



The Effectiveness of Canva as an Instructional Tool in Improving Students' Academic Performance: A Meta-Analysis

Jereme Lleva ASTAÑO*

Bicol University Graduate School, Legazpi City 4500, Philippines

*Corresponding email: jereme.astano@bicol-u.edu.ph

Abstract

This study evaluated the effectiveness of Canva in improving students' academic performance. The present inquiry employed a meta-analysis method using various publications retrieved from DOAJ, ERIC, Dimensions, and Google Scholar. A total of 22 studies with 26 valid datasets ($n = 1540$) were analyzed, records were primarily from Indonesia and published from 2022 to 2024. Most documents were considered to be of moderate quality, with concerns or potential risks related to the domains on the comparability of the comparison group and blinding of assessment. Results showed that Canva has a very large and significant effect ($g = 1.703$, $p < .001$) on students' academic performance, though substantial heterogeneity and publication bias were detected. Sensitivity analyses, such as the Trim-and-Fill and the WAAP method, confirmed the robustness of the findings. The results also revealed that country and subject influenced the effect size, but uneven subgroup distribution limited conclusive findings. Conversely, duration, class size, grade level, assessment blinding, and academic outcome, showed no significant moderating effects. Noteworthy, subgroup analysis suggests that Canva has potential and greater effect in Indonesia, particularly in English subjects, with smaller class sizes, among high school and university students who actively engage in the platform to improve communication skills. This meta-analysis provides empirical evidence of the positive effect of Canva on students' academic performance. Lastly, this investigation offers practical recommendations for future studies and practices.

Keywords: *academic performance, Canva, effectiveness, meta-analysis*

Acknowledgments: The author extends heartfelt gratitude to everyone who contributed to this research. Sincere appreciation goes to the mentors, colleagues, and peers for their valuable guidance and feedback. Gratitude is also expressed to the JDLDE review editors for enhancing the quality of this present scholarly work and to family and friends for their invaluable support.

For citation:

Astaño, J. L. (2025). The Effectiveness of Canva as an Instructional Tool in Improving Students' Academic Outcomes: A Meta-Analysis. *Journal of Digital Learning and Distance Education*, 3(10), 1327-1345. <https://doi.org/10.56778/jdlde.v3i10.468>

Introduction

Educational technology (EdTech) involves the effective use of technology to enhance teaching and learning. This approach integrates digital tools, interactive media, and innovative instructional strategies to create engaging and dynamic learning experiences for students. Additionally, by considering diverse learning styles and student interests, educational technology ensures that instruction is more personalized, inclusive, and adaptable to individual needs. Moreover, EdTech facilitates collaboration, critical thinking, and problem-solving through interactive platforms, simulations, and real-world applications. Sebastian et al. (2024) elaborate that educational technology encompasses various forms, including computer-based learning, synchronous and asynchronous learning, collaborative learning, and computer-mediated learning, among others. Similarly, Timotheou et al. (2022) highlight in their literature review that the adoption of technology in education was significantly accelerated by the COVID-19 pandemic, as institutions relied on digital tools to ensure continuity in learning. Despite its advantages, the authors conclude that while digital technologies offer numerous benefits, there remains a need for improvements in technological infrastructure and professional development for teachers. Furthermore, beyond enhancing academic outcomes, they emphasize that the integration of ICT in schools extends its impact beyond student performance in academic subjects. It also influences various stakeholders, shaping equality, social justice, and professional development.

In recent years, the use of digital technologies in education has become increasingly prevalent, with both students and teachers incorporating these tools into learning and instruction. Silva et al. (2024) report that integrating digital platforms significantly enhances student participation and motivation. One of the important digital tools used in education is Canva, an easy-to-use online graphic design platform. It allows anyone to create professional-looking visuals, presentations, and other media using a simple drag-and-drop interface and a wide range of templates (Gehred, 2020). The design platform was founded in 2012 by Melanie Perkins, Cliff Obrecht, and Cameron Adams. Moreover, the idea initially emerged when Perkins noticed the difficulty of students in design programs using complex traditional design tools. To address the issues, the founders created Canva making design accessible to everyone regardless of experience. Jay (2025) reports that Canva's user base has reached 180 million worldwide as of 2025. This marks a threefold increase since surpassing 60 million active users in 2021. Canva has experienced steady annual growth, with its user count more than doubling each year. Notably, the largest demographic of Canva users falls within the 25-34 age group, comprising approximately 30.74% of the total user base.

On the other hand, the literature review of Rajendran et al. (2023) examines the use of visual platforms, such as Canva, for English language learning. The proponents also identify a research gap, noting the lack of investigations that focus exclusively on Canva. Meanwhile, Jamaludin and Sedek (2024) describe that students have a positive perception of Canva as a note-taking and teaching tool. The authors also document that Canva fosters engagement, enhances comprehension, and supports cognitive development during class activities, leading to better learning outcomes. Fauziyah et al. (2022) investigate the use of Canva in education and find that the platform is effective in improving students' writing skills. The study also reveals that respondents have a positive perception of using Canva.

Meanwhile, the systematic review of Rodríguez Mina et al. (2024) highlights the significance of Canva in enhancing students' critical thinking skills, technical abilities, aesthetic appreciation, and creativity. This is attributed to its rich visual resources and user-friendly interface. Rodríguez Mina and colleagues also emphasize the importance of professional development and curriculum adaptation for effective integration of the platform in education. Likewise, Arwanda et al. (2025) report that Canva-based digital media positively impacts learning outcomes, motivation, and critical and creative thinking skills in elementary schools. Their study is based on a systematic literature review of research publications between 2020 and 2024 in Google Scholar. Despite existing literature reviews on the use

and reported effects of Canva as an instructional tool in education, few to no studies have conducted a meta-analysis to assess its effectiveness on students' academic performance. This investigation aims to bridge this gap by evaluating the impact of the platform and addressing the following research questions.

1. What are the features and qualities of the included studies in the meta-analysis?
2. How effective is Canva in improving students' academic performance?
3. How does the effectiveness of Canva vary according to country, subject, duration, class size, grade level, Canva implementation, blinding of assessment, and academic outcome?

Methodology

This investigation employed a meta-analysis method to evaluate the effectiveness of Canva in improving students' academic performance. This systematic approach of combining various studies generates results with a larger sample size (Riffenburgh, 2012). Moreover, the process yields overall statistics and confidence intervals that summarize the effects of the experimental intervention compared to the comparator intervention. Meta-analysis offers several advantages, including improved precision, the ability to address questions not covered in individual studies, the resolution of conflicts from varying results, and the generation of new hypotheses. Lastly, this study follows the eight-step practical guide in performing a meta-analysis by Hansen et al. (2021).

Search Strategy

The documents were gathered in the last week of February 2025 from various databases, repositories, and registers. This meta-analysis utilized DOAJ, ERIC, Dimensions, and Google Scholar to search for records on the implementation of Canva in education. The search query used: "effectiveness" OR "effect" AND "Canva" AND "quasi-experimental design" AND "experimental design". All included studies were peer-reviewed and published by reputable institutions.

Selection of Publications

The study employed the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) provided by Page et al. (2021). The systematic search flow was illustrated (see Figure 1), and the following criteria were used to guide the selection of studies.

1. The document must report the effects of the implementation of Canva in education.
2. The study must employ an experimental or quasi-experimental research design, with the experimental group receiving intervention using Canva as an instructional tool.
3. The research paper must provide sufficient data for the calculation of effect size.
4. Provided by reputable institutions or peer-reviewed.
5. Written in the English language.

The initial phase specifically identification yielded a total of 615 records. From this, 459 were excluded since the documents were not original articles or used other platforms aside from Canva. Additionally, 13 records were duplicated; this exclusion process resulted in 143 documents for further review. In the next stage, the remaining reports were sought for full-text retrieval, but 14 could not be obtained, leaving 129 reports for assessment. Moreover, during the next step, 129 reports were assessed for eligibility, with 107 being excluded due to reasons such as lack of Canva implementation (91), absence of a control group (5), insufficient data (4), and in other languages (7). Finally, only 22 studies met the inclusion criteria and were included in the current meta-analysis.

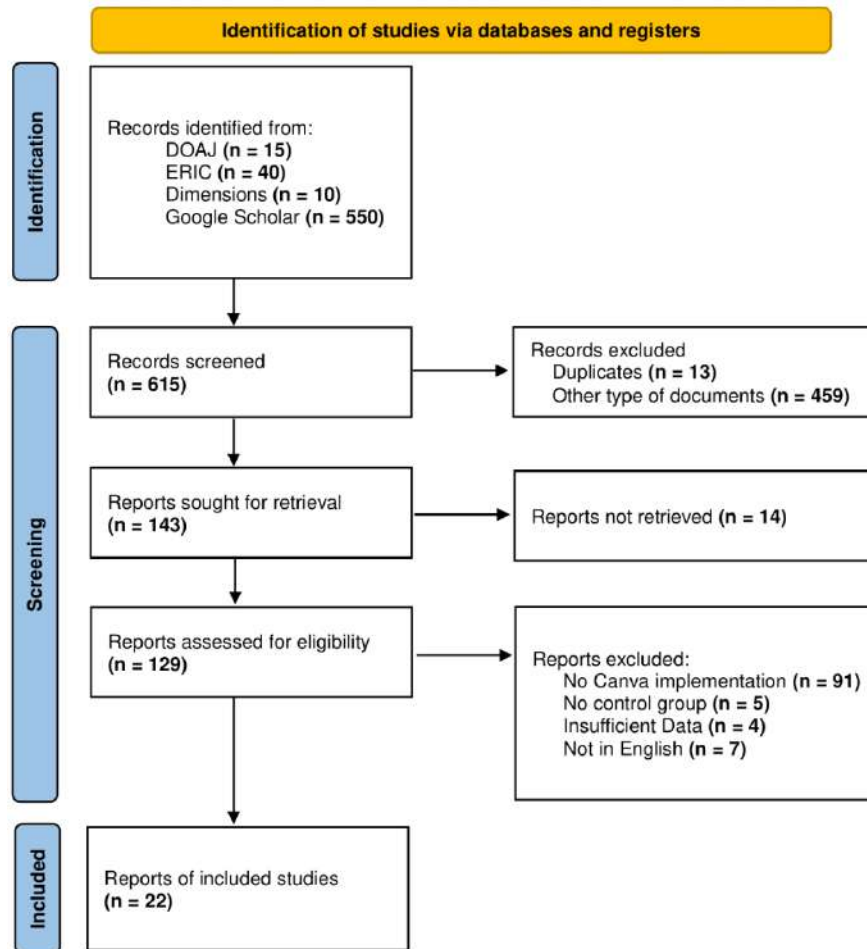


Figure 1. Systematic search flow of records on Canva research

Quality Assessment of Studies

To assess the quality of studies in the meta-analysis, the Newcastle-Ottawa Scale-Education (NOS-E) was employed (Cook and Reed, 2015). The scale consists of five domains: *representativeness of the intervention group*, *selection*, *comparability of the comparison group*, *study retention*, and *assessment blinding*. Each domain was scored as either 0 or 1, except for the comparability of the comparison group, which was rated from 0 to 2. The overall study quality was categorized as high (5–6), medium (3–4), or low (0–2). This methodology is consistent with the approach used by Prasittichok and Smithsarakarn (2024). In this inquiry, two independent raters assessed each document. In cases of different scoring, a third evaluator intervened to resolve and finalize the assessment.

Data Extraction and Coding of Moderators

This current research utilizes a matrix in Google Sheets to extract data from the 22 identified documents. The data includes the author's name, publication year, document type, journal source, academic outcome variables, and quantitative data for effect size computation. Additionally, moderators that may affect the implementation of Canva were also extracted.

1. Country - this moderator refers to the geographic origin of the document where the intervention was implemented and this was categorized as *Egypt or Indonesia*.

2. Subject - this factor refers to the academic field used in the implementation and is categorized as *English, Social Studies, and Science*.
3. Duration - this refers to the length of the implementation period of Canva and is categorized as *2-4 weeks, >8 weeks, and undetermined*.
4. Class Size - this potential moderator refers to the number of students where Canva was implemented and this was categorized as *1-30 or 31-50*.
5. Grade Level - this refers to the educational stage of the participants and is categorized as *elementary school, middle school, high school, and university level*.
6. Canva Implementation - this refers to the process of how Canva was implemented either *student-made or teacher-made*.
7. Assessment Blinding - refers to the process of how the outcomes were assessed and can be categorized as *blinded or not blinded*.
8. Academic Outcome - this potential moderator refers to the variable assessed in the study and is categorized as *cognitive achievement, communication skills, creative design skills, and self-direction*.

Data Analysis

This meta-analysis utilized the mean, standard deviation, sample size, and other necessary statistical data from individual studies, with Hedges' g as the effect size measure. Hedges' g , a bias-corrected standardized mean difference, applies to both large and small samples, avoiding the need to switch between effect size metrics (Chalmers & Altman, 1995; Turner & Bernard, 2006). Additionally, Effect sizes were converted using the online calculator provided by Wilson (2023), following meta-analysis guidelines (Hansen et al., 2021) and standard book references (Borenstein et al., 2009; Lipsey & Wilson, 2001). Furthermore, JASP 0.19.3 analyzed the effects of Canva on students' academic performance, generating meta-analytic estimates, essential statistics, and figures, including a forest plot, funnel plot, and tests for publication bias. On the other hand, subgroup analysis was performed in SPSS 30 (172) to examine effect size differences among moderators, with the Q statistic used to test significance. Specifically, Q_b was employed to assess homogeneity between groups (Çikrikci, 2016). The effect size interpretation of Sawilowsky (2009) was used: $g = 0.01$ (very small), $g = 0.2$ (small), $g = 0.5$ (medium), $g = 0.8$ (large), $g = 1.2$ (very large), and $g = 2.0$ (huge).

Results and Discussion

Features and qualities of the included studies

The features of included studies in the meta-analysis were assessed and the evaluation results were provided (see Table 1). The majority of the investigations were published in 2024 (17), while in the year 2023, there were only 4 records, and just one study was documented for the year 2022. The meta-analysis primarily relies on original articles (19) including some of the retrieved thesis manuscripts (3). Geographically, the studies were concentrated in Indonesia (21), while Egypt contributed one (1) study. Further, Canva was implemented across educational levels, with the most frequent focus on high school students (10), middle school (5), university levels (4), and elementary (3). The quality of individual studies was assessed using the Newcastle-Ottawa Scale-Education (NOS-E) (see Table 2). Thirteen studies scored 3, and six documents were rated 4, indicating medium quality. Meanwhile, only three (3) studies scored 5, interpreted as high quality. Moreover, the domains related to the representativeness of the intervention group, selection of the comparison group, and study retention were considered among the studies.

Table 1. Features of included studies in the meta-analysis

Features	Category	Frequency
Publication Year	2022	1
	2023	4
	2024	17
Type of Document	Original Articles	19
	Thesis Manuscripts	3
Country	Indonesia	21
	Egypt	1
Grade Level	Elementary School	3
	Middle School	5
	High School	10
	University Level	4

Table 2. Quality of studies included in the meta-analysis

Author/s (Year)	A	B	C	D	E	E	Total	Quality
Arsilla and Darmawati (2024)	1	1	0	0	1	1	4	Medium
Asrul and Partini (2024)	1	1	0	0	1	1	4	Medium
Budi and Anwar (2024)	1	1	1	1	1	0	5	High
El-Sherbiny (2024)	1	1	0	0	1	0	3	Medium
Farkhan (2024)	1	1	0	0	1	0	3	Medium
Fauzi (2024)	1	1	0	0	1	0	3	Medium
Fitriyah et al. (2024)	1	1	0	0	1	0	3	Medium
Hafidzin et al. (2024)	1	1	0	0	1	0	3	Medium
Harahap and Fahmi (2024)	1	1	0	0	1	0	3	Medium
Hasanah (2024)	1	1	0	0	1	0	3	Medium
Novia et al. (2024)	1	1	0	0	1	1	4	Medium
Setiawati et al. (2024)	1	1	0	0	1	0	3	Medium
Wahdania et al. (2024)	1	1	0	0	1	0	3	Medium
Prihatiningtyas and Astuti (2024)	1	1	0	0	1	1	4	Medium
Ruswandi et al. (2024)	1	1	0	0	1	0	3	Medium
Widiarti et al. (2024)	1	1	0	1	1	1	5	High
Purba et al. (2024)	1	1	0	0	1	0	3	Medium
Hikmah et al. (2023)	1	1	0	0	1	1	4	Medium
Noor et al. (2023)	1	1	0	0	1	1	4	Medium
Sembiring and Harahap (2023)	1	1	0	0	1	0	3	Medium
Salsabila (2023)	1	1	0	0	1	0	3	Medium
Rosandra (2022)	1	1	1	1	1	0	5	High

Domains: (A) representativeness of the intervention group, (B) selection of the comparison group, (C, D) comparability of the comparison group, (E) study retention, and (F) blinding of assessment.

On the other hand, this meta-analysis highlights concerns regarding the comparability of the comparison group and blinding assessment, largely due to the lack of reported baseline scores, participant characteristics, and reliance on human judgment in outcome evaluation. According to Luchini et al. (2021), a meta-analysis aggregates data from multiple studies to generate a higher level of evidence. The findings of this study are crucial for guiding stakeholders in making data-driven decisions. However, the synthesis evidence reliability depends on the quality and trustworthiness of the studies. Lastly, methodologically sound research ensures reliable and valid results, emphasizing the importance of study quality in producing credible conclusions.

Effectiveness of Canva in improving academic performance

This meta-analysis utilized 22 studies with 26 valid datasets, comprising a total sample of 1540. Moreover, a random effects model was employed to assess the effect of Canva on students' academic performance. Borenstein et al. (2009) argued that when synthesizing data from individual studies, it is unlikely that all investigations are identical or functionally equivalent. Therefore, assuming a common effect size is not appropriate. Therefore, a random effects model is more suitable than a fixed effects model. Table 3 presents the pooled effect size value (Hedges' g) of 1.703, this suggests that Canva has a very large effect on students' academic performance. The diamond in the forest plot (Figure 2) represents the pooled effect estimate. Notably, the effect of Canva was statistically significant ($z = 10.09$, $p < .001$, 95% CI [1.37, 2.03]).

Table 3. Effect size using the random effects model and the residual heterogeneity statistics

k	Hedges' g	SE	z	p	95% CI (Lower)	95% CI (Upper)
26	1.703	0.169	10.093	<.001	1.372	2.034
τ	τ^2	I^2	H^2	df	Q	p
0.786	0.618	85.25%	6.780	25	158.023	<.001

Pooling Model: Random-effects

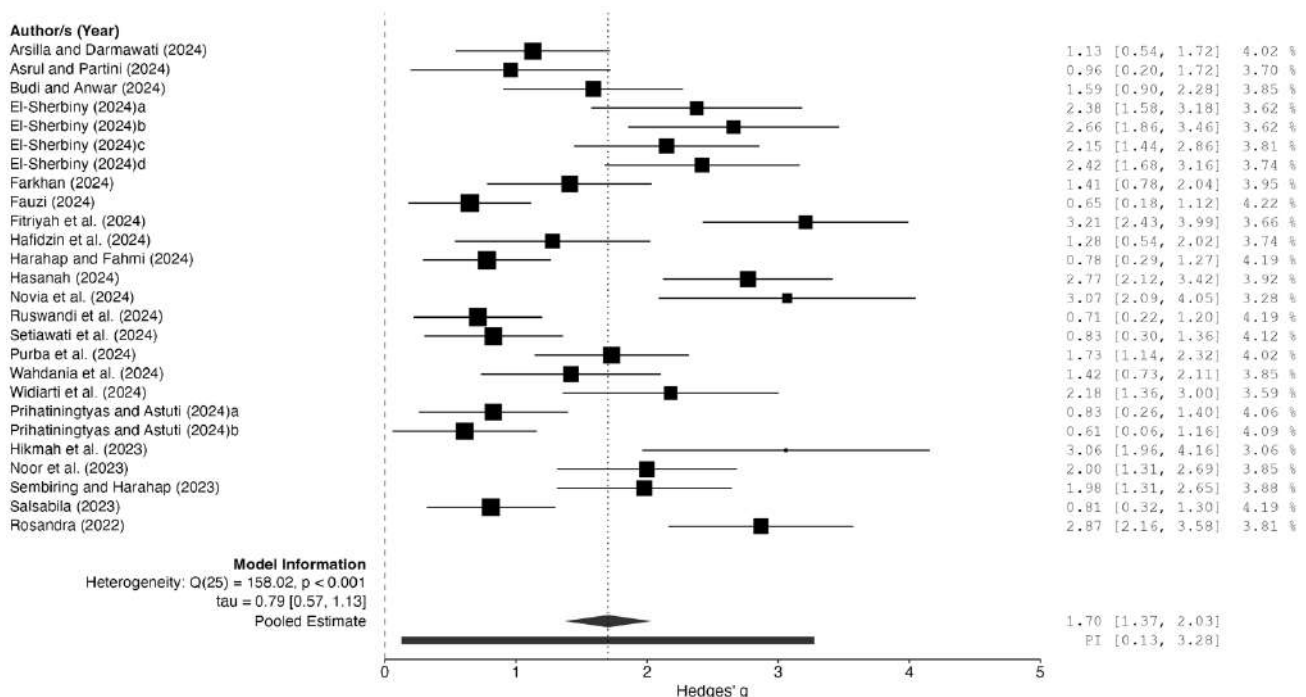


Figure 2. Forest plot showing the pooled effect size of using Canva on academic performance

Furthermore, as observed in the forest plot, all studies and datasets show statistically significant effects of Canva on students' academic performance as indicated by the confidence intervals (CIs) that do not cross the line of no effect (zero). Additionally, to evaluate the variability among studies Q statistical test was employed to assess whether all studies share a common effect size. If this hypothesis is true, the expected value would be the degrees of freedom or the number of studies minus one. Results indicate that the Q -value is 158.023 with 25 degrees of freedom and a significant p -value. Therefore, this indicates that the true effect size varies across studies.

Additionally, the I^2 statistic reveals that 85.25% of the variance in observed effects is attributed to true effect size differences rather than sampling error. The variance of true effects (τ^2) is 0.618, while the standard deviation of true effects (τ) is 0.786. Notably, the forest plot highlights the prediction interval (PI), ranging from 0.13 to 3.28, represented by the thick black line below the diamond. This suggests that in 95% of comparable populations, the true effect size will fall within this range. Noteworthy, while Canva may significantly influence students' academic performance, its effect may be minimal in certain contexts. Likewise, the forest plot demonstrates the individual study weights, meaning all datasets or studies contributed to the pooled effect size. It can be inferred that datasets with narrower confidence intervals have greater weights. This ensures that the investigation focuses on studies that are more precise and representative of the true effect.

Despite revealing substantial heterogeneity, the test did not specify the individual datasets contributing to this variability. In this case, sensitivity analysis was performed to ensure the robustness of meta-analytical findings. Notably, to detect potential outliers casewise diagnostics and including the interpretation of the Baujat plot and profile likelihood plot were employed (Baujat et al., 2002). In Figure 3 (A) each dot represents datasets where those on the right top quadrant exert the greatest influence on the overall effects and heterogeneity. Based on the study, only one dataset has contributed greatly to heterogeneity and overall effects.

Figure 3 (B) reveals that the data strongly suggest heterogeneity exists among the studies, as the likelihood dramatically improves when τ^2 moves away from zero. The peak of the likelihood curve, occurring between τ^2 values of 0.6 and 1.0, indicates the most probable amount of variability between the studies. However, the plateau-like shape of the peak suggests a degree of uncertainty in determining the exact level of heterogeneity. While the data strongly support the presence of heterogeneity, this plot doesn't provide a precise estimate, implying that the true τ^2 value could reasonably fall within a range around the peak.

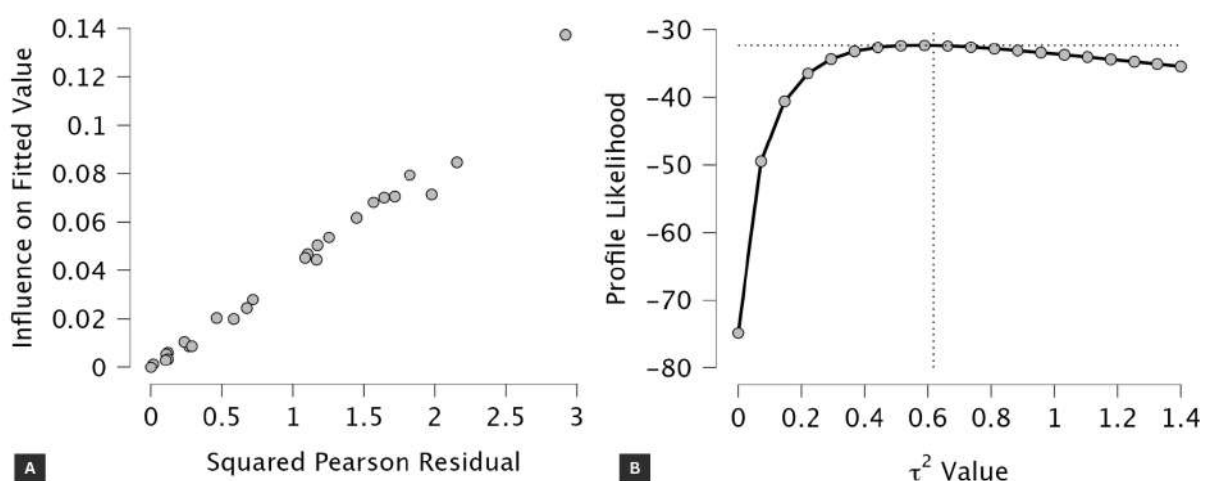


Figure 3. Baujat plot (A) and profile likelihood plot (B)

Another analysis performed was to evaluate the potential risk of publication bias. According to Rothstein et al. (2006), publication bias occurs when studies with significant results are more likely to be published than those with non-significant findings. To assess publication bias, a funnel plot can be used to visualize the distribution of effect sizes. Figure 4 (A) suggests potential publication bias due to its asymmetrical effect size distribution. However, relying solely on the plot may be misleading when determining the risk of publication bias, as other statistical tests are needed for confirmation (Simmonds, 2015).

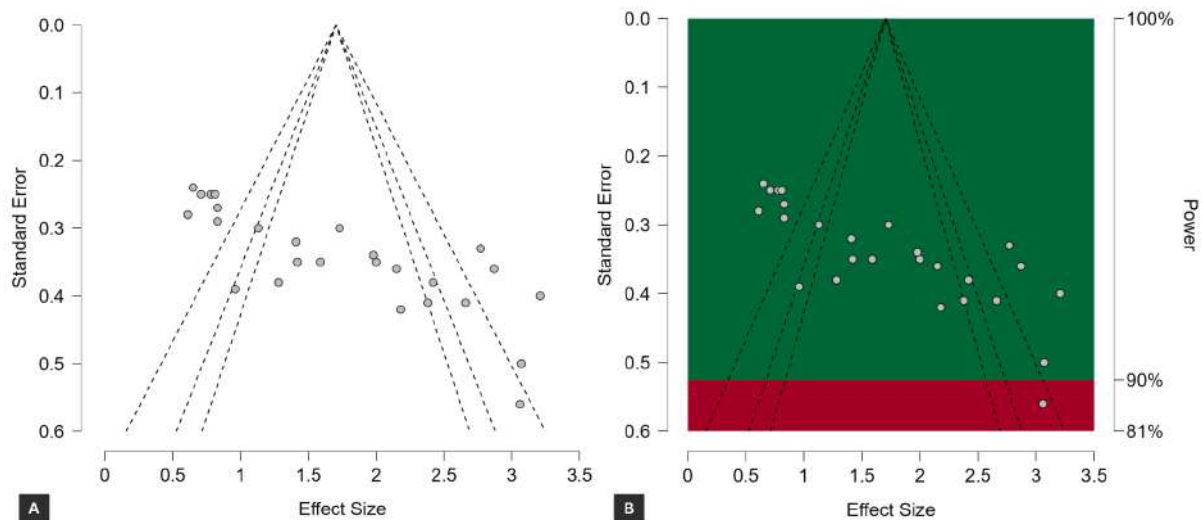


Figure 4. Conventional funnel plot (A) and power-enhanced funnel plot (B)

On the other hand, the power-enhanced funnel plot in Figure 4 (B) provides more detailed information by incorporating color-coded regions and a secondary axis for power. Studies in the green area have small standard errors, representing datasets with high power and more precise effect size estimates. Conversely, studies in the red region have large standard errors, indicating low-power studies that are typically smaller and less precise. Noteworthy, the power-enhanced funnel plot shows that almost all datasets fall within the high-power region (green area), suggesting that the current meta-analysis has sufficient statistical power to detect the effect of Canva in improving students' academic performance.

To assess the potential risk of publication bias, funnel plot asymmetry tests were conducted (Table 4). The rank correlation test (Kendall's tau) measured the correlation between effect size and standard error, yielding a significant tau value of 0.609 ($p < .001$), indicating a potential risk of publication bias. Additionally, the meta-regression test that examines the relationship between effect size estimates and their standard errors weighted by inverse variance (Egger's test) produced a significant z -value of 6.191 ($p < .001$), confirming the asymmetry of the funnel plot.

Table 4. Statistical tests for funnel plot asymmetry

Funnel Plot Asymmetry Test	statistic	value	p	95% CI (Lower)	95% CI (Upper)
Rank Correlation Test	τ	0.609	<.001		
Meta-Regression Test	z	6.191	<.001	-2.501	-0.478
Weighted Regression Test	t	6.743	<.001	-2.662	-0.692

Similarly, the weighted regression test yielded a significant result ($t = 6.743$, $p < .001$). Therefore, these statistical tests confirm that the effect size distribution is asymmetrical, suggesting a potential risk of publication bias. On the other hand, the Trim-and-Fill method was also performed as a sensitivity analysis to impute additional studies, correct asymmetry, and produce a more

symmetrical plot. Figure 5 shows that in this process, eight (8) imputed studies on the left side were illustrated based on the slope of the meta-regression test.

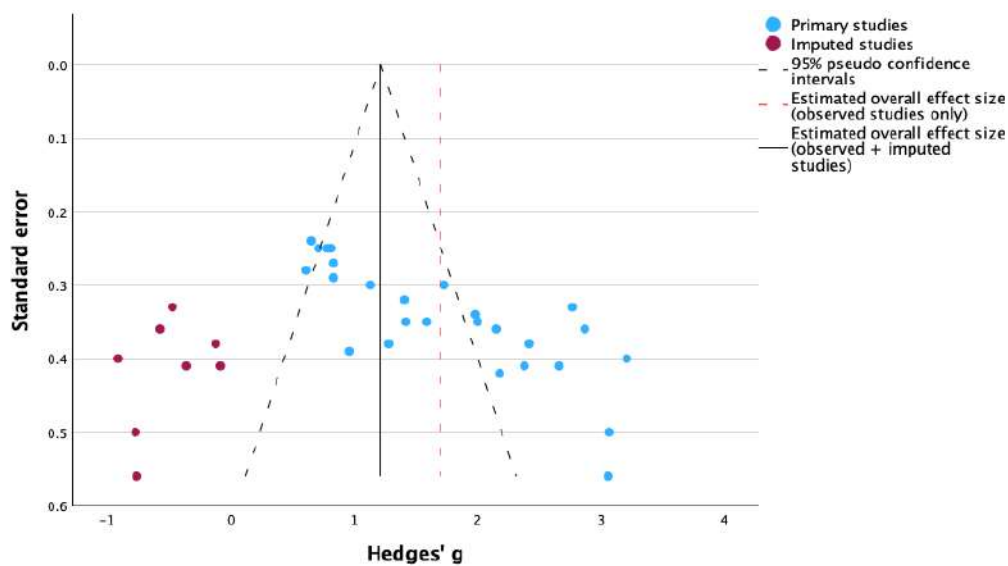


Figure 5. Funnel plot showing the imputed studies in the trim-and-fill analysis

The findings suggest a potential risk of publication bias in the current study, which may lead to an overestimation of effect sizes in the random-effects model. Lin and Chu (2018) note that publication bias presents a significant challenge in meta-analyses and systematic reviews, potentially affecting the validity and reliability of the results. However, Borenstein (2019) emphasizes that while publication bias can influence outcomes, it does not automatically invalidate the findings, but careful interpretation and additional sensitivity analyses can be employed. This investigation highlights that publication bias is just one factor that requires consideration. Other potential sources of bias should also be examined. Noteworthy, this study reports that bias may arise from the quality of the included studies, particularly in the comparability of control groups where individual studies do not report baseline scores and characteristics. Similarly, concerns were reported on the blinding of assessments where most studies utilized human judgment or participant-reported outcomes to determine the effectiveness of Canva to the variable outcomes. With the confirmed potential risk of publication bias, this study followed the recommendations of Bartoš et al. (2022) by adjusting meta-analytic estimates using JASP 0.19.3 (Table 5). Specifically, the investigation utilized the Trim-and-Fill analysis and the WAAP method (weighted average of adequately powered studies).

Table 5. Summary of meta-analytic estimates of the effect of Canva based on different models

Method	Effect Size (g) and 95% CI	Test against no effect	Interpretation
Random Effects Model	1.703 (1.372, 2.034)	$z = 10.093, p < .001$	Very Large
Trim-and-Fill Method ^a	1.215 (0.800, 1.631)	$z = 5.737, p < .001$	Very Large
WAAP Method ^b	1.454 (1.139, 1.769)	$t(24) = 9.046, p < .001$	Very Large

^aimputed studies: 8 on the left side of the funnel plot; iteration model: fixed effects

^bWAAP (weighted average of adequately powered studies); power > 80%: 25 datasets

Originally, the random-effects model produced a very large and significant effect size ($g = 1.703, p < .001$). The Trim-and-Fill method then adjusted for potential publication bias by adding studies to the left side of the plot (see Figure 5), reducing the effect size to 1.215, which remained very large and statistically significant effect size. Additionally, the WAAP method, which utilized 24

high-powered datasets, yielded an effect size estimate of 1.454, also considered very large and statistically significant. In brief, the findings indicate that regardless of the model used, the effect size remains very large and significant ($p < .001$), based on the interpretation of Sawilowsky (2009). Essentially, the meta-analytic estimates from different models provide additional sensitivity analyses, confirming the effectiveness of utilizing Canva as an instructional tool in improving students' academic performance.

Subgroup analysis based on identified moderators

This study provided empirical evidence on the effectiveness of Canva in improving students' academic performance. Despite the results, substantial heterogeneity was documented in this meta-analysis ($I^2 = 85.25\%$). According to Clephas and Heesen (2022), sources of heterogeneity can be examined through subgroup analyses and meta-regressions. Specifically, this study employed subgroup analysis, which involves dividing pooled data into distinct subgroups to enable comparisons and identify potential moderating variables influencing overall effects (Higgins & Thomas, 2019). The subgroup analysis results, including effect size estimates and the significance of potential moderators, were presented (see Table 6).

The results indicated that subgroup homogeneity for the country was significant ($Q = 8.791$, $df = 1$, $p = 0.003$), suggesting that the location where Canva was implemented had a moderating effect. Specifically, Egypt exhibited a huge and significant effect size ($g = 2.389$, $p < .001$), while Indonesia also demonstrated a very large and significant effect ($g = 1.585$, $p < .001$). However, these findings should be interpreted with caution due to the uneven distribution of datasets and sample sizes. Egypt was represented by only four datasets with a total sample of 320. Despite this, Canva as an instructional tool appears to have the greatest potential in Indonesian classrooms, where the effect was very large and supported by nearly all studies ($k = 22$, $n = 1,220$). These findings are supported by the studies of Mansyur et al. (2024), Rais and Zulfa (2024), and Sihombing and Tampubolon (2024), who reported that utilizing Canva would help improve the academic achievement and creative thinking skills of Indonesian students.

Additionally, subjects exhibited moderating effects ($Q = 16.685$, $df = 2$, $p < .001$). Specifically, English showed a very large and significant effect size ($g = 1.809$, $p < .001$), and Social Studies also demonstrated a very large and significant effect size ($g = 1.657$, $p = 0.014$). In contrast, Science had a medium yet significant effect size ($g = 0.716$, $p < .001$). However, these interpretations should be approached with caution due to the uneven distribution of datasets. As shown, Science and Social Studies were represented by only two and three datasets, respectively, with small sample sizes of 102 and 107. Further studies are needed to validate these findings. Despite this, Canva has greater potential in improving academic outcomes related to English subjects supported by 21 datasets and a total sample size of 1331. These findings are supported by the studies of Salsabila (2023), Purba et al. (2024), and Widiarti et al. (2024), which explored the role of Canva in enhancing communication skills and language acquisition.

On the other hand, subgroup analysis tests whether duration modifies the effect of the intervention and reveals a marginally significant result ($Q = 5.940$, $df = 2$, $p = 0.051$), suggesting that outcomes vary across different duration categories when considering the entire study population. Within the subgroups, durations of 2–4 weeks and more than 8 weeks exhibited huge and significant effect sizes. Additionally, studies where duration was not reported (undetermined) also showed a very large and significant effect size. However, these findings are not meaningful due to the uneven distribution of covariates, indicating that the analysis yields unreliable results. This investigation recommends that researchers explicitly report the duration or length of their studies in weeks or months to ensure clearer and more consistent analysis.

Table 6. Subgroup analysis according to the potential moderators from the studies

Moderators	Effect Size Estimates for Subgroup Analysis							Subgroup Homogeneity		
	<i>k</i>	<i>n</i>	<i>g</i>	<i>Lower</i>	<i>Upper</i>	<i>z</i>	<i>p</i>	<i>Q_b</i>	<i>df</i>	<i>p</i>
Country								8.791	1	0.003*
Egypt	4	320	2.389	2.006	2.767	12.293	<.001			
Indonesia	22	1220	1.585	1.216	1.954	8.418	<.001			
Subject								16.685	2	<.001*
English	21	1331	1.809	1.458	2.160	10.107	<.001			
Social Studies	3	107	1.657	0.340	2.974	2.467	0.014			
Science	2	102	0.716	0.321	1.111	2.555	<.001			
Duration								5.940	2	0.051
2-4 weeks	2	118	2.088	0.755	3.420	3.070	0.002			
>8 weeks	5	380	2.204	1.850	2.557	12.222	<.001			
Undetermined	19	1042	1.534	1.123	1.944	7.326	<.001			
Class Size								0.002	1	0.969
1-30	15	733	1.712	1.307	2.117	8.285	<.001			
31-50	11	807	1.698	1.121	2.276	5.766	<.001			
Grade Level								1.407	3	0.704
Elementary School	4	225	1.346	0.140	2.552	2.187	0.029			
Middle School	5	273	2.015	1.473	2.556	7.296	<.001			
High School	10	516	1.659	1.100	2.217	5.823	<.001			
University Level	7	526	1.756	1.153	2.359	5.709	<.001			
Canva Implementation								2.283	1	0.131
Student-made	16	988	1.895	1.464	2.325	8.624	<.001			
Teacher-made	10	552	1.400	0.925	1.876	5.772	<.001			
Assessment Blinding								0.157	1	0.692
Blinded	7	332	1.825	1.124	2.527	5.098	<.001			
Not Blinded	19	1208	1.664	1.282	2.045	8.546	<.001			
Academic Outcome								6.154	3	0.105
Cognitive Achievement	6	295	1.170	0.450	1.890	3.187	0.001			
Communication Skills	16	978	1.808	1.435	2.182	9.488	<.001			
Creative Designs Skills	2	160	2.278	1.765	2.790	8.715	<.001			
Self-direction	2	107	1.894	-0.653	4.442	1.457	0.145			

k (datasets); *n* (sample size); *g* (effect size estimate); random-effects model: *moderating effect, $p < .05$ (Sig. 2-tailed)

Furthermore, the non-significant Q value for subgroup homogeneity ($Q = 0.002$, $df = 1$, $p = 0.969$) indicates that class size does not significantly moderate the effect. However, specific class-size subgroups showed significant results. Both class sizes of 1-30 and 31-50 demonstrated very large and significant effects ($g = 1.712$, $p < .001$; $g = 1.698$, $p < .001$). It can also be inferred that class with 1-30 students may have a greater impact on academic performance, supported by 15 datasets with a total sample size of 733. However, this interpretation remains inconclusive due to the unequal distribution of datasets. Interestingly, although the 31-50 class size subgroup had fewer datasets (10), it included a larger overall sample ($n = 807$) compared to the 1-30 class. Therefore, more evenly distributed covariates and samples are required to validate these findings.

Subgroup analysis indicated that grade level had no moderating effect ($Q = 1.407$, $df = 3$, $p = 0.704$). However, middle school exhibited a huge and significant effect size ($g = 2.015$, $p < .001$). Meanwhile, elementary, high school, and university levels demonstrated very large and significant effect sizes. Despite these findings, interpretations should be approached with caution due to the

uneven distribution of datasets and the lesser sample size of other subgroups. Specifically, elementary and middle school were represented by only four and five datasets, respectively. Interestingly, the results suggest greater potential at high school and university levels, which were supported by 10 and 7 datasets, with a sample size of over 500 for each. Consistently, according to Rosandra (2022), utilizing Canva enhances the writing skills of ninth-grade students, while Arsilla and Darmawati (2024) reported notable improvements in the learning outcomes of 11th-grade students. Meanwhile, studies have documented the effectiveness of Canva in improving the academic outcomes of university students (El-Sherbiny, 2024; Fauzi, 2024; Harahap & Fahmi, 2024).

Additionally, the results indicated that the implementation of Canva, whether student-created or teacher-made, did not exhibit moderating effects ($Q = 2.283$, $df = 1$, $p = 0.131$). Both student-made and teacher-made subgroups demonstrated a very large and significant effect size ($g = 1.895$, $p < .001$; $g = 1.400$, $p < .001$). Notably, each group included at least 10 datasets with a total sample size exceeding 550. Therefore, datasets and sample sizes are not a concern in this analysis. Interestingly, student-created media in the tasks using Canva yielded a greater effect compared to teacher-prepared materials. These results support the principles of Activity-Based Learning (ABL), which encourages active student participation rather than passive learning. Anwer (2019) highlighted that students engaged in active learning demonstrate higher motivation and improved academic achievement. Likewise, Ruswandi et al. (2024) and Royani et al. (2024) reported that integrating Canva into Project-Based Learning (PBL) enhances students' writing skills and motivation. Overall, the findings indicate that active student engagement in the learning process using Canva has a positive impact on academic performance.

Subgroup analysis on assessment blinding yielded nonsignificant results ($Q = 0.157$, $df = 1$, $p = 0.692$), indicating that this factor is not a significant moderator. Notably, both blinded and non-blinded assessment outcomes demonstrated a very large and significant effect size. However, due to the uneven distribution of datasets and sample sizes, the interpretations would lack reliability. Therefore, no meaningful conclusions can be drawn from this analysis. As observed, the majority of studies rely on non-blinded assessment outcomes ($k = 19$, $n = 1208$), suggesting that researchers in the included studies depend on human judgment based on rubrics or participant-reported outcomes. In this context, Pitre et al. (2023) reported moderate evidence that the absence of blinding in assessments may lead to an overestimation of treatment effects for continuous outcomes. Consequently, observer bias is likely to occur.

Moreover, the non-significant Q -value for subgroup homogeneity ($Q = 6.154$, $df = 1$, $p = 0.105$) suggests that academic outcomes do not have a moderating effect. Specifically, creative design skills show a huge and significant effect size ($g = 2.278$, $p < .001$). Meanwhile, cognitive achievement and communication skills demonstrated very large and significant effect sizes. Conversely, a very large but non-significant effect size was observed for self-direction ($g = 1.894$, $p = 0.145$). This may be attributed to the fact that this subgroup included only two datasets with a total sample size of 107. Therefore, the interpretation and conclusions in this particular analysis are not meaningful due to the uneven distribution of covariates and the small sample sizes for cognitive achievement ($n = 6$), creative design skills ($n = 2$), and self-direction ($n = 2$). Despite these limitations, the implementation of Canva shows greater potential for improving communication skills, as supported by 16 datasets with a total sample of 978. This finding is supported by the studies of Budi and Anwar (2024), Novia et al. (2024), Wahdania et al. (2024), Widiarti et al. (2024), and Yundayani et al. (2019) which emphasize that the use of Canva in enhancing students' communication skills, particularly in writing and vocabulary mastery. In summary, this meta-analysis provides evidence supporting the effectiveness of Canva in improving students' academic performance.

Conclusion

This meta-analysis evaluated the effectiveness of Canva in enhancing students' academic performance. Data were collected from various resources, including DOAJ, ERIC, Dimensions, and Google Scholar. The study analyzed 22 documents comprising 26 valid datasets, with a total sample size of 1,540. Notably, most records were published in 2024, including original research articles and thesis manuscripts. Additionally, the majority of studies were implemented in Indonesia across different educational levels, from elementary to university. Further, regarding the study quality, most included studies were of medium quality, with only three classified as high quality. This investigation also identified concerns regarding the domains related to the comparability of control groups and the blinding of assessments in the included studies.

Meta-analytic findings revealed that Canva has a very large and significant effect on students' academic performance ($g = 1.703$, $p < .001$). However, substantial heterogeneity and publication bias were detected. Sensitivity analyses and different statistical models, including the Trim-and-Fill analysis and the WAAP method, were used to adjust the effect size. Regardless of these adjustments, the effect size remained very large and significant, indicating the robustness of the meta-analytical findings. On the other hand, country and subjects have a moderating effect however the results are inclusive due to uneven distribution of subgroups. Meanwhile, duration, class size, grade level, Canva implementation, assessment blinding, and academic outcome showed no moderating effects. Noteworthy, subgroup analysis suggests that the use of Canva has greater potential and effect in Indonesia, particularly in English subjects, with increased duration, smaller class sizes, and among high school and university students who actively engage with Canva to improve communication skills. Further, this meta-analysis provides empirical evidence that Canva has a positive impact on students' academic performance.

Noteworthy, this investigation has various essential research implications. Firstly, the significant effect of utilizing Canva suggests that teachers and policymakers should consider integrating Canva more systematically into curricula, particularly in subjects where its effectiveness has been demonstrated. Secondly, the identified limitations, such as heterogeneity and publication bias, highlight the need for more rigorous experimental designs and standardized methodologies in future research. Thirdly, since most studies were conducted in Indonesia, further investigations are necessary in other contexts to determine the generalizability of the findings. It is hoped that future implementations will be guided by the data obtained from this research.

Limitations and recommendations for future studies and practices

This investigation highlights the impact of Canva as an instructional tool in enhancing students' academic outcomes. However, this study also acknowledges certain limitations and offers valuable recommendations for future research and practice.

1. It was noted that most of the documents included in the meta-analysis were sourced from Indonesia, suggesting that the country is actively producing scholarly works related to the implementation of Canva. Therefore, additional research is recommended in other countries and regions to validate the current results.
2. From the analysis of subjects in which Canva was utilized, English was the most prevalent ($k = 21$), followed by Social Studies ($k = 3$) and Science ($k = 2$). This investigation highlights research gaps in other subjects, and additional studies are encouraged.
3. Subgroup analysis revealed nonsignificant results regarding duration, which was attributed to the uneven distribution of implementation lengths (2–4 weeks: 2; >8 weeks: 5; undetermined: 19). Additionally, most studies did not report the duration, and it is recommended that authors provide this information, as the duration of intervention may be a crucial factor in the effectiveness of Canva implementation.

4. A class size of more than 50 and additional implementations across all grade levels are encouraged to validate the findings of this research.
5. Data revealed that when students actively engaged with Canva throughout the implementation of the intervention, the effect size was significantly better compared to cases where the teacher solely used and prepared materials on the platform. This suggests that students must actively participate in creating, developing, and exploring the platform to maximize its impact on academic performance. Additionally, a more even distribution of subgroups is needed to validate these findings. Thus, further investigations are encouraged for both groups.
6. It was observed that most of the studies employed non-blinded assessment outcomes. Using this approach, effect size estimates may be overstated due to the risk of observer bias. Therefore, blinding assessments are recommended for future studies. However, non-blinded assessments may still be conducted, provided that researchers involve multiple observers or raters and inter-rater reliability shall be reported in the manuscript.
7. In academic outcomes, most investigations focused on communication skills, highlighting the significant potential of Canva in enhancing these skills. On the other hand, more studies are encouraged on cognitive achievement ($k = 6$), creative design skills ($k = 2$), and self-direction ($k = 2$). Lastly, further investigations are also recommended on other learning variables.

Conflicts of Interest

The author declares no conflicts of interest and affirms that this study was conducted independently, without external influence from any funding agencies, organizations, or individuals.

References

**studies included in the meta-analysis*

- Anwer, F. (2019). Development Activity-Based Teaching, Student Motivation and Academic Achievement. *Journal of Education and Educational Development*, 6(1). <https://files.eric.ed.gov/fulltext/EJ1216784.pdf>
- *Arsilla, T., & Darmawati, D. M. (2024). The Influence of Canva Learning Media on Economic Learning Outcomes. *Lembaran Ilmu Kependidikan*, 53(2), 213–223. <https://doi.org/10.15294/lik.v53i2.7873>
- Arwanda, Z., Pradana, D. D., & Widiyanto, D. N. (2025). Effectiveness of Using Digital Media Based on Canva Application in Primary School Learning: A Systematic Literature Review. *Jurnal Perkembangan Ilmiah Multidisiplin*, 1(1), 12–22. <https://doi.org/10.70294/tgtjr030>
- *Asrul, & Partini, D. (2024). The Effect of Using Canva-Based Media Usage on Geography Learning Outcomes of Class X Students at UNPATTI Laboratory High School. *Journal of Geography Science and Education*, 6(1), 19–28. <https://doi.org/10.32585/jgse.v6i1.5766>
- Bartoš, F., Maier, M., Quintana, D. S., & Wagenmakers, E.-J. (2022). Adjusting for Publication Bias in JASP and R: Selection Models, PET-PEESE, and Robust Bayesian Meta-Analysis. *Advances in Methods and Practices in Psychological Science*, 5(3), 1–19. <https://doi.org/10.1177/25152459221109259>
- Baujat, B., Mahé, C., Pignon, J.-P., & Hill, C. (2002). A graphical method for exploring heterogeneity in meta-analyses: application to a meta-analysis of 65 trials. *Statistics in Medicine*, 21(18), 2641–2652. <https://doi.org/10.1002/sim.1221>
- Borenstein, M. (2019). *Common Mistakes in Meta-Analysis*. Biostat, Inc.

- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). Introduction to Meta-Analysis. In *Introduction to Meta-Analysis*. John Wiley & Sons. <https://doi.org/10.1002/9780470743386>
- *Budi, B. S., & Anwar, K. (2024). The Implementation of a Canva-based E-portfolio: Its Impact on Achievement, Self-efficacy, and Anxiety in ESP-Writing Instruction. *English Review: Journal of English Education*, 12(3), 1027–1038. <https://doi.org/10.25134/erjee.v12i3.10369>
- Chalmers, I., & Altman, D. G. (1995). *Systematic reviews*. BMJ Publishing Group.
- Çikrikci, Ö. (2016). The effect of internet use on well-being: Meta-analysis. *Computers in Human Behavior*, 65, 560–566. <https://doi.org/10.1016/j.chb.2016.09.021>
- Clephas, P. R. D., & Heesen, M. (2022). Interpretation of meta-analyses. *Interventional Pain Medicine*, 1, 1–8. 100120. <https://doi.org/10.1016/j.inpm.2022.100120>
- Cook, D. A., & Reed, D. A. (2015). Appraising the Quality of Medical Education Research Methods: The Medical Education Research Study Quality Instrument and the Newcastle–Ottawa Scale-Education. *Academic Medicine*, 90(8), 1067–1076. <https://doi.org/10.1097/acm.0000000000000786>
- *El-Sherbiny, Doaa. M. A. (2024). Leveraging the Effect of Canva on Developing Students' Report Writing Skills and their Perception towards the Application in Amman Governorate. *Educational Sciences Journal*, 3. <https://doi.org/10.21608/ssj.2024.401579>
- *Farkhan, M. (2024). *The Effectiveness of Canva Application as a Student's Writing Media in Descriptive Text* (pp. 1–102) [Thesis Manuscript]. <http://etheses.uin-malang.ac.id/66922/>
- *Fauzi, I. (2024). The Effectiveness of Using Canva as Assisted Language Learning Media to Improve Undergraduate Students' Writing Skill. *Globish: An English-Indonesian Journal for English, Education, and Culture*, 13(2), 230–240. <https://doi.org/10.31000/globish.v7i2>
- Fauziyah, N. L., Widodo, J. P., & Yappi, S. N. (2022). The Use of “Canva for Education” and the Students' Perceptions of Its Effectiveness in the Writing Procedure Text. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 5(1), 6368–6377. <https://doi.org/10.33258/birci.v5i1.4359>
- *Fitriyah, R., Hilmiyati, F., & Juhji, J. (2024). Effectiveness of Canva-Based Interactive Animation Media in Enhancing Learning Interest of Second-Grade Madrasah Ibtidaiyah Students. *Al-Adzka: Jurnal Ilmiah Pendidikan Guru Madrasah Ibtidaiyah*, 14(2), 135–150. <https://doi.org/10.18952/aladzkapgmi.v12i2.13896>
- Gehred, A. P. (2020). Canva. *Journal of the Medical Library Association: JMLA*, 108(2), 338–340. <https://doi.org/10.5195/jmla.2020.940>
- *Hafidzin, H. K., Muzammil, L., & Sulisty, T. (2024). The Effectiveness of the Canva Application in Enhancing Students' Writing Proficiency across Learning Styles. *Edulitics*, 9(2), 130–139. <https://doi.org/10.52166/edulitics.v9i2.7958>
- Hansen, C., Steinmetz, H., & Block, J. (2021). How to Conduct a meta-analysis in eight steps: a practical guide. *Management Review Quarterly*, 72(1). <https://doi.org/10.1007/s11301-021-00247-4>
- *Harahap, A. F., & Fahmi, K. (2024). The Effect of Project-Based Learning Using Canva on Student's Ability to Write Health Promotion Text. *Getsempena English Education Journal (GEEJ)*, 11(2), 75–85. <https://doi.org/10.46244/geej.v11i2.2925>
- *Hasanah, L. U. (2024). *The Effectiveness of Canva Application Media to Improve Writing Skill of the Tenth Grade Students at SMKN 1 Jenangan* (pp. 1–104) [Thesis Manuscript]. <https://etheses.iainponorogo.ac.id/29436/>
- Higgins, J., & Thomas, J. (2019). *Cochrane Handbook for Systematic Reviews of Interventions*. (2nd ed.). Wiley-Blackwell. <https://training.cochrane.org/handbook/current>
- *Hikmah, D. N., Syamsunir, Usman, & Hermansyah, S. (2023). Influence Use Media Based Canva on Learning Outcomes of Citizenship Education Class XI Students of Private Senior High

- School (SMAS) Muhammadiyah Pangsid. *International Journal of Language and Ubiquitous Learning*, 1(3), 162–169. <https://doi.org/10.70177/ijlul.v1i3.647>
- Jamaludin, N. F., & Sedek, S. F. (2024). Canva as a Digital Tool for Effective Student Learning Experience. *Journal of Advanced Research in Computing and Applications*, 33(1), 22–33. <https://doi.org/10.37934/arca.33.1.2233>
- Jay, G. (2025). *Canva Usage, Revenue & Growth Statistics (in 2025)*. Famewall. <https://famewall.io/statistics/canva-stats/>
- Lin, L., & Chu, H. (2018). Quantifying publication bias in meta-analysis. *Biometrics*, 74(3), 785–794. <https://doi.org/10.1111/biom.12817>
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Sage Publications.
- Luchini, C., Veronese, N., Nottegar, A., Shin, J. I., Gentile, G., Granzio, U., Soysal, P., Alexinschi, O., Smith, L., & Solmi, M. (2021). Assessing the quality of studies in meta-research: Review/guidelines on the most important quality assessment tools. *Pharmaceutical Statistics*, 20(1), 185–195. <https://doi.org/10.1002/pst.2068>
- Mansyur, H., M, U., & Zain, S. (2024). The Effectiveness of the Use of Canva Media on Indonesian Language Learning Outcomes for Grade VII Students SMP Negeri 2 Rappang. *International Journal of Sustainable Applied Sciences (IJSAS)*, 2(6), 563–570. <https://penerbitjurnalinternasional.com/index.php/ijzas/article/view/618>
- *Noor, M., Karani, E., & Ristati. (2023). The Effectiveness of Canva Application as a Media in Writing Greeting Card at the Eight Grade of SMP Negeri 12 Banjarmasin. *Journal on Education*, 5(3), 9540–9548. <https://doi.org/10.31004/joe.v5i3.1826>
- *Novia, F., Rachmanita, & Gustina. (2024). Exploring Canva Application to Write Announcement Text. *Didascein: Journal of English Education*, 5(1), 10–17. <https://ejournal.univ-tridianti.ac.id/index.php/Didascein/article/view/457>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & McGuinness, L. A. (2021). The PRISMA 2020 statement: An Updated Guideline for Reporting Systematic Reviews. *British Medical Journal*, 372(71). <https://doi.org/10.1136/bmj.n71>
- Pitre, T., Kirsh, S., Jassal, T., Anderson, M., Padoan, A., Xiang, A., Mah, J., & Zeraatkar, D. (2023). The impact of blinding on trial results: A systematic review and meta-analysis. *Cochrane Evidence Synthesis and Methods*, 1(4), 1–12. <https://doi.org/10.1002/cesm.12015>
- Prasittichok, P., & Smithsarakarn, P. N. (2024). The Effects of Microlearning on EFL Students' English Speaking: A Systematic Review and Meta-Analysis. *International Journal of Learning, Teaching and Educational Research*, 23(4), 525–546. <https://doi.org/10.26803/ijlter.23.4.27>
- *Prihatiningtyas, M., & Astuti, T. (2024). The Effect the Canva Based Problem Based Learning Model on Student Motivation and Learning Outcomes in Science and Technology Subjects. *Jurnal Penelitian Pendidikan IPA*, 10(8), 5734–5740. <https://doi.org/10.29303/jppipa.v10i8.7948>
- *Purba, D., Siahaan, S., & Sinurat, B. (2024). The Effect of Canva Teaching Media to The Writing Ability of Eighth Grade Students of SMP Teladan Pematangsiantar Pematangsiantar on a Descriptive Text. *TOFEDU: The Future of Education Journal*, 3(5), 1574–1579. <https://journal.tofedu.or.id/index.php/journal/article/view/253/239>
- Rais, R., & Zulfa, I. (2024). The Influence of the Canva Application in Improving Primary School Student Achievement in West Sumatra. *Journal of Social Science Utilizing Technology*, 2(1), 140–152. <https://doi.org/10.70177/jssut.v2i1.813>
- Rajendran, R., Din, R., & Othman, N. (2023). A Critical Review on Using Canva as a Visual Media Platform for English Language Learning. *International Journal of Academic Research in*

- Business and Social Sciences*, 13(6), 631–641. <https://doi.org/10.6007/IJARBSS/v13-i6/14513>
- Riffenburgh, R. H. (2012). Sample Size Estimation and Meta-Analysis. In *Elsevier eBooks* (pp. 365–391). Elsevier BV. <https://doi.org/10.1016/b978-0-12-384864-2.00018-4>
- Rodríguez Mina, L. E., Garces Arce, M. F., Martínez, R. A., & Gomez Rodriguez, V. G. (2024). Canva as a teaching strategy in cultural and artistic education. A systematic review. *Ciencia Digital*, 8(2), 64–85. <https://doi.org/10.33262/cienciadigital.v8i2.2967>
- *Rosandra, S. (2022). *The Influence of Using Canva towards Students' Writing Ability in Procedure Text at the First Semester in the Ninth Grade Students of MTs Darul Huda Bandar Lampung in the Academic Year 2021/2022* (pp. 1–57) [Thesis Manuscript]. <https://repository.radenintan.ac.id/18842/>
- Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2006). *Publication Bias in Meta-Analysis Prevention, Assessment and Adjustments*. John Wiley & Sons.
- *Royani, K., Sukirlan, M., & Nurweni, A. (2024). Canva-Aided Project-Based Learning to Improve Students' Writing Achievement. *International Journal of Current Science Research and Review*, 7(5), 2912–2918. <https://doi.org/10.47191/ijcsrr/V7-i5-52>
- *Ruswandi, R., Gumelar, W. S., Ermaya, A. S., & Ginanjar, G. (2024). The effectiveness of project-based learning by using Canva application on students' descriptive writing achievement. *EduLite: Journal of English Education, Literature and Culture*, 9(2), 1–20. <https://doi.org/10.30659/e.9.2.1-20>
- *Salsabila, S. (2023). The Effect of Using Digital Posters Based on Canva Application on Students' Writing Ability in Narrative Text at Senior High School. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 11(2), 1678–1687. <https://doi.org/10.24256/ideas.v11i2.4242>
- Sawilowsky, S. (2009). New Effect Size Rules of Thumb. *Journal of Modern Applied Statistical Methods*, 8(2). <https://doi.org/10.22237/jmasm/1257035100>
- Sebastian, A., Jaheer Mukthar, K. P., Lirio, R. P., Asis, E. H., Acosta-Ponce, W., & Villegas-Ramirez, G. (2024). The Educational Technology: A Technology for Education and an Education with Technology. In: Khoury, R.E., Nasrallah, N. (eds) *Intelligent Systems, Business, and Innovation Research. In Studies in Systems, Decision and Control* (Vol. 489, pp. 717–726). Springer International Publishing. https://doi.org/10.1007/978-3-031-36895-0_60
- *Sembiring, E. G. B., & Harahap, Y. S. (2023). The Effectiveness of Using Canva Toward Students Writing Ability of Achievement Student of SMP Negeri 3 Mardinding. *International Journal of Educational Research Excellence (IJERE)*, 2(2), 366–371. <https://doi.org/10.55299/ijere.v2i2.598>
- *Setiawati, M., Firdos Santoso, C. A. H., & Juhana. (2024). The Effect of Using Canva Media on Students' Learning Interests and Learning Outcomes in the Indonesian Language Subject of Grade V SD Negeri Sukasari 5 Kota Tangerang. *Klasikal: Journal of Education, Language Teaching and Science*, 6(3), 969–977. <https://doi.org/10.52208/klasikal.v6i3.1245>
- Sihombing, V. I. C., & Tampubolon, S. O. (2024). The Influence of the Canva-assisted Project-based Learning Model on Students' Creative Thinking Abilities in Class V Elementary School Poster Materials. *International Journal of Teaching and Learning (INJOTEL)*, 2(1), 327–334. <https://injotel.org/index.php/12/article/view/69/97>
- Silva, P., Vieira, I., Babo, L., & Torres, C. (2024). Integrating Digital Tools to Enhance Learning Experiences in Higher Education. In: Abreu, A., Carvalho, J.V., Mesquita, A., Sousa Pinto, A., Mendonça Teixeira, M. (eds) *Perspectives and Trends in Education and Technology. Lecture Notes in Networks and Systems*. https://doi.org/10.1007/978-3-031-78155-1_38
- Simmonds, M. (2015). Quantifying the risk of error when interpreting funnel plots. *Systematic Reviews*, 4(1). <https://doi.org/10.1186/s13643-015-0004-8>

- Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2022). Impacts of Digital Technologies on Education and Factors Influencing schools' Digital Capacity and transformation: a Literature Review. *Education and Information Technologies*, 28, 6695–6726. <https://doi.org/10.1007/s10639-022-11431-8>
- Turner, H. M., III, & Bernard, R. M. (2006). Calculating and Synthesizing Effect Sizes. *Contemporary Issues in Communication Science and Disorders*, 33, 42–55. https://doi.org/10.1044/cicsd_33_s_42
- *Wahdania, W., Permana, D. R., & Angraini, N. (2024). An Investigation of Canva's Impact on Narrative Text Writing Skill. *Indo-MathEdu Intellectuals Journal*, 5(6), 7313–7322. <https://doi.org/10.54373/imeij.v5i6.2026>
- *Widiarti, S., Qamariah, Z., & Normuliati, S. (2024). The Effect of Canva Based Flashcard on Students' Vocabulary Mastery. *Journal of English Language and Education*, 9(4), 165–174. <https://doi.org/10.31004/jele.v9i4.533>
- Wilson, D. B. (2023). *Practical meta-analysis effect size calculator (Version 2023.11.27)*. <https://www.campbellcollaboration.org/calculator/>
- Yundayani, A., Susilawati, & Chairunnisa. (2019). Investigating the Effect of Canva on Students' Writing Skills. *English Review: Journal of English Education*, 7(2). <https://journal.uniku.ac.id/index.php/ERJEE/article/view/1800>