INTERNATIONAL JOURNAL OF ADVANCES IN EDUCATIONAL RESEARCH
2025, VOL. 2, NO. 1, 61-70
https://doi.org/10.62941/ijaer.v2i1.178

RESEARCH ARTICLE

Comparing creative thinking skills through the Osborn learning model among junior high school students

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ABSTRACT

Creative thinking is one of the essential skills students must possess to identify multiple solutions in problem-solving. However, in practice, students' creative thinking ability is still relatively low. This study employed a quantitative approach using a quasi-experimental design with a pretest–posttest control group. The population comprised all eighth-grade students at SMP Negeri 2 Delima. The sample was selected using random sampling and consisted of two classes: class VIII-C as the experimental group, which was taught using the Osborn learning model, and class VIII-B as the control group, which received conventional instruction. Data were collected through pre-tests and post-tests and analyzed using paired t-tests. The results showed a significant difference between the experimental and control groups, indicating that the null hypothesis was rejected and the alternative hypothesis was accepted. Furthermore, the N-gain analysis revealed that the improvement in the experimental class was significantly higher than in the control class. These findings suggest that the Osborn learning model is more effective in enhancing students' creative thinking skills compared to conventional teaching methods.

KEYWORDS

Osborn learning model; creative thinking; junior high school; experimental study

ARTICLE HISTORY

Received: 16 August 2025
Accepted: 24 August 2025
Published: 24 August 2025

CITATION (APA 7TH)

Azhari, B. & Qaroena, A. (2025). Comparing creative thinking skills through the Osborn learning model among junior high school students. *International Journal of Advances in Educational Research*, *2*(1), 49-60. https://doi.org/10.62941/ijaer.v2i1.178

1. Introduction

In the context of education, mathematics learning in Indonesia has specific objectives outlined in national policies and regulations. According to the Ministry of National Education of the Republic of Indonesia (2006), the objectives of mathematics learning emphasize the development of students' logical, analytical, systematic, critical, and creative thinking skills, as well as their ability to collaborate effectively in teams. These objectives are in line with the general aims of education,

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namely fostering holistic student development, including both cognitive and affective aspects (Batu, 2017). To achieve this, mathematics learning objectives are further specified as follows: (1) understanding mathematical concepts, explaining relationships among them, and applying concepts or algorithms flexibly, accurately, efficiently, and appropriately in problem-solving; (2) using reasoning on patterns and properties, performing mathematical manipulations to make generalizations, construct proofs, or explain mathematical ideas; (3) solving problems that involve understanding, modeling, solving, and interpreting solutions; (4) communicating ideas through symbols, tables, diagrams, or other media to clarify situations or problems; and (5) appreciating the usefulness of mathematics in life by developing curiosity, persistence, confidence, and a positive attitude toward problem-solving (Ministry of National Education of the Republic of Indonesia, 2006).

According to the Ministry of Education and Culture of the Republic of Indonesia (2014), the Mathematics Subject Guidelines for junior high schools in the 2013 curriculum emphasize that mathematics learning should be directed toward developing students' creative thinking skills. These skills are essential, as they enable students to solve problems, foster innovation, and adapt to change, which are increasingly important for addressing complex real-world challenges.

Creative thinking is defined as a mental habit that involves intuition, imagination, exploring possibilities, opening new perspectives, and generating unexpected ideas. Johnson (2014) describes it as a mental activity that fosters originality and new understanding, while Munandar (2021) emphasizes that creative thinking involves generating multiple answers based on given information, with a focus on diversity and appropriateness. Similarly, Surya (2015) highlights that creative thinking encompasses expanding possibilities, delaying premature judgment, offering unusual alternatives, applying imagination and intuition, and adopting multiple perspectives.

Torrance (1987) identifies four indicators of creative thinking: (1) Fluency – the ability to generate multiple relevant ideas about a problem; (2) Flexibility – the ability to provide varied approaches or solutions; (3) Originality – the ability to create novel ideas that differ from common approaches; and (4) Elaboration – the ability to develop ideas in detail and integrate them into a coherent whole.

Despite its importance, research shows that students' creative thinking skills in mathematics remain relatively low. Faelasofi (2017) found that students performed poorly in terms of flexibility, fluency, and elaboration. Similarly, Apriansyah & Ramdani (2018) reported that MTs students demonstrated weak performance across all four indicators, largely due to teacher-centered instruction that limited students' opportunities to explore problems independently (Hasan et al., 2022). As a result, students often lack interest in solving problems that require multiple strategies.

Preliminary observations at SMP Negeri 2 Delima confirm this issue. A creative thinking test administered to 20 students in class VIII-C revealed an average score of 26.87, with scores ranging from 12.50 to 43.75. The test, which included three questions on straight-line equations covering all indicators, showed that only 26.25% of students demonstrated fluency, 28.75% flexibility, 25.00% originality, and 27.5% elaboration. These findings indicate that students' creative thinking ability is still low.

One contributing factor is the learning model used by teachers. Traditional approaches often emphasize logic and computational skills, leaving little room for creativity. To address this, mathematics instruction needs to be redesigned to actively involve students and encourage idea generation (Rizal & Faradilla, 2024).

An appropriate model for fostering creative ideas is the Osborn learning model, which employs brainstorming techniques to generate ideas and solve problems. This model encourages students to propose as many ideas as possible, including unconventional ones, without fear of criticism (Nurafifah et al., 2016). The stages of the Osborn model include: (1) Orientation – introducing a new problem or situation; (2) Analysis – examining relevant material; (3) Hypothesis – allowing students to propose ideas, emphasizing fluency; (4) Incubation – developing ideas independently or in groups; (5) Synthesis – class discussions to present unique ideas, highlighting originality; and (6) Verification – selecting the best solution from the proposed ideas.

Based on these considerations, the purpose of this study is to compare students' creative thinking abilities at SMP Negeri 2 Delima through the application of the Osborn learning model.

H_1: The creative thinking skills of students taught using the Osborn learning model are better than those taught using conventional learning.

2. Methods

This study employed a quantitative approach with an experimental research method using a quasi-experimental design. Specifically, the design applied was a pretest–posttest control group design, involving two classes: one experimental class and one control class. The experimental class was taught using the Osborn learning model, while the control class received instruction through conventional methods.

The population of this study consisted of all eighth-grade students at SMP Negeri 2 Delima. The sample was selected using random sampling, resulting in two classes: class VIII-B as the experimental group and class VIII-C as the control group. The research design is presented in Table 1.

Table 1. Pretest–posttest control group design

Class	Pre-test	Treatment	Post-test
Experimental	O_1	X	O_2
Control	O_1	Y	O_2

In this design, the experimental group (class VIII-B) received treatment in the form of learning through the Osborn model, while the control group (class VIII-C) was taught using conventional methods. Both groups were given a pretest (O_1) before the learning intervention and a posttest (O_2) afterward. The purpose of the pretest was to measure students' initial creative thinking ability, while the posttest was intended to assess any improvement after the learning process.

Two types of instruments were used in this study: data collection instruments and learning tools. The data collection instrument consisted of an essay test developed based on creative thinking indicators, namely fluency, flexibility, originality, and elaboration. The test was administered in two forms: a pretest and a posttest, to measure the improvement in students' creative thinking skills after receiving different instructional treatments. Meanwhile, the learning tools included a lesson plan (*RPP*) and student worksheets (*LKPD*).

The data analysis technique used to test the research hypothesis was the paired *t*-test. Data were analyzed both manually and with the assistance of SPSS (*Statistical Product and Service Solutions*) software to ensure accuracy. A significance level of 5% was used as the decision-making criterion. In addition, to measure the improvement in students' creative thinking ability, gain scores were calculated and classified according to Hake criteria (Susetyo, 2015). The classification is presented in Table 2.

Table 2. Hake gain score criteria

Gain Score	Category
$g \geq 0,7$	High
$0,3 \leq g < 0,7$	Moderate
$g < 0,3$	Low

3. Results

The results of the study conducted by the researcher at SMP Negeri 2 Delima in class VIII-B and class VIII-C were the analysis of hypothesis testing using an independent sample t-test based on the N-gain results of the experimental class and the control class. The variables involved in this study were the Osborn learning model and students' creative thinking skills, which were measured using a test instrument consisting of a pretest administered before the treatment and a posttest administered after the treatment. The test questions were specifically designed to obtain data for further analysis. After the samples were selected randomly, the researchers administered the pretest to measure students' creative thinking skills. Next, they were given treatment in the form of learning using the Osborn learning model. After that, students were given a posttest to measure the increase in students' creative thinking skills after the application of the Osborn model.

The data obtained from the pretest and posttest results were initially in ordinal form. Therefore, they were first converted into interval-scale data using the Method of Successive Intervals (MSI). Afterward, the data were processed to calculate the N-gain values for both classes. The N-gain results for the experimental and control classes are presented in Table 3.

Table 3. N-Gain results of the experimental class and control class

Class	Average N-Gain Score	Interpretation
Experimental	0.4144	Moderate
Control	0.2438	Low

Based on the N-gain results, it was found that the average N-gain value of the experimental class was higher than that of the control class. Subsequently, a normality test was conducted on the data obtained. The results of the normality test are presented in Table 4.

Table 4. Results of normality test

Class	$\chi^2{}_{value}$	Description
Experimental	5.3423	Normal
Control	7.3220	Normal

Normality testing is a very important step in research that can determine whether data is normally distributed so that it can proceed to further statistical analysis. For the N-gain data of the experimental class in this study, a value of $\chi^2{}_{value}$ 5.3423, which is lower than the critical value of 11.1 ($\chi^2{}_{table}$). Therefore, it can be concluded that the data is normally distributed. $\chi^2{}_{table}$Similarly, the N-gain data for the control class showed a value of$\chi^2{}_{value}$ of 7.3220, which is lower than the critical value of 11.1. Therefore, it can be concluded that the data is normally distributed.

Since both data sets are normally distributed, the analysis can proceed with the homogeneity test of the N-gain for the experimental and control classes. The results of this test are presented in Table 5.

Table 5. Results of homogeneity test

Class	F_{value}	Description
Experimental and Control	2.872	Homogeneous

The homogeneity test aims to determine whether the samples from the study have the same variance, so that the generalization of the research results will also apply to populations from the same or different populations. Based on the results of the homogeneity test for the experimental and control classes, the value obtained was 2.8721, which is higher than the value obtained for the control class (F-table), which is 1.9252. Therefore, it can be concluded that there is a difference in variance between the experimental and control classes (homogeneous). Since both data sets are normally distributed and homogeneous, the researcher can proceed with the study by using a two-sample t-test with an independent samples t-test to analyze the comparison of creative thinking abilities between the experimental and control classes of eighth-grade students in classes VIII-B and VIII-C at SMP Negeri 2 Delima.

Table 6. Results of the independent sample t-test

Class	t_{hitung}
Experimental and Control	3.84

Based on the calculation results in Table 6, the value of t-value was obtained at 3.8419. To determine whether this value is significant, it was compared with the value of t-table. The degrees of freedom (df) were calculated using the formula:

$$df = (n_1 + n_2 - 2) = (28 + 26 - 2) = 52$$

With a significance level of 5% (α = 0.05) and df = 52, the value of t-table is 1.671. Since t-value ≥ t-table (3.8419 ≥ 1.671), the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted.

This finding indicates that students taught using the Osborn learning model demonstrated significantly better creative thinking ability compared to those taught using conventional learning methods.

4. Discussion

The improvement in creative thinking skills observed in the experimental class can be attributed to the application of the Osborn learning model, which consists of structured stages designed to foster students' creative abilities.

At the orientation stage, students were divided into small groups and presented with problems related to straight-line equations. This step stimulated curiosity and encouraged students to begin formulating possible solutions. At the analysis stage, students identified and examined the problems given. As emphasized by Susmalia et al. (2021), this stage is crucial because it helps students build their knowledge foundation.

The hypothesis stage required students to formulate problems and propose possible answers, allowing them to think critically and express diverse ideas. This was followed by the incubation stage, where students reflected individually on their hypotheses before discussing them with group members. Such activities enhanced students' confidence in their ideas, consistent with Herawati et al. (2019), who highlighted self-confidence as a key factor in academic success.

At the synthesis stage, class discussions were conducted, and each group presented their ideas while others responded. This two-way communication fostered creativity and collaboration, aligning with the findings of Aswin et al. (2025) and Sari et al. (2016), who emphasized the importance of communication and motivation in developing creativity. Finally, at the verification stage, the teacher guided students in drawing conclusions and linking initial problems with final solutions, ensuring alignment with the learning objectives (Rizal & Faradilla, 2024; Nabila et al., 2025).

Overall, the Osborn learning model provided students with opportunities to freely express ideas without fear of criticism, thereby stimulating curiosity and motivation to explore. This aligns with Udayani et al. (2019), who noted that the Osborn model encourages students to actively construct knowledge and seek solutions independently. In addition, the model minimized passive learning behaviors by requiring every student to participate.

However, despite these advantages, the Osborn model also has limitations. It requires considerable time for group discussions and presentations, thus demanding effective classroom time management. Moreover, the model is best suited for topics where students already possess basic prerequisite knowledge, so that class time can focus on extending and reconstructing understanding rather than covering foundational content.

5. Conclusion

This study demonstrates that students taught using the Osborn learning model achieved better creative thinking skills compared to those taught with conventional methods. The improvement in the experimental group was categorized as moderate, while the control group only showed low improvement. Statistical analysis further confirmed a significant difference between the two groups.

In conclusion, the Osborn learning model is more effective in enhancing students' creative thinking skills than conventional teaching approaches. Its structured stages encourage active participation, collaboration, and confidence in expressing ideas, which are essential for fostering creativity in mathematics learning.

Conflict of interest

The author declares that they have no conflict of interest.

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References

Apriansyah, D. & Ramdani, M. (2018). Analisis Kemampuan Pemahaman Berpikir Kreatif Matematika Siswa MTs Materi Bangun Ruang Sisi Datar. *Jurnal Cendekia: Jurnal Pendidikan Matematika, 2*(2), 1-7. https://doi.org/10.31004/cendekia.v2i2.46

Aswin, U. R., Dianti, M. R., & Amelia, D. (2025). Promoting creative thinking and adaptive skills through learning workshops: Insights from Al Hidayah Orphanage, Padang. *International Review of Community Engagement*, *1*(1), 45–52. https://doi.org/10.62941/irce.v1i1.94

Batu, D. L. (2017). *Penerapan Model Pembelajaran Osborn Untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis Dan Self-Confidence Siswa SMP.* FKIP Unpas.

Faelasofi, R. (2017). Identifikasi kemampuan berpikir kreatif matematika pokok bahasan peluang. *JURNAL e-DuMath*, *3*(2). https://doi.org/10.52657/je.v3i2.460

Hasan, A., Nurhasanah, Husna, A., Razak, A., & Mardhani , M. (2022). Teachers' Performance in Indonesian Secondary Schools: Does Motivation Matter?. *Jurnal EMT KITA*, *6*(2), 308-315. https://doi.org/10.35870/emt.v6i2.652

Herawati, E., Somatanaya, A. A. G., & Hermanto, R. (2019). Hubungan self-confidence dan kemampuan berpikir kreatif matematik peserta didik yang diajar menggunakan model elicting activities (MEAs). *Journal of Authentic Research on Mathematics Education (JARME), 1*(1), 1-9. https://doi.org/10.37058/jarme.v1i1.621

Johnson, E. B. (2019). *CTL: Contextual Teaching & Learning*. Corwin Press.

Ministry of National Education of the Republic of Indonesia. (2006). *Regulation of the Minister of National Education of the Republic of Indonesia Number 22 of 2006 concerning Content Standards for Primary and Secondary Education Units* [Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 22 Tahun 2006 tentang Standar Isi untuk Satuan Pendidikan Dasar dan Menengah]. Ministry of National Education.

Ministry of Education and Culture of the Republic of Indonesia. (2014). *Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 58 of 2014 concerning the 2013 Curriculum for Junior High Schools/Islamic Junior High Schools*

[Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 58 Tahun 2014 tentang Kurikulum 2013 Sekolah Menengah Pertama/Madrasah Tsanawiyah]. Ministry of Education and Culture.

Munandar, U. (2021). *Pengembangan Kreativitas Anak Berbakat*. Rineka Cipta.

Nabila, C. A., Maimun, & Irwan Putra. (2025). The effect of the Mentimeter-based brainstorming method on secondary school students' critical thinking skills. *International Journal of Advances in Educational Research*, *2*(1), 37–48. https://doi.org/10.62941/ijaer.v2i1.154

Nurafifah, L., Nurlaelah, E., & Usdiyana, D. (2016). Model Pembelajaran Osborn untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa. *Mathline: Jurnal Matematika dan Pendidikan Matematika*, *1*(2), 93–102. https://doi.org/10.31943/mathline.v1i2.21

Rizal, K., & Faradilla, M. (2024). The application of inquiry-based student worksheets to enhance critical thinking skills on buffer solutions. *International Journal of Advances in Educational Research*, *1*(2), 71–78. https://doi.org/10.62941/ijaer.v1i2.83

Sari, Z. O. & Septiasari, E. A. (2016). Pentingnya Kreativitas dan Komunikasi pada Pendidikan Jasmani dan Dunia Olahraga. *Jurnal Olahraga Prestasi*, *12*(1): 97-110. https://doi.org/10.21831/jorpres.v12i1.9500

Susetyo, B. (2015). *Prosedur penyusunan dan analisis tes untuk penilaian hasil belajar bidang kognitif*. Refika Aditama.

Surya, M. (2015). *Strategi Kognitif dalam Proses Pembelajaran*. Alfabeta.

Susmalia, D., Holiwarni, B., & Anwar, L. (2021). Penerapan Model Pembelajaran Osborn Untuk Meningkatkan Hasil Belajar Peserta Didik Pada Pokok Bahasan Reaksi Reduksi Dan Oksidasi. *Jurnal Penelitian Pendidikan Kimia Universitas Riau*, 6(2): 103-108.

Torrance, E. P. (1987). Teaching for creativity. *Frontiers of creativity research: Beyond the basics*, *189*, 215.

Udayani, L. G. W., Sariasa, S., & Ardana, I. M. (2019). Efektivitas Model Pembelajaran Osborn dalam Meningkatkan Prestasi Belajar Matematika. *Jurnal Pendidikan dan Pembelajaran Matematika Indonesia*. *8*(1), 20-28. https://doi.org/10.23887/jppm.v8i1.2840