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The Influence of Interactive Learning Media Based on Ispring Suite 11 on Physics Learning Outcomes on Gas Kinetic Theory Material at SMA Negeri 25 Garut

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gas kinetic theory, students, ispring suite, learning media

ABSTRACT
This research is motivated by the importance of learning media that is tailored to the needs of students, one of which is in the process of improving learning outcomes. This research was conducted because of the low learning outcomes of students in physics subjects, one of which is due to the use of learning media in the classroom, which still tends to use conventional learning media. Therefore, efforts are needed so that student learning outcomes can be improved. Interactive learning media based on ispring suite 11 is an interesting learning medium and allows students to actively participate in learning activities and improve student learning outcomes. The purpose of this study is to determine the influence of interactive learning media based on ispring suite 11 on physics learning outcomes on gas kinetic theory material. The type of research used is Quasy Experimental with the design of "Nonequivalent Pretest and Posttest Control Group", samples are selected by purposive sampling technique. Class XI Science 3 is used as an experimental class and Class XI Science 1 is used as a control class. The instruments used were tests with multiple choice of 20 questions and questionnaires. Based on the calculation using the effect size, a value of 1.36 was obtained which was categorized as very strong, so it was proven that ispring suite 11-based interactive learning media had a significant influence on student learning outcomes. And the results of the study show that interactive learning media based on ispring suite 11 is proven to be effective in improving student learning outcomes compared to conventional media, this is seen from the results of the N-gain test in the experimental class of 71.05% and in the control class of 54.24%.

INTRODUCTION

Physics is a science that has the characteristics of abstract and concrete concepts and has a relationship between natural phenomena and daily life. Thus, teachers must be able to explain various concepts of physics into real or visible forms. However, in the physics learning process, students experience difficulties when learning or understanding physics material, so many students become lazy to learn physics. In addition, in the learning process using only conventional media, this can cause students to feel bored in learning and can produce a passive learning experience that has the potential to cause suboptimal student learning outcomes. According to Handayani & Suharyanto (2016) said that uncreative and varied learning media

is known to be a factor that makes students not interested and lack motivation to learn physics, so that the cognitive results are less than optimal. Such learning, if carried out continuously, will make students bored in participating in lessons, so it requires media that can be used according to the material taught so that students are more interested in participating in lessons (Arsyad, 2014; Chusni et al., 2018).

The material chosen in this study is gas kinetic theory. This is based on interviews that have been conducted that the material of gas kinetic theory is one of the abstract materials that cannot be observed directly, namely learning about the properties of gases based on the behavior of the atoms that make up gases that move randomly and students have difficulty in determining the equations of gas kinetic theory which results in their inability to solve physics problems, This factor results in low student learning outcomes. In order to help smooth and attract students' enthusiasm when learning so that it is possible to improve the desired learning outcomes, interactive learning media is needed to improve good learning outcomes (Darma, 2021; Dasmo et al., 2020).

Through interactive learning media, it can attract students' willingness, motivation, activeness, and creativity, this is desirable to improve student learning outcomes. Media that can be used as a solution to improve student physics learning outcomes is ispring suite 11-based interactive learning media (Butar et al., 2022; Yanto, 2019). In addition, physics teachers at SMA Negeri 25 Garut have never used interactive learning media based on ispring suite 11 on physics materials. Ispring Suite is a computer-aided media that can accommodate educators in presenting material and provide the application of various learning to make it easier for students to understand the material (H. Wijayanto et al., 2017).

The use of interactive learning media has become a necessity in modern education, especially in addressing the challenges faced by students in understanding abstract physics concepts. By integrating interactive elements, such as animations, simulations, and multimedia presentations, students can visualize complex processes and better comprehend the underlying principles. This approach not only bridges the gap between theoretical and practical understanding but also aligns with the evolving educational trends that emphasize student-centered learning. As a result, the adoption of such media has been proven to increase student engagement and foster a deeper interest in learning physics (Gat, 2019; Oktaviani & Rustandi, 2018).

In addition, interactive learning media such as iSpring Suite 11 offers a user-friendly platform for both teachers and students. With its ability to transform static materials into dynamic and interactive content, iSpring Suite 11 empowers educators to design lessons that cater to diverse learning styles. This is particularly relevant in teaching abstract topics like the gas kinetic theory, where visualizing the motion of gas molecules and their interactions can significantly enhance comprehension. By employing such tools, teachers can ensure that students not only understand the material but also develop the problem-solving skills needed to excel in physics (Rahmawati & Wiyatmo, 2021; Ramadhani & Liwayanti, 2021).

The application of iSpring Suite 11-based interactive learning media also supports the development of critical thinking and creativity in students. Through features such as quizzes, interactive diagrams, and gamified learning activities, students can actively engage with the material, leading to an improved ability to retain and apply knowledge. This active learning approach shifts the traditional teacher-centered paradigm to a more collaborative and engaging process, where students take an active role in their educational journey. Such innovations are particularly beneficial in overcoming the limitations of conventional learning methods, which often result in passive classroom experiences (Sartika, 2022).

Finally, the integration of interactive media in physics learning represents a step forward in enhancing the quality of education, particularly in schools that have yet to adopt such technologies. The introduction of iSpring Suite 11 at SMA Negeri 25 Garut serves as a strategic

initiative to address the existing challenges in teaching physics. By utilizing this platform, educators can create a more stimulating and effective learning environment, ultimately leading to better academic performance and a renewed enthusiasm for physics among students. This effort underscores the importance of leveraging technology to make education more accessible, enjoyable, and impactful for all learners (P. A. Wijayanto, 2017; Yanti & Fatisa, n.d.).

Based on the problem, the results of the interviews and some opinions from relevant research, it encourages researchers to conduct research and researchers want to prove whether there is really an influence of ispring suite-based interactive learning media in improving student learning outcomes. The researcher chose to conduct this research because considering the problems that occur in the field, namely many low physics learning outcomes because in the learning process they still use conventional learning media and are still teacher-centered. Therefore, based on this background, the researcher is interested in conducting a research entitled "The Influence of Interactive Learning Media Based on Ispring Suite 11 on Physics Learning Outcomes on Gas Kinetic Theory Material".

Previous studies have demonstrated the importance of integrating interactive learning media into science education to enhance student engagement and comprehension. For instance, Rahmawati and Wiyatmo (2021) explored the effectiveness of iSpring Suite 9 in fostering interest and independent learning in physics, showing positive outcomes. Similarly, Dasmo et al. (2020) highlighted the benefits of interactive media in improving physics learning outcomes, though these studies often focus on general physics topics without delving into specific abstract concepts like gas kinetic theory. This indicates a need for more targeted research to address specific content areas using interactive tools.

The need for innovative educational tools is underscored by the persistent challenges in teaching abstract physics concepts such as gas kinetic theory. Conventional learning methods often fail to engage students, leading to low academic performance and disinterest in physics. As education moves towards technology integration, adopting advanced interactive learning media like iSpring Suite 11 is crucial to bridge the gap between traditional teaching and modern learning demands.

While prior research has explored the general use of interactive media in education, there is limited empirical evidence on its application to specific physics topics such as gas kinetic theory. Additionally, studies rarely measure the direct impact of interactive tools on student learning outcomes compared to traditional methods, leaving a gap in understanding their efficacy in enhancing comprehension of abstract concepts.

This study provides a novel contribution by applying iSpring Suite 11-based interactive learning media specifically to the teaching of gas kinetic theory. By focusing on a challenging and abstract physics topic, the research introduces a targeted approach to leveraging technology in addressing content-specific learning difficulties.

The study aims to evaluate the influence of iSpring Suite 11-based interactive learning media on students' physics learning outcomes, particularly in the context of gas kinetic theory. It seeks to compare the effectiveness of this media with conventional teaching methods and assess its potential to improve student engagement and comprehension.

The findings of this study offer practical benefits for educators by providing evidence-based insights into the effectiveness of interactive learning tools in teaching abstract physics concepts. For students, the use of iSpring Suite 11 enhances their ability to grasp complex topics, fosters critical thinking, and improves problem-solving skills.

This research has significant implications for education policymakers and curriculum developers. It highlights the importance of integrating advanced interactive media into teaching strategies to improve learning outcomes. The study also serves as a foundation for future research, encouraging the adoption of technology-driven approaches in addressing educational challenges, particularly in science subjects.

RESEARCH METHOD

Research Design

The type of research carried out is quantitative with the Quasi Experimental method. The research design used is the Nonequivalent Pretest and posttest Control Group. There are two groups of research subjects, namely the experimental and control classes. Both classes will be pretested before treatment, to ensure their respective conditions before being treated. After receiving the treatment, both classes will conduct a posttest to find out the condition of each class. The difference between the two is in the treatment that will be applied. The control group will be given material using conventional learning media, while the experimental group will be given material using interactive learning media based on ispring suite 11. The description of the Nonequivalent Control Group is shown in the following table 1.

Table 1 Nonequivalent Control Group

Group	Pretest	Treatment (X)	Posttest
Experiment	O1	XE	O2
Control	O1	Export	O2

Information:

O1 = Experiment and control groups given pretest

O2 = Experiment and control groups given posttest

XE = The experimental group was given learning treatment using interactive media based on iSpring Suite 11

Export = The control group was given learning treatment using conventional media

Participants

The population in this study is all students of class XI Science at SMA Negeri 25 Garut.The sampling technique in this study was taken based on the consideration of the subject teacher (purposive sampling), namely the sample used only in two classes, namely class XI Science 1 and XI Science 3 SMA Negerri 25 Garut, with a total of 29 students in each class.

Instruments

The researcher has prepared several instruments to answer the problems in the research, which aims to obtain data that will support the research, namely:

a. Test

The test is applied to find out the difference in learning outcomes. The form of the test is in the form of multiple choice of 30 questions with 5 multiple choice answers and only 1 correct answer. Before the implementation of the learning outcome test, in data collection, questions will be distributed to students outside the sample for trial. Furthermore, after completion, a validity test, reliability test, question difficulty test, and discriminating power test are carried out, with the aim of getting good questions.

b. Questionnaire

The questionnaire in this study is in the form of a questionnaire of student responses to interactive learning media based on ispring suite 11 on gas kinetic theory material, in this study a questionnaire was also chosen because this study has quite a lot of respondents. This study uses a closed questionnaire and the questionnaire calculation in this study uses the Likert scale as a variable measurement scale.

Data Analysis

Analysis of Student Learning Outcome Data

In the analysis stage of student learning outcome data, the data used is pretest and posttest score data on student learning outcomes from both classes that have been processed previously. The purpose of this data analysis is to answer the formulation of the problem in the research.

Data was obtained by testing a multiple-choice test of 20 questions in the experimental class and control class. This study uses descriptive statistical analysis including mean values, maximum values, minimum values, and standard deviations. Followed by the prerequisite test, namely the normality test and the data homogeneity test using the appropriate test. If the results of the data analysis are declared normal and homogeneous, then the hypothesis test uses a t-test with an independent sample t-test. Then the researcher conducted an effect size test to determine the effect of using interactive learning media based on ispring suite 11 and conducted an N-gain test.

Data analysis of Student Response Questionnaire

To describe the students' response to the use of interactive learning media based on ispring suite 11, it was analyzed by calculating the overall average score generated using the Likert scale. Student responses will be evaluated through filling out a questionnaire which is then calculated as a percentage.

RESULTS AND DISCUSSION

Descriptive Analysis

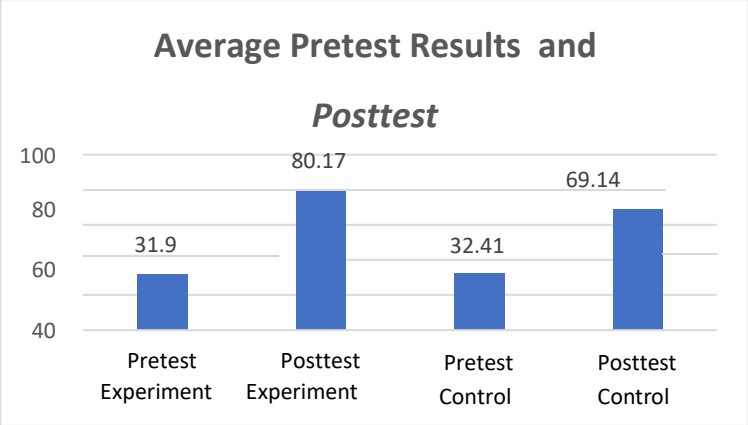

Figure 1. Average pretest and posttest results

From the results of the study, the pretest and posttest values in the experimental class and control class are obtained as shown in figure 1. The average pretest score of the experimental class was 31.90, while the posttest score was 80.17. The average pretest score in the control class was 32.41, while the posttest score was 69.14.

Normality Test

The results of the pretest normality test in the experimental class and the control class can be seen in the following table 2.

Table 2 Results of Pretest Normality Test

Normality Test				
	Shapiro-Wilk			
Class	**Statistics**	**Df**	**Sig.**	**Conclusion**
Experiment	0,938	29	0,089	Usual
Control	0,931	29	0,058	Usual

Source: Research document, processed by IBM SPSS Stattistic version 26

Based on the data analysis in table 2, the results of the calculation of the pretest score in the experimental class were obtained, which was 0.089, which means that it exceeded the significance value of $\alpha = 0.05$ ($0.089 > 0.05$) so that it showed that the sample came from a normally distributed population. Then for the results of the calculation of the pretest score in the control class, which is 0.058, it means that it exceeds the significance value of $\alpha = 0.05$

(0.058>0.05) so that it shows that the sample comes from a normally distributed population. The analysis of the results of the posttest normality test of the experimental class and the control class can be seen in the following table 3.

Table 3 Results of Posttest Normality Test

Normality Test				
Class	**Shapiro-Wilk**			**Conclusion**
	Statistics	**Df**	**Sig.**	
Experiment	0,944	29	0,129	Usual
Control	0,925	29	0,052	Usual

Source: Research document, processed by IBM SPSS Stattistic version 26

Based on the data analysis in table 3, the results of the posttest score calculation in the experimental class were obtained which was 0.129 which means that it exceeded the significance value of $\alpha = 0.05$ (0.129 > 0.05) so that it showed that the sample came from a normally distributed population. The results of the posttest score calculation in the control class were 0.052 which means that it exceeded the significance value of $\alpha = 0.05$ (0.052 > 0.05) so that it showed that the sample came from a normally distributed population.

Homogeneity Test

The homogeneity test was carried out on the pretest data of the two classes, so the results of the homogeneity test for the pretest of the two classes were obtained in the following table 4.

Table 4. Results of Pretest Homogeneity Test

Homogeneity Test						
Class		**Test Of Homogenity of Variance**				**Conclusion**
		Statistics	df1	DF2	Sig.	
Experiments and Control	Based On Mean	0,50	1	56	0,823	Homogeneous

Source: Research document, processed by IBM SPSS Statistic version 26

Based on the results of the calculation in table 4, the homogeneity test in the preliminary pretest data shows that in the learning outcomes of students in the experimental class and control class with the results based on mean, the value of 0.823 exceeded the significance value of $\alpha = 0.05$ (0.823 > 0.05), so that the pretest of both homogeneous variances can be known.

The homogeneity test was also carried out on the posttest data of the two classes, so the results of the homogeneity test for the postest of the two classes were obtained which are presented in the following table 5.

Table 5. Posttest Homogeneity Test Results

Homogeneity Test						
Class		**Test Of Homogenity of Variance**				**Conclusion**
		Statistics	df1	DF2	Sig.	
Experiments and Control	Based On Mean	2.583	1	56	0,114	Homogeneous

Source: Research document, processed by IBM SPSS Statistic version 26

Based on the results of the calculation in table 5, the homogeneity test on the final test data of the posttest shows that in the learning outcomes of students in the experimental class and control class with the results based on mean, a value of 0.114 means that the value exceeds the significance value of $\alpha = 0.05$ (0.114> 0.05), so it can be known that the pretest of both variances is homogeneous.

T-test

The analysis of the data of the pretest t-test results in the control class and the experimental class is presented in the following table 6.

Table 6. Results of the Experimental and Control Class Pretest t-Test

Independent Sample Test				
	Class	Average	Sig (2-tailed)	Conclusion
Pretest	Experiment	31.90	0,789	Ho accepted
	Control	32.41		

Source: Research document, processed by IBM SPSS Statistic version 26

Based on table 6, the results of the independent sample test on Equal Variances Assumed obtained a value of Sig. (2-tailed) $\alpha = 0.789$ which means greater than 0.05 ($0.789 > 0.05$), then Ho was accepted and Ha was rejected so that there was no difference in the improvement of learning outcomes between the experimental class and the control class before being given a treatment. Because there is no difference in the improvement of learning outcomes in the initial ability, the next test is the t-test in the final ability or posttest. The analysis of the results of the posttest t-test in the experimental class and the control class is shown in the following table 7.

Table 7 Results of Post-test t-Test of Experimental Class and Control Class

Independent Sample Test				
	Class	Average	Sig (2-tailed)	Conclusion
Posttest	Experiment	80,17	0,000	Ha accepted
	Control	69,14		

Source: Research document, processed by IBM SPSS Statistical Version 26 calculation

Based on table 7, the results of the independent sample test on Equal Variances Assumed obtained a value of Sig. (2-tailed) $\alpha = 0.000$ which means less than 0.05 ($0.000 < 0.05$), so Ha is accepted and Ho is rejected so that there is a difference in the improvement of learning outcomes between the experimental class that uses ispring suite 11-based interactive learning media and the control class that uses conventional learning media.

Effect Size

Based on the calculation of the effect size, it was obtained as 1.36. The value of this effect size when viewed in the interpretation table of the Effect Size of the Cohen scale, shows that the treatment given by the researcher has a very strong influence with a category.

N-Gain

The results of the n-gain test in the experimental class and the control class are shown in the following table 8.

Table 8. N-Gain Test Results of Experimental and Control Classes

Class	Average N-Gain Score	Average N-Gain (%)
Experiment	0,71	71,05
Control	0,54	54,24

Based on table 8, it shows that the average N-Gain Score in the experimental class using interactive learning media based on ispring suite 11 was obtained at 0.71 and included in the medium category, then the N-Gain percent value was 71.05% and the criteria were quite effective. Meanwhile, the average N-Gain Score in the control class using the conventional learning model was obtained at 0.54 which was included in the low category, then, the N-Gain percent value was 54.24% and had less effective criteria.

Questionnaire Data Analysis

The results of the questionnaire calculation that are reviewed from four aspects are shown in the following table9.

Table 9. Results of Likert Scale Questionnaire Calculation

It	Aspects	Average Answer Respondents (%)
1	Benefits of Interactive learning media Based on iSpring Suite 11	80,23 %
2	Ease of use of ispring suite 11-based Interactive learning media on the material Gas Kinetic Theory	79,66%
3	Materials in ispring suite 11-based Interactive learning media on theoretical materials Gas Kinetics	81,15%
4	Languages used in ispring suite-based Interactive learning media 11 on gas kinetic theory material	85,52%

Discussion

This study aims to determine the influence of interactive learning media based on ispring suite 11 on physics learning outcomes on gas kinetic theory material at SMA Negeri 25 Garut. In this study, 3 meetings were needed with a sample of 58 respondents, namely 29 students of class XI Science 3 as an experimental class and 29 students of class XI Science 1 as a control class. In this study, conventional learning media is used in the control class and interactive learning media based on ispring suite 11 is used for the experimental class. The results of this study are to answer the problem formulation that has been explained earlier, namely:

The Effect of Interactive Learning Media Based on ispring Suite 11 on Physics Learning Outcomes on Gas Kinetic Theory Material at SMA Negeri 25 Garut

Based on the results of the study, effect size was carried out to determine the influence of the treatment that has been carried out. The results of the calculation of the effect size obtained a value of 1.36 which is categorized as very strong, which means that the treatment carried out has a very strong influence. This influence was obtained due to the use of interactive learning media based on ispring suite 11 on student physics learning outcomes.

The difference in the improvement of physics learning outcomes in gas kinetic theory material in high school in cognitive aspects between those who use ispring suite 11-based interactive learning media and conventional learning media

Based on the results of the research, the results of the pretest and posttest were obtained in both the experimental class and the control class. The average score of the pretest of the experimental class was 31.90 and the posttest score was 80.17. The average pretest score in the control class was 32.41 and the posttest score was 73.95. The average score of the two classes has a significant difference. The difference stated that the average score of the experimental class was greater than the average value of the control class, which showed the difference in the treatment of the experimental group towards the cognitive score during the physics learning process on the gas kinetic theory material. Therefore, students who learn using interactive learning media based on ispring suite 11 show higher learning outcomes so that they experience an increase than students who learn using conventional learning media.

Based on the results of the N-Gain test that has been carried out by the researcher, it is stated that the results of the pretest and posttest scores in the experimental and control classes produced a decision, namely the effectiveness of interactive learning media based on ispring suite 11 on student learning outcomes.

Student response to learning using interactive learning media based on ispring suite 11

The results of the student response questionnaire on the learning that has been carried out show that most of the students give a positive response to learning using interactive learning media based on ispring suite 11. This is evidenced by the results of the calculation of the student response questionnaire using the Likert scale on the material aspect of gas kinetic theory, the result was 80.23%, the score showed that the classification was very agreeable. The second aspect is the ease of use of interactive learning media based on ispring suite 11 on gas kinetic theory material, the result was 79.66%, the score showed an agreement classification. The third aspect is the material contained in the interactive learning media based on ispring suite 11 on the gas kinetic theory material, the result is 81.15%, the score shows that the classification is very agreeable. The fourth aspect, namely the language used in the interactive learning media based on ispring suite 11 on the gas kinetic theory material, obtained a result of 85.52%, showing a classification that strongly agrees. From this, it can be concluded that there is a positive response of students to the learning carried out.

CONCLUSION

Interactive learning media based on ispring suite 11 on physics learning outcomes on gas kinetic theory material at SMA Negeri 25 Garut has a significant influence. This is evidenced based on the calculation of an effect size of 1.36 which is included in the very strong interpretation criteria. Then, after the independent sample test was carried out, it was decided that there was an increase in student learning outcomes after being treated using interactive learning media based on ispring suite 11. Then interactive learning media based on ispring suite 11 has proven to be effective in improving physics learning outcomes compared to conventional learning media. This was done by the N-Gain test in the experimental class which produced an average N-Ngain score of 0.71 and an N-gain percent of 71.05%. The student response to ispring suite 11-based interactive learning media is in the high category.

REFERENCES

Arsyad, A. (2014). Media Pembelajaran. rev. ed. *Jakarta: Raja Grafindo Persada*, *258*.

Butar, F. E. B., Sidabutar, R., & Sauduran, G. N. (2022). Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Hasil Belajar Matematika. *Jurnal Pendidikan Sains dan Komputer*, *2*(02), 420–426.

Chusni, M. M., Zakwandi, R., Ariandini, S., Aulia, M. R., Nurfauzan, M. F., & A Azmi, T. (2018). *APPY PIE UNTUK EDUKASI_Rancang Bangun Media Pembelajaran Berbasis Android*.

Darma, B. (2021). *Statistika Penelitian Menggunakan Spss (Uji Validitas, Uji Reliabilitas, Regresi Linier Sederhana, Regresi Linier Berganda, Uji t, Uji F, R2)*. GUEPEDIA.

Dasmo, D., Lestari, A. P., & Alamsyah, M. (2020). Peningkatan hasil belajar fisika melalui penerapan media pembelajaran interaktif berbasis ispring suite 9. *SINASIS (Seminar Nasional Sains)*, *1*(1).

Gat, G. (2019). E-Learning: Mengembangkan Konten Standarisasi Scorm Dengan Ispring Suite. *SENSITIf: Seminar Nasional Sistem Informasi dan Teknologi Informasi*, 399–406.

Handayani, T. S., & Suharyanto. (2016). Pengembangan mobile learning berbasis android sebagai media pembelajaran pada materi fluida statis untuk meningkatkan minat dan hasil belajar ranah kognitif peserta didik. *Jurnal Pendidikan Fisika*, *5*(6), 384–389. http://journal.student.uny.ac.id/ojs/index.php/pfisika/article/view/1957/5916

Oktaviani, F., & Rustandi, D. (2018). Implementasi digital marketing dalam membangun brand awareness. *PRofesi Humas*, *3*(1), 1–20.

Rahmawati, N., & Wiyatmo, Y. (2021). Pengembangan Media Pembelajaran Interaktif Berbasis Software iSpring Suite 9 untuk Meningkatkan Minat Belajar dan Kemandirian Belajar Peserta Didik Kelas X pada Mata Pelajaran Fisika. *Jurnal Pendidikan Fisika*, *8*(2).

Ramadhani, D., & Liwayanti, U. (2021). Penerapan Media Pembelajaran Interaktif Berbasis Ispring Pada Materi Sejarah Komputer. *Mimbar Ilmu*, *26*(1), 28–38.

Sartika, A. D. (2022). *Pemanfaatan Ispring Suite 9 Dalam Pembelajaran Fisika Di SMAN 1 Gunung Meriah*. UIN Ar-Raniry Fakultas Tarbiyah dan Keguruan.

Wijayanto, H., Utomo, S. B., & Haryono, H. (2017). Upaya Peningkatan Sikap Ilmiah Dan Prestasi Belajar Siswa Melalui Penerapan Project Based Learning (PjBL) Dilengkapi Media Webquest Pada Pembelajaran Kimia Materi Sistem Koloid Kelas XI IPA 2 SMAN Gondangrejo Tahun Pelajaran 2015/2016. *Jurnal Pendidikan Kimia Universitas Sebelas Maret*, *6*(1), 39–45.

Wijayanto, P. A. (2017). *Pengaruh metode debat aktif berbantu ispring suite terhadap motivasi dan hasil belajar geografi*.

Yanti, I. E., & Fatisa, Y. (n.d.). Desain dan Uji Coba Media Pembelajaran Interaktif Berbasis Android pada Materi Reaksi Reduksi dan Oksidasi. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, *6*(2), 402–415.

Yanto, D. T. P. (2019). Praktikalitas media pembelajaran interaktif pada proses pembelajaran rangkaian listrik. *INVOTEK: Jurnal Inovasi Vokasional dan Teknologi*, *19*(1), 75–82.