



The Effectiveness of Using Artificial Intelligence in Teaching *Seni Budaya* Subject to Grade X Students of SMP Negeri 20 Batam: Experiment Quasy

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ABSTRACT

This study aims to describe the effectiveness of using AI in arts and culture learning. The study was conducted at SMP Negeri 20 Batam. The research activities took place at the beginning of the even semester of the 2024/2025 academic year. The study population was 34 students of class 7A who participated in arts and culture learning using conventional teaching materials and also 34 students of class 7B who participated in learning using AI. The sample was allocated to 58 students based on Slavin's formula. Each sample group consisted of 29 students drawn randomly without replacement from the population group. A quasi-experiment was used in this study by assigning class 7B with a relatively low class ranking as the treatment group and assigning class 7B with a relatively high class ranking as the control group. Data were collected using a 4-option multiple-choice test instrument that was arranged objectively and systematically. Learning outcome data were analyzed using parametric inferential statistics, namely the independent sample t-test because the sampling requirements, normality, and homogeneity were met. All calculations were carried out using the SPSS application. The post-test of learning arts and culture for the control group, namely the group using conventional teaching materials, reached a mean of 11.76 which is equivalent to a standard score of 78.38 percent, while the results of learning arts and culture for the treatment group, namely the group using AI-based teaching materials, reached a mean of 12.58 which is equivalent to a standard score of 83.57 percent. The use of AI is declared effective in learning arts and culture because the t value = -4.342 on df 62 has a sig. value of 0.00. Thus, H_0 is rejected because $\text{sig. } 0.00 < 0.05$.

Keyword: artificial intelligence, Seni Budaya subject, experiment quasy

Efektivitas Penggunaan Kecerdasan Buatan dalam Pembelajaran Seni Budaya di Kelas VII SMP Negeri 20 Batam: Quasi-Eksperimen

ABSTRAK

Penelitian ini bertujuan untuk mendeskripsikan efektivitas penggunaan AI dalam pembelajaran seni budaya. Penelitian dilakukan di SMP Negeri 20 Batam. Kegiatan penelitian berlangsung di awal semester genap tahun pelajaran 2024/2025. Populasi penelitian ini adalah 34 siswa kelas 7A yang mengikuti pembelajaran seni budaya menggunakan bahan ajar konvensional dan juga 34 siswa kelas 7B yang mengikuti pembelajaran menggunakan AI. Sampel ditempatkan sebanyak 58 siswa berdasarkan formula Slavin. Setiap kelompok sampel sebanyak 29 siswa yang ditarik secara random sederhana tanpa pengembalian dari kelompok populasi. Quasi-eksperimen digunakan dalam penelitian ini dengan menetapkan kelas 7B yang memiliki peringkat kelas relatif rendah sebagai kelompok perlakuan dan menetapkan kelas 7B yang memiliki peringkat kelas relatif tinggi sebagai kelompok kontrol. Data dikumpul menggunakan instrumen tes pilihan ganda 4 opsi yang disusun secara objektif dan sistematis. Data hasil belajar dianalisis menggunakan statistik inferensial parametrik yakni uji t sampel independen karena syarat sampling, normalitas, dan homogenitas terpenuhi. Semua penghitungan menggunakan aplikasi SPSS. Postes belajar seni budaya untuk kelompok kontrol yakni kelompok yang menggunakan bahan ajar konvensional mencapai mean 11,76 yang setara dengan skor baku persen 78,38 sedangkan hasil belajar seni budaya untuk kelompok perlakuan yakni kelompok yang menggunakan bahan ajar berbasis AI mencapai mean 12,58 yang setara dengan skor baku persen 83,57. Penggunaan AI dinyatakan efektif dalam pembelajaran seni budaya karena nilai $t = -4,342$ pada $df 62$ memiliki nilai sig. 0,00. Dengan demikian, H_0 ditolak karena $\text{sig. } 0,00 < 0,05$.

Kata kunci: kecerdasan buatan, pembelajaran Seni Budaya, quasi-eksperimen

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INTRODUCTION

Arts and Culture learning in seventh grade junior high school involves six objectives. For Fine Arts, there are two learning objectives. First, drawing flora, fauna, and still life. This objective includes learning about: the definition of drawing, drawing objects, composition, drawing techniques, and drawing tools and media. Second, drawing decorative motifs. This objective includes learning about: the definition of decorative motifs, decorative motif motifs, decorative motif patterns, and decorative motif drawing techniques.

For Music, there are two learning objectives. First, singing with one voice. This objective includes learning about: singing in unison, vocal techniques and the human vocal organ, and vocal practice. Second, singing with more than one voice. This objective includes learning about: ensemble music, playing techniques, and playing melodic instruments.

For Dance, there are two learning objectives. First, space, time, and energy in dance movement. This objective includes learning about: the definition of dance and the elements of dance movement. Second, processing space, time, and energy according to accompaniment. This objective is achieved through practicing dance movements.

For Theater, there are two learning objectives. First, acting out fragment scenes. This objective covers learning about the concept of fragments and basic theatrical acting techniques. Second, writing fragment scripts. This objective covers learning about techniques for writing fragment scripts and excerpts.

Fine arts involves several learning activities. First, applying decorative motifs to textile materials. This objective includes learning about: applying decorative motifs to textile materials, types and properties of textile materials, and techniques for drawing decorative motifs on textile materials. Second, applying decorative motifs to wood. This objective includes learning about: applying decorative motifs to wood materials,

examples of decorative motif applications, and techniques for applying decorative motifs to wood materials.

Standardly, arts and culture learning uses learning strategies covered in textbooks. In other words, the learning strategies follow the presentation techniques in textbooks published by the Ministry of Education and Culture.

This article is based on research on arts and culture teaching using artificial intelligence (AI) in seventh grade at SMP Negeri 20 Batam. In other words, this learning utilizes electronic media compared to learning using manuals. Based on the description above, three problems were formulated. The research questions are as follows:

- 1) What are the categories of arts and culture learning outcomes using manual textbooks in seventh grade at SMP Negeri 20 Batam?
- 2) What are the categories of arts and culture learning outcomes using AI applications in seventh grade at SMP Negeri 20 Batam?
- 3) Are arts and culture learning outcomes similar between learning using manual textbooks and using AI applications in seventh grade at SMP Negeri 20 Batam?

In line with the research questions, two research objectives are provided. These objectives are:

- 1) to describe the categories of arts and culture learning outcomes using manual textbooks in seventh grade at SMP Negeri 20 Batam;
- 2) to describe the achievement of arts and culture learning outcomes using AI applications in seventh grade at SMP Negeri 20 Batam;
- 3) to describe the similarity of arts and culture learning outcomes between learning using manual textbooks and using AI applications in seventh grade at SMP Negeri 20 Batam.

This article is believed to have many benefits. First, for Arts and Culture students, this article is useful because it can be used as a consideration in



planning, implementing, and evaluating learning programs. Second, for school principals, this article can be used as part of the supervision material in order to provide guidance to teachers.

AI is one of the technological developments widely used in learning because it can provide responses similar to human behavior (Chear & Norman, 2024). The use of AI in education is not only transforming the education system but also changing the way knowledge is shared, learning approaches, cognition, and the development of civilization (Kaur 2021). AI can also assist teachers in carrying out daily tasks because it can automatically generate assignments, further assessments, grades, and feedback. Lin (2022) found that AI can develop personalized learning that helps analyze skill mastery, provide optimal educational activities for students, and encourage students to learn at their own pace and ability level to achieve learning objectives.

The emergence of advanced technologies such as AI should be viewed positively by teachers. This is because AI is a rapidly evolving branch of science and technology in the field of education. The concept of AI refers to the ability of computers and systems to mimic human intelligence in learning, thinking, and decision-making (Normadiah & Daud, 2023).

Relevant articles are widely found in online journal scientific articles. These articles are described below.

First, Adrianto & Rachma Waryanti (2025) entitled *Meningkatkan Inklusivitas Seni: Dampak Kecerdasan Buatan (AI) dalam Karya Seni*. Besaung. The findings reveal a consensus among participants that AI's presence in art is inevitable. However, they contend that AI will not fundamentally alter the nature of art or replace human creativity. Instead, AI is perceived as a potential tool to strengthen inclusivity, particularly by enhancing accessibility. This study contributes valuable insights into AI's impact on artistic inclusivity and offers guidance for artists to leverage technology responsibly, creating inclusive, sustainable, and culturally rich artworks.

The findings also prompt further discussion on the ethics of AI in art and the need to balance technological innovation with the preservation of cultural identity.

Second, Nalendra et al. (2025) entitled *Analisis Kemiripan Unsur Desain Pada Karakter Spider-Man Dengan Karya Digital Artificial Intelligence*. The results show that similarities in several Manga Matrix elements within AI works indicate that the character still refers to the original Intellectual Property. Conversely, the Personality aspect tends to disappear when the Intellectual Property's visual elements are modified, resulting in differences from the original visual elements. This research may contribute design recommendations for designers by indicating that Personality aspects can change if the visual elements that compose them are modified by AI.

Third, Ghaffara et al. (2025) entitled *Kreativitas Versus Dehumanisasi Seni Desain: Keterampilan Manusia di Tengah Tantangan Kecerdasan Buatan dalam Era Digital*. Through a qualitative descriptive approach, the main aim of this research is to investigate artists' views regarding the use of AI, both as a partner and as a threat. The analysis results show that AI influences the role and identity of artists, especially in maintaining emotion and meaning in digital art. It is hoped that these findings can provide an understanding of the balance between technology and human expression in art, as well as answer ethical and aesthetic challenges in the context of art that continues to develop.

METHOD

This study employed a quasi-experimental method through a pretest-posttest control class design. This means that the study used two groups of students. The first group was the control class, and the second group was the treatment class. Clark et al. (2008), Balaka (2012), and Razak (2017) state that the pretest-posttest control class design is often used in various research fields, such as social studies and education.

The study took place at SMP Negeri 20 Batam. This A-accredited school is located in Tiban Koperasi, Tibanbaru Village, Sekupang District, Batam City, Riau Islands Province, Indonesia. In the 2022/2023 academic year, the school has nine seventh-grade classes.

This study took place at the beginning of the even semester of the 2024/2025 academic year. Preparation activities took place in February 2025, including the development of test instruments. Data collection, analysis, and the writing of the scientific article took place from March to July 2025.

The study population was seventh-grade students in two parallel classes at SMP Negeri 20 Batam, who participated in arts and culture learning using conventional teaching materials for the control class and AI for the treatment class. The control class consisted of 39 students in class VII-A, who had a higher class ranking than the other classes. The treatment class consisted of 37 students in class VII-D, who had a lower class ranking than the other classes.

The sample size was 64 students based on the formula developed by Slavin (Razak, 2017; Amin et al., 2023; Santoso, 2023; Setiawan, 2007). This number was divided into 33 students in class VII-A and 31 students in class VII-D. However, in the context of a quasi-experimental study, all members of the population participated in the learning activities.

Each member of the sample was drawn using simple random sampling from each population group. The sampling technique used was a random sampling technique without replacement.

Table 1
Population and Sample Size of Grade VII
Students at SMP Negeri 20 Batam per Research
Group

No.	Group	Population	Sample
1	Control Group	39	33
2	Experiment Group	37	31
	Total	76	64

Data on arts and culture learning outcomes were collected using a test instrument. The test was in the form of multiple-choice items, designed following systematic and objective procedures to meet content validity requirements (Azwar (2016), Hatch & Farhady (1982), Fulcher & Davidson, 2007). The test development procedure is presented below.

First, determine the type of test, namely a four-option multiple-choice test for more definitive scoring purposes.

Second, determine the arts and culture aspects that will be the learning objectives. This article only covers the fine arts aspect.

Third, determine the test indicators. This article involves five indicators: the definition of drawing, drawing objects, composition, drawing techniques, and drawing tools and media.

Fourth, write the test specifications using a table containing a column for indicators, a column for questions per indicator, and a column for totals. This specification involves 15 items.

Each question answered according to the key receives a score of 1 (one). Each question answered incorrectly receives a score of 0 (zero). Therefore, the minimum score is 0, while the maximum score is 15.

Data were analyzed using parametric inferential statistics, namely the paired-sample t-test and the independent-sample t-test. The paired-sample t-test was used to determine the magnitude of the increase in post-test results compared to the pre-test results for each sample group. The independent-sample t-test was used to determine whether there was a difference in post-test results between the experimental and control groups. All statistical calculations were carried out using SPSS.

Students were deemed successful in the learning process if they obtained a minimum score of 11, equivalent to a standard score of 73.33.



RESULTS

1. Control Group Learning Outcomes

The pre-test mean was 9.24 (61.62 percent) with a standard deviation of 1.17, and the post-test mean, i.e., the arts and culture learning outcomes of the control group at SMP Negeri 20 Batam, was 11.76 (78.38 percent) with a standard deviation of 0.85. Complete descriptive statistics are presented in the table below.

Table 2
Pretest and Posttest Results of Arts and Culture Learning in the Control Group

No.	Sample Code	Pretest		Post-test	
		Score	Percent	Score	Percent
1	1727	10	66,67	13	86,67
2	1728	10	66,67	13	86,67
3	1729	10	66,67	13	86,67
4	1730	10	66,67	13	86,67
5	1731	11	73,33	13	86,67
6	1732	11	73,33	13	86,67
7	1733	11	73,33	13	86,67
8	1734	11	73,33	13	86,67
9	1706	8	53,33	12	80,00
10	1711	9	60,00	12	80,00
11	1719	10	66,67	12	80,00
12	1720	10	66,67	12	80,00
13	1721	10	66,67	12	80,00
14	1722	10	66,67	12	80,00
15	1723	10	66,67	12	80,00
16	1724	10	66,67	12	80,00
17	1725	10	66,67	12	80,00
18	1726	10	66,67	12	80,00
19	1701	7	46,67	11	73,33
20	1703	7	46,67	11	73,33
21	1705	8	53,33	11	73,33
22	1707	8	53,33	11	73,33
23	1708	8	53,33	11	73,33
24	1709	8	53,33	11	73,33
25	1710	8	53,33	11	73,33

The test requirements were met in terms of inferential statistical calculations. First, the arts and culture data in the control group were normally distributed. Second, the arts and culture data in the control group were homogeneous, as the sig. value of 0.439 was greater than 0.05.

The paired sample t-test value of the control group is -21.657 at sig. 0.000 (Figure-1). Thus, sig. 000 < 0.05. Therefore, Ho is rejected, which means that the pretest and posttest scores of the control group of sample members of SMP Negeri 20 Batam are significantly different.

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
before	9,24	33	1,173	0,204
after	11,76	33	0,867	0,151
Paired Samples Test				
	Mean	t	df	Sig. (2-tailed)
before - after	-2,515	-21,657	32	0,000

Figure 1
Screenshot of Paired Sample t-Test Results for Arts and Culture Data in the Control Group

2. Learning Outcomes of the Treatment Group

The pre-test mean for the treatment group was 9.03 (60.22 percent) at a standard deviation of 0.75, and the post-test mean for arts and culture learning outcomes using AI in the treatment group at SMP Negeri 20 Batam was 12.58 (83.87 percent) at a standard deviation of 0.61. Complete descriptive statistics are presented in the table below.

Table 3
Pre-test and Post-test Results for Arts and Culture Learning in the Treatment Group

No.	Sample Code	Pretest		Post-test	
		Score	Percent	Score	Percent
1	4714	9	60,00	14	93,33
2	4729	10	66,67	14	93,33
3	4706	8	53,33	13	86,67
4	4707	8	53,33	13	86,67
5	4708	8	53,33	13	86,67
6	4709	9	60,00	13	86,67
7	4710	9	60,00	13	86,67
8	4711	9	60,00	13	86,67
9	4712	9	60,00	13	86,67
10	4713	9	60,00	13	86,67
11	4723	10	66,67	13	86,67
12	4724	10	66,67	13	86,67
13	4725	10	66,67	13	86,67
14	4726	10	66,67	13	86,67
15	4727	10	66,67	13	86,67
16	4728	10	66,67	13	86,67
17	4701	8	53,33	12	80,00
18	4702	8	53,33	12	80,00
19	4703	8	53,33	12	80,00
20	4704	8	53,33	12	80,00
21	4705	8	53,33	12	80,00
22	4715	9	60,00	12	80,00
23	4716	9	60,00	12	80,00
24	4717	9	60,00	12	80,00
25	4718	9	60,00	12	80,00
26	4719	9	60,00	12	80,00
27	4720	9	60,00	12	80,00
28	4721	9	60,00	12	80,00
29	4722	9	60,00	12	80,00
30	4730	10	66,67	12	80,00
31	4731	10	66,67	12	80,00
mean		9,03	60,22	12,58	83,87
stdev		0,75		0,61	

The requirements for using a paired sample t-test are met in terms of calculating inferential statistics. First, the arts and culture data in the control group are normally distributed. Second, the arts and culture data in the control group are homogeneous because the sig. value of 0.476 is > 0.05.

The paired sample t-test value for the control group is -24.394 at a sig. value of 0.000 (Figure 2). Therefore, sig. 000 < 0.05. Therefore, Ho is rejected, meaning the pretest and posttest scores of the treatment group differ significantly.

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
before	9,03	31	0,752	0,135
after	12,58	31	0,620	0,111
Paired Samples Test				
	Mean	t	df	Sig. (2-tailed)
before - after	-3,548	-24,394	30	0,000

Figure 2
Screenshot of Paired Samples t-Test Results for Arts and Culture Data for the Treatment Group

3. Effectiveness of AI in Arts and Culture Learning

The effectiveness of AI applications in arts and culture learning in seventh-grade students at SMP Negeri 20 Batam was determined by analyzing independent sample t-tests using posttest data. The test results showed an independent sample t-value of -4.342 with a df of 62, with a sig. 0.00 value (Figure 3). Therefore, sig. 0.00 < 0.05, so Ho is rejected. This means that the mean posttest score of the experimental group was higher than that of the control group.



Group Statistics					
	Mean	N	Std. Deviation	Std. Error Mean	
Control	11,76	33	0,867	0,151	
Experiment	12,58	31	0,620	0,111	

Independent Samples Test					
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	-4,342	62	0,000	-0,823	0,190
Equal variances not assumed	-4,387	58,007	0,000	-0,823	0,188

Figure-3
SPSS Screenshot of Post-Test Results for Arts and Culture Data of Grade VII Students at SMP Negeri 20 Batam per Sample Group

The independent sample t-test yielded 0.00 at the 0.000 level (Figure 3). Therefore, H_0 is rejected because the value of sig. <0.005. This means that the control group's post-test mean differs significantly from the treatment group's post-test mean. Therefore, the AI application is effective in arts and culture learning in grade VII of SMP Negeri 20 Batam, as the treatment group's post-test mean is significantly higher than the control group's post-test mean.

DISCUSSION

The AI application is indeed effective compared to the application itself. This means that arts and culture learning using conventional teaching materials can also help students achieve learning outcomes in line with the learning objectives. Of the 33 students in the control group, only one failed to reach the minimum score of 73.33. This sample member, coded 4702, only achieved a post-test score of 63.33 because he was only able to answer 10 of the 15 items. This condition can be improved through remedial learning so that the sample members can reach the minimum threshold.

Remedial learning serves to provide re-understanding to students who have not yet achieved the learning outcomes according to the target. Remedial learning is relatively easy to implement, although it sometimes requires the inclusion of students who have already completed the course (Diani et al., 2022; Hasibuan & Aisiah, 2020; Magfiroh et al., 2024). The results of the study indicate that the use of AI applications was effective in arts and culture learning in seventh-grade students at SMP Negeri 20 Batam. This was indicated by the better mean post-test results in the treatment group compared to the mean in the control group. This is thought to be due to several factors. First, teachers' high confidence in teaching due to the use of AI applications motivates them to engage in learning seriously. Teachers are believed to be more confident using AI-based materials than using manual learning materials. Henry & Cliffordson (2013), Lamb (2012), Nizigama et al., 2023; Nduwimana, 2019; Subari et al., 2022), and Adeninawaty et al. (2018) state that high motivation is essential in various aspects of life, including motivation for teaching achievement for teachers.

Electronic teaching materials, such as AI, have been shown to produce better learning outcomes than manual teaching materials. This finding aligns with the conclusions of online journal articles such as those by (Permana & Kurniaman, 2024; Razak, 2025; Dewi et al., 2025; Widiastuti et al., 2023).

CONCLUSION

First, for the control group, the pre-test mean was 9.24 (61.62 percent), while the post-test mean for arts and culture learning outcomes using manual textbooks in seventh-grade students at SMP Negeri 20 Batam was 11.76 (78.38 percent).

Second, for the treatment group, the pre-test mean was 9.03 (60.22 percent), while the post-test mean for arts and culture learning

outcomes using AI applications in seventh-grade students at SMP Negeri 20 Batam was 12.58 (83.87 percent).

Third, the post-test mean in the control group using manual teaching materials was lower than that in the treatment group using AI applications in seventh-grade students at SMP Negeri 20 Batam.

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