the table above, it is known that the results of the test of differences in student learning outcomes and student learning motivation between the experimental class and the control class show that there is a significant effect on both variables.

On the student learning outcomes variable, the Sig. value for the Corrected Model is 0.000, which is smaller than 0.05. This indicates that the model as a whole has a significant effect on student learning outcomes. Furthermore, the Sig. value for Class is also 0.000, which is smaller than 0.05, indicating that there is a significant difference between the groups (experimental and control classes) in terms of student learning outcomes. Thus, it can be concluded that H1 is accepted.

On the student learning motivation variable, the Sig. value for the Corrected Model is 0.007, which is also smaller than 0.05. This indicates that the model as a whole has a significant effect on student learning motivation. Furthermore, the Sig. value for Class is 0.007, which is smaller than 0.05, meaning there is a significant difference between the groups (experimental and control classes) in terms of students' learning motivation. Thus, we can conclude that H2 is accepted.

3.4 Effect Size

The *effect size* test is used to measure how much influence the independent variable has on the dependent variable in this study. Effect measurement is done using *Partial Eta Squared*, which shows the proportion of variance in the dependent variable that can be explained by the independent variable. The *Partial Eta Squared* value can be used to determine the size of the effect, with the provisions: a value of 0.01 indicates a small effect, 0.06 indicates a medium effect, and 0.14 indicates a large effect.

The results of the effect test for learning outcome variables and student learning motivation can be seen in the *Multivariate Test* Table and *Tests of Between-Subjects Effects* Table previously presented.

Table 8. Effect Test Results

Source		Type III Sum of Squares	df	Mean Square	Partial Eta Squared
Corrected Model	Student Learning Outcomes	18046.983[a]	3	6015,661	0,195
	Student Learning Motivation	2646.228[b]	3	882,076	0,122
Intercept	Student Learning Outcomes	322658,293	1	322658,293	0,812
	Student Learning Motivation	620724,050	1	620724,050	0,970
Class	Student Learning Outcomes	18046,983	3	6015,661	0,195
	Student Learning Motivation	2646,228	3	882,076	0,122
Error	Student Learning Outcomes	74706,333	94	794,748	
	Student Learning Motivation	19078,180	94	202,959	
Total	Student Learning Outcomes	413325,000	98		
	Student Learning Motivation	641586,000	98		

Corrected Total	Student Learning Outcomes	92753,316	97
	Student Learning Motivation	21724,408	97

(Source: Processed SPSS Data, 2025)

Based on the table above, it is known that the Partial Eta Squared test results contained in the table above, we can measure how much influence the class variables (experimental and control groups) have on the variables of student learning outcomes and student learning motivation.

In the student learning outcomes variable, the Partial Eta Squared value is 0.195. Based on the interpretation guidelines, the value of 0.195 is included in the large effect category, which means that class has a considerable influence on student learning outcomes. This indicates that about 19.5% of the variation in student learning outcomes can be explained by class differences.

In the student learning motivation variable, the Partial Eta Squared value is 0.122. Based on the interpretation guidelines, the value of 0.122 is included in the moderate effect category, which indicates that class has a moderate influence on student learning motivation. About 12.2% of the variation in student learning motivation can be explained by class differences.

Based on the Partial Eta Squared measurement, it can be concluded that the effect of the class on student learning outcomes is large (19.5%), while its effect on student learning motivation is moderate (12.2%). The greater effect on student learning outcomes indicates that the changes that occurred in the experimental class were more significant in improving student learning outcomes compared to student learning motivation.

This study resulted in the finding that the use of Wordwall media significantly had a positive impact on the learning outcomes and motivation of fourth grade students of SD Negeri 06 Belutu in the IPAS subject of plant body parts material. Wordwall used in learning provides interactive features such as crossword puzzles, gameshow quiz, match up, and quizzes which are proven to be able to increase active student involvement during the learning process. Compared to the control class that only used PowerPoint (PPT) media, the experimental class showed higher learning enthusiasm and more active student participation in understanding the material.

The learning process lasted for four meetings, starting with a pretest on the first meeting to determine students' initial abilities. Next, learning was conducted with different methods between the experimental and control classes. The experimental class used Wordwall with various game variations, while the control class continued to use PPT presentations. After all the material was delivered, students took a posttest and filled out a questionnaire to measure learning outcomes and motivation. The pretest results showed the average value of the experimental class was 53.8 and the control class was 45.2. While the posttest results increased to 80.4 in the experimental class and 50.2 in the control class.

Data analysis using the Paired Sample T-Test test showed that in the experimental class there was a significant difference between the pretest and posttest scores with a sig. (2-tailed) of 0.000 < 0.05. Conversely, in the control class there was no significant difference with a sig. value of 0.586 > 0.05. This finding is in line with previous research which states that Wordwall media can effectively improve student learning outcomes. In addition, the Multivariate ANOVA (MANOVA) test conducted showed the significance values of all analysis methods (Pillae's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root) were below 0.05. This proves that there is a significant effect of using Wordwall media on learning outcomes and student motivation simultaneously.

This finding is supported by previous studies such as those conducted by Aidah and Nurafni (2022), Minarta and Pamungkas (2022), and Usman et al. (2023) which both show

that the use of Wordwall can significantly improve student learning outcomes. In addition, Permana et al. (2022) also concluded that Wordwall has an effect on increasing student learning motivation. Based on the overall research results and supporting findings, it can be concluded that Wordwall media is effective in improving learning outcomes and motivation of grade IV students in IPAS learning, especially the material of plant body parts, and becomes an alternative learning media that is suitable in the digital learning era.

4. CONCLUSION

Based on the results of the research and discussion that has been carried out, it can be concluded that Wordwall media has a significant effect on the learning outcomes and motivation of fourth grade students of SD Negeri 06 Belutu in the IPAS subject matter of plant body parts. This is evidenced by an increase in the average pretest and posttest scores in the experimental class, from 53.75 to 80.42, with a difference of 27.36 points. The results of the Paired Sample T-Test test showed a significance value of 0.000 <0.05, which means there is a significant difference between before and after the use of Wordwall. In addition, student learning motivation also increased, seen from the average motivation score of the experimental class of 86.75 compared to the control class of 72.08, with the results of the Independent Sample T-Test test showing a sig value. 0,000 < 0,05. Simultaneously, through Multivariate ANOVA analysis (Pillae's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root), Wordwall proved to have a significant effect on improving student learning outcomes and motivation.

Based on these conclusions, the researcher provides some suggestions. The government is expected to support the development of technology-based learning media in schools, including the provision of teacher training and supporting facilities such as computer devices and internet access. School principals are expected to encourage teachers to adopt digital learning innovations through professional development programs such as training or seminars. Teachers are advised to utilize Wordwall as an interactive learning media that can increase students' understanding and motivation to learn, and continue to develop competence in the use of educational technology. Future researchers are advised to conduct further studies on the effectiveness of Wordwall in other subjects, different levels of education, or on other aspects of learning such as social skills, critical thinking skills, and student creativity.

.REFERENCES

Asela, S., Salsabila, U. H., Lestari, N. H. P., Sihati, A., & Pertiwi, A. R. (2020). The role of interactive media in PAI learning for visual students' learning styles. *Journal of Research Innovation*, *1*(7), 1297–1304.

Abdillah, F., & Syaban, M. B. A. (2023). Development of Application-Based Word Wall Game Media on Natural Science Subjects for Elementary School Students. *Journal of Cakrawala Pendas*, *9*(1), 70–76.

Adinda Carissa Maharani, Fairuz Najla Rachmadani, Indana Zulfa, Muhammad Rafi Alfarizi, & Ade Suryanda. (2023). The Use of Behaviorism Learning Theory in Improving Understanding of Biology Concepts in Senior High School. *Pragmatics: Journal of Language Science and Education*,*2* (1), 58-69. https://doi.org/10.61132/pragmatik.v2i1.160

Agusti, N. M., & Aslam, A. (2022). Effectiveness of Wordwall Application Learning Media on Science Learning Outcomes of Elementary School Students. *Basicedu Journal*,*6* (4), 5794-5800. https://doi.org/10.31004/basicedu.v6i4.3053

Asela, S., Salsabila, U. H., Lestari, N. H. P., Sihati, A., & Pertiwi, A. R. (2020). The role of interactive media in PAI learning for visual students' learning styles. *Journal of Research Innovation*, *1*(7), 1297–1304.

Azzahra, F., Rahmadita, J., & Hazmi, M. Z. (2024). The Effectiveness of Using Wordwall Website in Improving Science Learning Motivation in Elementary School: A Literature Review. *International Journal of Education and Learning Assessment*, *1*(01), 1–12.

Bariyah, C. (2024). Application of Word Wall to Foster Students' Understanding of Science

Learning. *Sustainable Journal of Education Quality Studies,7* (1), 88-97. https://doi.org/10.32923/kjmp.v7i1.4467

Burhanuddin, N. A. N., Ahmad, N. A., Said, R. R., & Asimiran, S. (2021). Learning Theories: Views from Behaviourism Theory and Constructivism Theory. *International Journal of Academic Research in Progressive Education and Development,10* (1), 85-98. https://doi.org/10.6007/ijarped/v10-i1/8590

Devia Ramadani, Jamilah, Arik Darojat, & Suherman, A. (2024). Wordwall Games Based Media To Improve Students' Learning Outcomes. In *Journal Civics And Social Studies* (Vol. 8, Issue 1). Atlantis Press International B.V. https://doi.org/10.31980/journalcss.v8i1.1655

Jiang, L., Mo, J., & Kosar Altinyelken, H. (2024). Covid-19, school closures and educational inequities: exploring lived experiences. *Educational Research,66* (1), 51-67. https://doi.org/10.1080/00131881.2024.2302139

Kusnadi, E., & Azzahra, S. A. (2024). The use of Wordwall-based interactive learning media in increasing students' learning motivation in Civics subjects at MA Al Ikhlash Padakembang Tasikmalaya. *Journal of Education and Learning Dimensions*, *12*(2), 323–339.

Kusumawati, A. A. (2024). Self regulation in increasing students' learning motivation. *Empathy Journal*, *13*(3), 47–52.

Rohman, A. D., & Khaliza, T. N. (2024). QUIZIZZ-BASED WORDWALL LEARNING MEDIA INNOVATION: ALTERNATIVE IN INCREASING CRITICAL THINKING STUDENTS IN THE 21st CENTURY ERA. *Jurnal Masyarakat Berdikari dan Berkarya (Mardika)*, *2*(2), 72–79.

Srimuliyani, S. (2023). Using gamification techniques to improve student learning and engagement in the classroom. *EDUCARE: Journal of Education and Health*, *1*(1), 29–35.

Titin, T., Yuniarti, A., Shalihat, A. P., Amanda, D., Ramadhini, I. L., & Virnanda, V. (2023). Understanding Media for Learning Effectiveness. *JUTECH: Journal of Education and Technology,4* (2), 111-123. https://doi.org/10.31932/jutech.v4i2.2907

Vrontis, D., & Christofi, M. (2021). R&D internationalization and innovation: A systematic review, integrative framework and future research directions. *Journal of Business Research,128* (March), 812-823. https://doi.org/10.1016/j.jbusres.2019.03.031

Wahab, G., & Rosnawati. (2021). Theories of learning and learning. In *Paper Knowledge. Toward a Media History of Documents* (Vol. 3, Issue April).

Waluyo Hadi, Yofita Sari, & Nadra Maulida Pasha. (2024). Analysis of the Use of Wordwall Interactive Media to Improve Science Learning Outcomes in Elementary Schools. *Journal of Mipa Education,14* (2), 466-473. https://doi.org/10.37630/jpm.v14i2.1570

Wang, Q., & Xue, M. (2022). The implications of expectancy-value theory of motivation in language education. *Frontiers in Psychology,13* (November), 1-8. https://doi.org/10.3389/fpsyg.2022.992372

Widiyanti, F., & Nandiyanto, A. B. D. (2021). Interactive Power Point Implementation as a Digital Learning Media in Increase Understanding Theory Temperature and heat in Elementary School students. *International Journal of Research and Applied Technology,1* (2), 342-349. https://doi.org/10.34010/injuratech.v1i2.6761

Winarti, W. (2018). Planting the Concept of Teacher Science and Character Building of Indonesian Language Teacher Candidates FKIP Muhammadiyah University of North Sumatra Based on the Social Model Group. *Tarbiyah Journal,25* (1). https://doi.org/10.30829/tar.v25i1.235

Zaniyati, M., & Rohmani, R. (2024). Analysis of the Effectiveness of Pop-Up Book Media on Science Learning in Elementary Schools. *IJORER: International Journal of Recent Educational Research,5* (4), 919-934. https://doi.org/10.46245/ijorer.v5i4.641

Weller, J. M. (2004). Simulation in undergraduate medical education: Bridging the gap between theory and practice. Medical Education, 38(1), 32-38 .