



The Effectiveness of Flipped Classroom based Online Based Learning Model on Students Creative Thinking Skills

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Abstrak

Penelitian ini bertujuan untuk mengetahui efektivitas online based learning berbasis flipped classroom untuk meningkatkan keterampilan berpikir kreatif siswa. jenis penelitian adalah penelitian meta-analisis. Data penelitian berasal dari 13 jurnal nasional dan internasional yang terbit tahun 2018-2023. Analisis data menggunakan bantuan aplikasi JSAP. Kriteria inklusi dalam meta-analisis ini adalah penelitian diperoleh dari google scholar, researchgate, Taylor of francis dan Mendeley, penelitian harus metode eksperimen atau quasi eksperimen terkait online based learning berbasis flipped classroom pada kelas eksperimen dan model konvensional kelas kontrol, penelitian berasal dari jurnal terindeks SINTA dan Scopus dan penelitian mempunyai data yang lengkap untuk menghitung nilai effect size. Hasil penelitian menyimpulkan bahwa implementasi online based learning berbasis flipped classroom berpengaruh positif terhadap keterampilan berpikir kreatif siswa dengan nilai mean effect size sebesar 1.080 dengan kategori effect size tinggi. Temuan ini menjelaskan online based learning berbasis flipped classroom efektif diterapkan sekolah untuk mendorong keterampilan berpikir kreatif siswa.

Kata Kunci: *Online Based Learning, Flipped Classroom, Effect Size, Berpikir Kreatif*

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Abstract

This research aims to determine the effectiveness of flipped classroom-based online learning to improve students' creative thinking skills. The type of research is meta-analysis research. Research data comes from 13 national and international journals published in 2018-2023. Data analysis using the JSAP application. The inclusion criteria in this meta-analysis are research obtained from Google Scholar, Researchgate, Taylor of Francis and Mendeley,

research must be experimental or quasi-experimental methods related to flipped classroom-based online learning in experimental classes and conventional models in control classes, research comes from indexed journals SINTA and Scopus and research have complete data to calculate the effect size value. The research results concluded that the implementation of online based learning based on the flipped classroom had a positive effect on students' creative thinking skills with a mean effect size value of 1.080 in the high effect size category. These findings explain that online learning based on the flipped classroom is effectively implemented by schools to encourage students' creative thinking skills.

Keywords: Online Based Learning, Flipped Classroom, Effect Size, Creative Thinking

Introduction

Creative thinking skills are very important for every student. These skills enable students to generate new ideas and unique solutions to solve problems (Kardoyo et al., 2019; Hidayat et al., 2022). Students who have the ability to think creatively tend to be more open to new experiences (Hidayat, 2023). Furthermore, students are also able to look at problems from a variety of different points of view (Suryono et al., 2023; Nurtamam et al., 2023). Therefore, creative thinking skills train students to find new ways to solve problems at hand (MoU, 2024). Creative thinking skills need to be trained and developed from an early age so that students grow into innovative and productive individuals (Putra et al., 2023; Abdurrahman et al., 2023). Schools have an important role in developing students' creative thinking skills.

Teachers can encourage students to think creatively by providing opportunities to explore new ideas and concepts (Estabrooks & Couch, 2018). Furthermore, teachers can encourage creative thinking skills by giving project assignments that challenge students to think outside the box (Hews et al., 2023). Teachers also need to create a learning environment that supports and values students' creative ideas, even if they sound unorthodox (Yildiz & Yildiz, 2021). Thus, creative thinking skills will help students succeed in the future.

But in fact, creative thinking skills in students are still relatively low (Khairunnisa et al., 2022; Rahman et al., 2023; Sumarni & Kadarwati, 2020). Low critical thinking skills are caused by teachers not involving students to be more active in carrying out the learning process (Ichsan et al., 2023; Suharyat et al., 2022; Luciana et al., 2023; Rahman et al., 2023). Furthermore, in learning activities the teacher does not direct learning that encourages students to think creatively (Mursid et al., 2022; Birgili, 2015; Khoiriyah & Husamah, 2018). This result is also supported by PISA research in 2018 showing the creative thinking skills of Indonesian students obtained a score of 396, ranked 71 out of 78 member countries (Utomo et al., 2023; Zulyusri et al., 2023; Elfira et al., 2023; Sofianora et al., 2023). Therefore, there is a need for a learning model that can encourage students' creative thinking skills.

Online-based learning is a learning model that can encourage students' creative thinking skills. In online-based learning learning materials, discussions, assignments, and exams are carried out online via the internet (Liu et al., 2023). Online learning platforms allow students to access materials anytime and anywhere as long as there is an internet connection (Chen et al., 2010). Online-based learning also allows interaction between teachers and students or between students through available discussion and chat features (Cook & Dupras, 2004; Huang, 2011). Online-

based learning has many advantages over conventional learning methods. Online-based learning helps students learn at their own pace because it is self-paced learning (Klasse et al., 2023).

Furthermore, online-based learning can be combined with flipped classrooms. Flipped classroom is a learning approach in which learning material is given to students to be studied outside the classroom independently, while time in class is focused on discussions, practical activities, and working on joint assignments (Taylor et al., 2023). In the flipped classroom model, teachers create videos or other interactive learning materials that students can access at home before class begins (Ma, 2023). Learning through flipped classrooms students use the knowledge they already have from previous independent learning to carry out more applicable activities (Chen et al., 2023). Flipped classrooms encourage students to learn more actively and independently, while class time is more meaningful (Alqahtani et al., 2022; Wilson & Hobbs, 2023). So, online based learning based on flipped classrooms is important to be applied in schools.

Research explains that online based learning based on flipped classrooms has a significant influence on students' creative thinking skills (Segundo et al., 2023). Research results Essel et al., (2024) Online-based learning can increase students' confidence in learning. Research by Millán et al., (2023) Said learning with online-based learning has a positive influence on student independence in learning. But the gap, the number of studies on online-based learning has not found the effect of the size of online based learning based on flipped classroom-based on students' creative thinking skills. Therefore, it is necessary to conduct a meta-analysis to get accurate and in-depth conclusions about the application of online-based learning. Based on this, this

study aims to determine the effectiveness of online based learning based on flipped classrooms to improve students' creative thinking skills.

Methods

The research method used is quantitative meta-analysis with a meta-analysis approach. Meta-analysis is a type of research that analyzes and collects data from primary studies that can be analyzed quantitatively (Tamur et al., 2021; Razak, 2021; Diah et al., 2022; Chamdani et al., 2022; Zulkifli et al., 2022). This study population includes all experimental and quasi-experimental studies that test the effectiveness of the application of online-based flipped classrooms in improving students' creative thinking skills.

The research sample was obtained through a systematic search on a database of reputable international journals with relevant keywords. The sample inclusion criteria include: research obtained from Google Scholar, Researchgate, Taylor of Francis and Mendeley, research must be experimental methods or quasi-experiments related to online based learning based on flipped classrooms in experimental classes and conventional models of control classes, research comes from SINTA and Scopus indexed journals published in 2018-2023 and research has complete data to calculate effect size values. The research data were analyzed by meta-analysis to obtain a big picture of the effect of the intervention on improving students' creative thinking. Data analysis in this study using JSAP application. Furthermore, the effect size criteria in the study are guided by the effect size criteria (Cohen et al., 2007) i.e. if $0.00 \leq ICE \leq 0.20$ (low effect size); $0.20 \leq ES \leq 0.80$ (medium effect size) and $ES \geq 0.20$ (effect size).

Result and Discussion

Based on the results of data search through the Google Scholar, Researchgate, Taylor of Francis and Mendeley databases related to online based learning based on flipped classroom-based on creative thinking skills, 13 journals were obtained in accordance with the inclusion criteria set. Data that meet the inclusion criteria are calculated effect size values which can be seen in Table 1.

Table 1. Effect Size Value

Journal Code	Year	Effect Size	Effect Size Criteria
P1	2020	1.30	High
P2	2020	1.08	High
P3	2023	0.83	High
P4	2021	0.78	Medium
P5	2021	0.44	Medium
P6	2022	2.07	High
P7	2023	1.18	High
P8	2023	0.92	High
P9	2021	0.62	Medium
P10	2019	0.72	Medium
P11	2020	0.80	Medium
P12	2018	1.10	High
P13	2023	2.21	High
Average Value of Effect Size		1.080	High

Table 1, the results of effect size analysis from 13 journals that meet the inclusion criteria, eight journals (n = 8) have a high criterion effect size value and 5 journals (n = 5) have a medium criteria effect size value. The average value of effect size is 1,080, so the implementation of online based learning based on flipped classroom has a significant influence on students' critical thinking skills compared to conventional learning. This research is in line with Ratinho, (2023) Online-based learning can have a positive influence on students' motivation and creative thinking skills. In addition, the results of the study

Nida et al., (2020) Saying flipped classroom-based learning can improve students' creative thinking skills.

Furthermore, this positive effect of online flipped classrooms on creative thinking supports some of the previous theories and research. According to constructivist theory, flipped classrooms encourage students to actively build their knowledge through meaningful activities in class after learning the material independently outside the classroom (Alyoussef, 2023). In addition, key elements in flipped classrooms such as interactive discussions, digital simulations, online quizzes, and project assignments conducted in class have been shown to increase students' cognitive engagement (Aljaber et al., 2023). This high cognitive engagement is important for sparking creativity. The flexibility of time and multimedia in the online-based learning platform also makes it easier for each student to hone creative thinking skills according to their respective learning styles (Parkavi et al., 2023). Teachers also find it easier to give specific feedback and enrichment to encourage originality of students' thinking (Darby et al., 2023).

Furthermore, knowing the effectiveness of online based learning based on flipped classroom on creative thinking skills based on the level of education that can be seen in Table 2.

Table 2. The effect of measuring the effectiveness of online based learning based on flipped classrooms based on education levels

Education Level	Effect Size Value	Average value of Effect Size	Criterion
Elementary School	0.72	0.81	High
Junior School	0.82		
High School	0.89		

Based on table 2, the results of the effect size analysis based on education level obtained the effect size value of elementary school (ES = 0.72), junior high school (ES = 0.82) and high school (ES = 0.89). Furthermore, the average value of effect size based on education level is 0.81 with high criteria. These findings conclude that online-based learning is effective for improving students' creative thinking skills. This is in line with Piaget's opinion (Santrock, 2011) that students' creative thinking ability increases with cognitive development. High school students are in the formal operational stage with abstract thinking skills that allow them to develop creative ideas better than junior high school students.

In addition to cognitive development factors, the flipped classroom learning model is also more suitable for the psychological characteristics of high school students who are already able to learn independently (self-directed learning). The results of the Zainuddin & Perera (2019) study support that flipped classrooms are effective in increasing creative thinking in the context of self-directed learning. Meanwhile, junior high school students still need more intensive scaffolding and teacher guidance in implementing the flipped classroom model optimally (Ramo et al., 2023; Nja et al., 2022). High school students are also required to prepare for college which emphasizes higher-order thinking skills such as creative thinking. Therefore, the flipped classroom model that stimulates independent learning and creative thinking is very relevant to be applied in high school (Ichsan et al., 2022; Hariyadi et al., 2023). On the other hand, the junior high school curriculum is still oriented towards mastering content, so the impact of flipped classrooms on creative

thinking has not been maximized (Kazu & Kurto, 2020).

Conclusion

Based on the results of the meta-analysis research, it can be concluded that the implementation of online based learning based on flipped classroom has a positive effect on students' creative thinking skills with a mean effect size value of 1,080 with a high effect size category. These findings explain that online based learning based on flipped classrooms is effectively applied by schools to encourage students' creative thinking skills. Online-based learning based on flipped classrooms encourages students to be more independent and creative in solving problems in life. Therefore, online-based learning is very important for teachers to apply in fostering students' creative thinking skills.

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