



Comparative Study of the Use of PowerPoint and Prezi Media on Science Learning Outcomes

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The IPAS (Natural Sciences and Social Studies) learning process for fifth grade students at MI Ma'arif Sambiroto still uses lecture methods and conventional learning media such as whiteboards, which results in a lack of interaction and active participation from students. This makes the learning atmosphere feel monotonous and students tend to get bored quickly, resulting in a less than optimal understanding of the material. This study aims to compare the use of PowerPoint and Prezi presentation media on the learning outcomes of fifth-grade students in IPAS. This study uses a quantitative research design with a quasi-experimental type and a nonequivalent control group design model. Data collection techniques were carried out through questionnaires, which were then analyzed using percentage analysis and One-Way Anova. The results showed that the use of PowerPoint media obtained 98% data, which was classified as good, while Prezi obtained 92% data, which was also classified as good. The learning outcomes of students who used PowerPoint were very high, with 91.7% data, and students who used Prezi obtained 91.4% learning outcomes. The One-Way ANOVA statistical test shows a significant difference between the two media in terms of IPAS learning outcomes, with a calculated F value of 125.364 for PowerPoint and 180.134 for Prezi. Based on these results, it can be concluded that although both media improve student learning outcomes, the use of PowerPoint has a higher value than Prezi in improving IPAS learning outcomes. Both media have a significant effect on IPAS learning outcomes.

Keywords: Learning media, PowerPoint, Prezi, learning outcomes, IPAS

INTRODUCTION

The Merdeka Curriculum at the elementary school/MI level integrates science and social studies into Natural and Social Sciences (IPAS), taking into account the characteristics of elementary school children who view phenomena holistically and integrally. With this integration, teachers are encouraged to design contextual, inquiry-based learning that emphasizes effective scientific communication, including through digital presentation media in the classroom. The IPAS Learning Outcomes document affirms this rationale and directs learning towards the development of social science understanding that is connected to real life.

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Currently, technological developments in the digital era have a major impact on the quality of education. Technology should be used as a medium in the learning process. Agung (2021) defines learning media more succinctly as a tool that functions and can be used to convey learning messages. Learning media also makes it easier for students to receive or remember the material that has been delivered and makes it easier for teachers to deliver learning material. Thus, learning media is an important tool to support and facilitate the teaching and learning process in the classroom in an effort to improve educational interaction and optimize student learning activities and outcomes.

One of the benefits of learning media in the classroom is as a presentation medium. There are many presentation media that can be used today. Presentations using software-assisted applications will create more innovative, interactive, and conducive learning activities. Some interactive presentation media applications are *PowerPoint* and *Prezi*. The use of learning media such as *PowerPoint* and *Prezi* can be an alternative choice for teachers to deliver material, not only simplifying the learning process, but also making it more interesting. *PowerPoint* and *Prezi* learning media can display text, images, animations, sounds, and videos. Thus, this learning media can accommodate all interactive learning activities such as listening, reading, writing, and playing.

Researchers compared *PowerPoint* and *Prezi* because both are presentation media with similar functions and benefits, so it is necessary to compare the use of these two-learning media to see and support better learning outcomes. This can be seen from the learning outcomes of the two classes studied. Through the learning outcomes, it can be seen whether the media is able to provide efficient learning understanding or not.

Based on the results of observations conducted by researchers in the fifth grade IPAS class at MI Ma'arif Sambiroto, it was found that the IPAS learning process was still not optimal because it still used lecture methods and wrote learning materials on a whiteboard. During the learning process, students rarely actively asked questions about the material being taught. The suboptimal use of learning media in the IPAS learning process, which only involves note-taking and listening, will quickly bore students because the learning atmosphere seems monotonous and the teacher only presents the teaching material without any interesting displays, so that the learning process is less effective and efficient and students are less able to understand the teaching material clearly.

The researchers also had limitations that prevented them from studying all students at MI Ma'arif Sambiroto, so they chose to conduct research on classes VA and VB in IPAS learning. The characteristics of students aged 9 to 12 years or grades 4 to 6 of SD/MI are that they naturally have a strong curiosity and are interested in the world around them, enjoy playing and prefer to be happy/cheerful, like to organize themselves to handle various things, explore situations and try new things, are usually emotionally driven to achieve because they dislike dissatisfaction and reject failure, and learn effectively when they feel satisfied with the situation and learn by working, observing, taking initiative, and teaching other children (Jirout et al., 2024).

From the results of interviews conducted by researchers with fifth-grade IPAS teachers, it was found that they had never used presentation media in IPAS lessons. However, they had used innovative visual learning media to support student understanding. The learning outcomes of fifth-grade students in IPAS were still considered low. This is evident from the results of the daily tests on spatial geometry in the second semester. As a result, students must take remedial tests/retake exams to improve their scores. The learning outcomes in IPAS during the daily tests on spatial geometry in the second semester are still below the minimum passing grade (KKM) of 70 with a percentage of 80%.

From the above issues, it is hoped that the use of presentation-based media will improve the quality of student learning outcomes. This is because the use of displays or icons can motivate students to pay attention to the material being presented so that they can understand what the teacher is explaining. According to Chou, et al. (2015), the use of *PowerPoint* and *Prezi* presentation media applications can provide opportunities for students to be actively involved in learning so that they can be conditioned to always be focused and fully participate in the learning process (learner participation). Therefore, the purpose of this study is to determine the difference between using *PowerPoint* and *Prezi* presentation media on student learning outcomes in IPAS subjects.

METHODS

This study uses a quantitative approach with a positivistic foundation, examining differences in learning outcomes that are measured numerically and analyzed using statistical techniques to test hypotheses. The design used is a nonequivalent groups pre-test–post-test quasi-experiment, because the classes studied were not selected randomly. Two fifth-grade classes at MI Ma'arif Sambiroto were used as treatment groups with different presentation media: class VA received lessons using Microsoft *PowerPoint* (X_1) and class VB used *Prezi* (X_2). Before the treatment, both classes were given a pre-test to determine their initial ability in fifth-grade IPAS material on ecosystems. After the treatment, both classes were given a post-test to measure their learning achievements.

The research was conducted at MI Ma'arif Sambiroto, Sambiroto Hamlet, Sambibulu Village, Taman Subdistrict, Sidoarjo Regency, East Java, on February 3-5, 2025. The research population consisted of all fifth-grade students ($N=60$), comprising VA = 30 students and VB = 30 students. The sampling technique used purposive sampling, with all students in both classes selected as samples due to their suitability for the research objectives and readiness for media implementation.

The research variables included independent variables (X), namely presentation media with two levels ($X_1=PowerPoint$, $X_2=Prezi$), and dependent variables (Y), namely IPAS learning outcomes on ecosystem material. The intervention was carried out by the researcher together with the fifth-grade IPAS teacher: class VA received the material presentation through *PowerPoint*, while class VB received it through *Prezi*. To capture the initial conditions related to students' knowledge and learning experiences of the material, a short questionnaire was given before the lesson. During the lesson, the researcher ensured the equivalence of objectives, material coverage, and learning time in both classes so that the comparison between the two media would be fair. Data collection techniques consist of three types, namely 1) questionnaire tests, 2) written tests, and 3) documentation. The questionnaire test aims to determine the use of *PowerPoint* and *Prezi* software in IPAS lessons. The questionnaire is assessed using a *Likert scale*, with the following criteria: score 5 (strongly agree), 4 (agree), 3 (unsure), 2 (disagree), 1 (strongly disagree). The written test consisted of a pre-test and post-test to measure cognitive learning outcomes on ecosystem material; and (3) documentation (photos of activities, attendance lists, and relevant archives) to reinforce the learning process. The questionnaire items for each medium were compiled from operational indicators (topic relevance, message clarity, use of text–images–audio–video, zooming for concept mapping), while the learning outcome test contained items representing the competency indicators for fifth-grade spatial geometry material.

Before use, the instruments were tested for validity and reliability. The validity of the questionnaire and test items was examined empirically (item-total correlation) using SPSS 23 software, with a significance criterion of $p < 0.05$ as an indicator of validity. Internal reliability was estimated using *Cronbach's Alpha* (questionnaire) and/or the appropriate coefficient for tests, with a criterion of $\alpha > 0.60$ indicating reliability/consistency. Only valid and reliable items were retained for the main data collection.

The data analysis techniques used in this study were as follows: 1) to determine the use of *PowerPoint* and *Prezi* presentation media from the questionnaire provided. Percentage calculations were performed using the following steps: counting the answers, calculating the frequency, and entering them into the following formula:

$$P = \frac{f}{N} \times 100\%$$

P = Percentage, f = Frequency of respondents' choices, N = Number of respondents, 100% = fixed number

The percentage calculation results are based on the following standards: 76%-100% (excellent), 56%-75% (good), 40%-55% (fair), and <40% (poor). Meanwhile, the criteria for student learning outcomes are as follows: 85%-100% (very high), 70%-84% (high), 60%-69% (fair), 51%-59% (low), <50% (very low). To analyze the differences between using *PowerPoint* and *Prezi* in terms of learning outcome profiles, inferential analysis was conducted to test the hypothesis of difference. The prerequisites for analysis were tested through normality tests (*Shapiro Wilk/Kolmogorov Smirnov* at $\alpha=0.05$) and variance homogeneity tests (*Levene's Test*, $\alpha=0.05$). To test the difference in means between groups on the post-test scores, an independent t-test (for two groups) or One-Way ANOVA (equivalent for $k=2$) was used with a significance level of 0.05. In addition, to see the improvement in each class, a paired-samples t-test (comparing pre-test–post-test per class) was used at $\alpha=0.05$. All processing was performed using SPSS version 23.

FINDINGS AND DISCUSSION

The results of the questionnaire analysis of the use of *PowerPoint* presentation media in class VA and the use of the *Prezi* application in class VB are as follows (Table 1).

Table 1. results of a survey on the use of PowerPoint and Prezi applications

Class VA				Class VB			
Responden	PowerPoint (%)	Resp	PowerPoint (%)	Responden	Prezi (%)	Resp	Prezi (%)
1	100	16	100	1	100	16	87,5
2	97,5	17	100	2	92,5	17	90

3	97,5	18	100	3	87,5	18	97,5
4	97,5	19	95	4	92,5	19	100
5	100	20	100	5	95	20	92,5
6	92,5	21	97,5	6	87,5	21	87,5
7	100	22	100	7	85	22	95
8	97,5	23	97,5	8	90	23	85
9	100	24	100	9	92,5	24	82,5
10	97,5	25	100	10	92,5	25	87,5
11	95	26	100	11	92,5	26	92,5
12	95	27	97,5	12	90	27	100
13	97,5	28	97,5	13	87,5	28	92,5
14	100	29	97,5	14	90	29	100
15	97,5	30	95	15	85	30	95

Results of the *Prezi* utilization survey: 92%

Results of the *PowerPoint* utilization survey: 98% (Good)

Based on the table above, it shows that student learning outcomes using *PowerPoint* media in class VA are higher than those using *Prezi* media. Although both types of media are good. This is due to several factors, including the fact that 100% of students can see the audio-visual animated images in *PowerPoint*, 100% of students can receive detailed and clear information through presentations using *PowerPoint*, and 100% of students are inspired, motivated, and happy to receive information/material using *PowerPoint*. This is in line with Gambari, et al., (2018) opinion that *PowerPoint* presentation media has advantages, namely attractive presentation due to the use of colors, fonts, and animations, as well as visual information that is easy to understand. The use of *PowerPoint* in drawing learning can also improve students' cognitive achievement (Ibrahim, 2018).

The results of the analysis of the learning outcomes of class VA using *PowerPoint* and the learning outcomes of class VB using the *Prezi* application, based on pre-test and post-test scores (post-test 1 and post-test 2), are as follows (Table 2).

Table 2. learning outcomes for class VA (*PowerPoint* media) and learning outcomes for class VB (*Prezi* application media)

Responden	Pre-test Score	Pos-test Score <i>PowerPoint</i> Class VA			Responde n	Pre-test Score	Pos-test Score <i>PowerPoint</i> Class VA		
		Score 1	Scorei 2	Avarage			Score 1	Scorei 2	Average
1	60	74	95	85	1	61	84	90	87
2	63	88	95	92	2	81	95	100	98
3	76	100	100	100	3	70	90	95	93
4	74	100	100	100	4	74	90	95	93
5	81	84	95	90	5	66	90	95	93
6	69	100	100	100	6	63	94	100	97
7	76	100	100	100	7	60	94	100	97
8	83	90	100	95	8	70	95	100	98
9	79	84	88	86	9	70	100	100	100
10	78	90	95	93	10	70	80	90	85
11	63	84	88	86	11	74	80	90	85
12	79	78	95	87	12	81	94	100	97
13	70	74	95	85	13	68	90	90	90
14	76	74	90	82	14	76	95	100	98
15	78	88	85	87	15	70	80	90	85
16	70	88	95	92	16	60	90	95	93
17	84	94	100	97	17	74	100	100	100
18	68	94	100	97	18	63	90	95	93
19	66	80	85	83	19	70	90	95	93
20	63	74	90	82	20	70	80	84	82
21	69	88	90	89	21	63	80	84	82
22	74	94	100	97	22	60	84	90	87
23	70	94	100	97	23	67	80	90	85
24	78	94	95	95	24	66	85	90	88
25	78	94	95	95	25	73	90	90	90
26	72	88	100	94	26	76	90	95	93

27	73	90	95	93	27	80	90	95	93
28	81	84	95	90	28	84	95	100	98
29	88	88	95	92	29	76	80	90	85
30	68	88	95	92	30	67	80	90	85
Avarage					Avarage				
Category					Category				

Based on the results of the analysis, it shows that the use of *PowerPoint* media and *Prezi* media both have very high criteria. In the use of *PowerPoint* media, 13.3% of students obtained a score of 100, 13.3% of students obtained a score of 97, 10% of students obtained a score of 95. 3.3% of students obtained a score of 94, 6.6% of students obtained a score of 93, 13.3% of students obtained a score of 92, 6.6% of students obtained a score of 90, 3.3% of students obtained a score of 89, 6.6% of students obtained a score of 87, 6.6% of students obtained a score of 86, and 6.6% of students obtained a score of 85. This is in accordance with the opinion of Kresnadi (2018) that the practical benefits in the teaching and learning process by using PowerPoint learning media are that it can clarify the presentation of messages and information so that it can facilitate and improve the learning process and outcomes. The use of *Prezi* media is also classified as "very high". This is due to several factors, including 98% of students being able to think creatively by using *Prezi* media. 97% of students are interested in the slide show displayed on the *Prezi* presentation media. And 97% of students can see images, text, video, and sound in one view. This is in accordance with the opinion of Santiana, et al., (2017) namely Can be used for online and offline presentations, Has a more varied choice of themes and can be downloaded online, Uses Zooming User Interface (ZUI) which allows to enlarge and reduce the display of presentation media so that it is more interesting, Has a concept map maker feature that can help map the scope of cognitive science, and Collaborative *Prezi* design, allows for collaboration with fellow user presentations in real-time, across space and time zones (Alia, et al., 2020; Ismail, et al., 2017).

Data analysis on the differences in the use of *PowerPoint* and *Prezi* presentation media on the learning outcomes of the social studies subject of class V MI Ma'arif Sambiroto uses several tests, including: 1) validity test. The results of the validity test of the questions show that all questions have a calculated r value $> r$ table value (0.250), so that all data to be analyzed are declared valid, 2) reliability test. The results of the *Cronbach's Alpha value* are $0.699 > 0.60$ so that it can be said that the research instrument above is reliable, 3) normality test. The results of the normality test show that the learning outcomes of class VA using *PowerPoint* have a value of $0.136 > 0.05$ so that the data is declared normally distributed. The learning outcomes of class VB using *Prezi* media have a value of $0.023 > 0.05$, so that the data is declared normally distributed, 4) Homogeneity test shows that the significance value of the social studies learning outcomes is $0.758 > 0.05$, which means that the data is homogeneous. Of the four tests conducted, all were deemed suitable for further testing, namely the *Paired Sample T-test* (T-Test). The *Paired Sample T-Test* (T-Test) was used to determine differences in learning outcomes before (pre-test) and after (post-test) using media. The results of the Paired Sample T-Test for Class VA using *PowerPoint* media can be seen in (Table 3).

Table 2. Class VA learning outcomes (*Powerpoint* media) and Class VB learning outcomes (*Prezi* application media)

	Paired Differences					t	df	Sig. (2-tailed)			
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference							
				Lower	Upper						
Pair 1 Pre-test-Post test Powerpoint	- 18.200	7.631	1.393	- 21.050	-15.350	- 13.063	29	.000			
Pair 1 Pre-test-Post test Prezi	- 21.333	7.237	1.321	- 24.036	-18.631	- 16.147	29	.000			

Based on the Paired Sample T-Test table on the use of *PowerPoint* presentations in Class VA above, the significance value (2-tailed) is $0.000 < 0.05$, indicating a significant difference between the pre-test and post-test results of science learning using *PowerPoint* presentations. Similarly, the use of the *Prezi* application has a significance value (2-tailed) of $0.000 < 0.05$, indicating a significant difference between the pre-test and post-test results of science learning using *Prezi* presentations.

A *One-Way ANOVA* test shows that the use of *PowerPoint* and *Prezi* media has a significance value of $0.000 < 0.05$, indicating a significant difference in learning outcomes using *PowerPoint* and *Prezi* presentations. The utilization rate of *PowerPoint* media is higher (180.123) than of *Prezi*. This statement aligns with research findings showing that using *Prezi* as a digital presentation tool is more effective in enhancing knowledge acquisition than traditional instruction (Chou, Cheng & Lu, 2015). Similarly, *PowerPoint* also improves student academic performance (Leom, 2021).

CONCLUSIONS

Based on the analysis of the use of *PowerPoint* media in class VA and *Prezi* in class VB, both showed excellent performance in improving student learning outcomes. Although *PowerPoint* was slightly superior in terms of utilization, with 100% of students receiving information clearly and being inspired by the media, *Prezi* also showed high results in increasing student creativity and interactivity. The results of the pretest and posttest tests, as well as the *One-Way ANOVA* test, showed a significant difference between the two media, with *PowerPoint* having a slightly higher average utilization (180.123). Overall, although both were effective, *PowerPoint* was more dominant in improving student learning outcomes.

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