Zhongguo Kuangye Daxue Xuebao
Journal of China University of Mining and Technology

2024 | Vol 29 | Issue 3 | Page 180-187
Journal Homepage: https://zkdx.ch/
DOI: 10.1654/zkdx.2024.29.3-14

Effects of Design Thinking-based Instruction on students' Writing Performance and Creative Thinking Skills

Bezabih Mitiku*
PhD candidate in TEFL, Department of Language Education, School of Teacher Education and College of Education, Bahir Dar University, Bahir Dar, Ethiopia
*Corresponding author

Birhanu Simegn
Assoc. Prof. in TEFL, Department of Language Education, School of Teacher Education and College of Education, Bahir Dar University, Bahir Dar, Ethiopia

Yenus Nurie
Assoc. Prof. in TEFL, Department of Language Education, School of Teacher Education and College of Education, Bahir Dar University, Bahir Dar, Ethiopia

Abstract
This study aimed at investigating the effect of design thinking-based instruction on improving students' writing performance and creative thinking skills. The purpose of this research was to increase students' writing performance and their creativity. A quasi-experimental design with multistage sampling approach was adopted to solve this problem. Two classes were randomly chosen from the university, and the 51 students chosen were grouped as the comparison and experimental groups with 24 students being the experimental group who used the design-thinking approach, and 27 students who were the comparison group that used the conventional methods. The data were obtained via pre-and posttests and reflective journals, where thematic analysis was applied for the qualitative data and t-tests for quantitative data. The outcomes show that students who participated in the design thinking-based instruction significantly improved their essay writing performance, especially in the areas of task achievement, lexical resource, grammatical range and accuracy, and coherence and cohesiveness. Additionally, these students exhibited higher creativity levels in fluency, flexibility, elaboration, and originality. The paper comes to an end with the idea that implementing design thinking-base studies becomes a successful method for enhancement of writing and thinking abilities and therefore, the researchers and the policymakers should include such a method in other courses as well, and the students should be also given this opportunity.

Keywords
Design Thinking, Instruction, Creative Thinking, Writing Performance

1. Introduction
Design thinking is an iterative and nonlinear problem-solving approach that prioritizes the needs of students. It involves comprehending the problem, observing others, interpreting the results, generating ideas, building prototypes, testing, implementing, and improving. Design thinking is a practical and human-centered idea that is particularly useful for solving complex and undefined problems. According to the literature, design thinking comprises six phases: empathy, define, ideate, prototype, Test (revise and assess), and publish. During these phases, teams use creative techniques to challenge presumptions, redefine challenges, and generate innovative ideas to prototype and test (Padala & Maheswari (2017). Design thinking is a practical methodology that prioritizes the needs of people, fosters creativity, and encourages iteration. Its usefulness lies in its ability to solve complex and undefined problems by challenging assumptions and generating creative solutions. Design thinking is often perceived as a collaborative process, yet it is characterized by a lack of teamwork, creativity, and generating ideas, leading to confusion and frustration. This is in contrast to the emphasis on collaborative learning and writing by compositionists and the widespread use of small group discussions, peer response, ideate empathy, and prototyping (Samah, 2020). As such, this study aimed to address this controversial issue.

Creative thinking is the ability to generate or produce new or original ideas, insights, inventions, or artistic products, and it is necessary for creative problem-solving (Burçak and Ernst, 2019). It is used for both innovating new things, and addressing the reordering of the available knowledge that is required to facilitate the new thing in a consistent and meaningful way. It is needed as a means of action as well as in respect to the ends to be generated and reached (Samah, 2020). Besides, design thinking provides flexible and easily-accessible structures to guide educators, and enhance their creativity in addressing practical problems. Creative thinking can be quantified in four dimensions: Fluency, Flexibility, Elaboration, and Originality. Fluency is defined as the capacity to generate a huge amount of ideas. Flexibility is the capability to shift perspectives and generate diverse ideas. Elaboration denotes expanding on existing ideas by linking and reorganizing them. Originality is the capability to generate novel and unique ideas. These four dimensions can be commonly be used to measure creative thinking's effectiveness (Trisnayanti et al., 2020 and Fatmawati et al., 2022). Students are not taught to think creatively or unconventionally; instead, they are instructed to think consistently. As a result, they are unable to produce unique concepts, techniques, or solutions that differ from those that already exist. Trisnayanti et al., (2020) confirmed that a low average in creative thinking ability among students, which could be attributed to uninspired teaching techniques. Meanwhile, research on this topic has revealed that these students do less academically than those who demonstrated a higher level of creative thinking (Rahardjanto et al, 2019).

Numerous attempts have been made to enhance the English language proficiency of students who are learning English as a foreign language (EFL). Despite these efforts, prior research has revealed that the majority of students' academic performance in English language, overall, and writing skills, in particular, have been less effective (Abdullah, 2014; Bekele, 2011), as cited in (Rahmawati, 2018). One possible explanation for this underachievement could be attributed to the challenging nature of writing, which necessitates students to gather their thoughts and organize them into logical sentences and coherent paragraphs, taking their readers into account (Rahmawati, 2018). Zubair (2021) highlighted that the quality of English language instruction is often compromised due to inappropriate and ineffective teaching methodologies employed by English language teachers, aggravating the problems students face. Concerning creative thinking skills, students are not taught to think creatively or unconventionally; instead, they are instructed to think consistently. As a result, they are unable to produce unique concepts, techniques, or solutions that differ from those that already exist. The study confirmed that a low average in creative thinking ability among students, which could be attributed to uninspired teaching techniques. Meanwhile, research on this topic has revealed that these students do less academically than those who demonstrated a higher level of creative thinking (Rahardjanto, 2019).

In academic settings, the use of design thinking principles for writing instruction has become more prevalent in order to tackle complex problems that do not have straightforward solutions. However, research has shown that students' understanding of these principles often falls below what is expected of them. This poses a significant challenge for academic programs that require students to have a solid grasp of these concepts. To address this issue, it is crucial to develop new and efficient teaching strategies to provide students with the knowledge and abilities they need to succeed. In their research, Ramirez and Jones (2013) cited in (Yenus, 2018) highlight this need for improved instructional methods. Researches explained that the influence of varieties teaching methodologies on the writing proficiency of EFL students. However, there is a shortage of linguistic research on whether or not design thinking-based instruction can enhance students' writing aptitude and creativity. Furthermore, the effectiveness of design thinking-based instruction on writing skills among Ethiopian students has not been investigated. Based on the literature reviewed and the proven benefits of design thinking-based instruction, the researcher posit that design thinking-based instruction can indeed facilitate the improvement of students' writing performance and creative thinking skills.

The study was conducted to answer the following questions:

1. Does design thinking-based instruction significantly enhance students' academic writing performance?
2. Does design thinking-based instruction significantly enhance students' creative thinking skills?
3. Is there any statistically significant difference between students in the experimental and comparison groups in writing performance and creative thinking skills?

The study has the potential to make a significant contribution to the field of English language pedagogy by introducing a more effective research-based language learning pedagogy. Specifically, it aims to explore the use of a design thinking-based writing approach as a scaffolding tool, which could provide valuable insights into the teachers' understanding of design thinking-based instruction in the context of teaching writing. The study's findings could be used in future research to further advance the field of writing pedagogy by building upon the knowledge generated through this study.

1.1 Theoretical Framework of the Study

Cheng et al, (2023) explained that the design thinking pedagogy helps to integrate constructivism theory into teaching-learning processes. Constructivism enables students participate in creating own meanings through knowledge construction. Since constructivism can be challenging to execute in a classroom without a process. According to Cheng et al, (2023) design thinking is the paramount method for putting constructivism theory into practice. "Design Thinking is a constructivist learning design, because of its qualities in training certain skills, which are predispositions for a constructive way of learning: motivation for exploration, openness for new ideas, creative thinking and other metacognitive skills" (p. 11). Another area of design thinking is the social component, which contributes to social learning (Vygotsky, 1978). As he argued, offering opportunities for social collaboration with others is crucial to learning and cognitive growth. According to a recent study, the practice of design thinking provides to social learning processes

because it is built on human-centeredness and deep cooperation. And also the teamwork involved in design thinking helps students enhance their social skills (Cheng et al, 2023).

1.2 Conceptual Framework of the Study

Design thinking-based instruction, constructivism which has its roots in the learning theories, is a good fit for this study's objectives because it emphasizes collaborative, social construction of new meanings through reshaping, restructuring, investigating, defining, and discussing, asking generating ideas. These mechanisms are also key components of design thinking-based instruction. Social constructivists like Vygotsky, (1978) believed that students learn best when they are mediated by their teachers, peers, and the course materials. Learners gradually acculturate into discipline writing with help and support from peers and teachers via scaffolding (Pamela, 2021). Based on their written work, they also evaluate, scrutinize, rewrite, and edit various academic writing texts, including texts and argumentative essays. These assist students in developing their creative thinking and academic writing abilities. Teams apply the nonlinear, iterative design thinking-based instruction in this study's conceptual framework to comprehend users, question presumptions, and reframe issues and creative innovative solutions to prototype and test. Involving six phases- Empathize, Define, Ideate, prototype and Test (revise, edit) and publish. Design thinking is vital to solve wicked problems. These instructional models were used to improve students' writing performance and creative thinking skills.

2. Materials and Methods

This study aimed to investigate the impact of design thinking-based writing instruction on the academic writing performance of students. Accordingly, given the nature of the research, a mixed-method approach was employed to gather data through quantitative and qualitative methods. The study employed a quasi-experimental design (also known as a pretest-posttest control group design), which is commonly used when random allocation is not feasible or practical (Creswell, 2017).

2.1 Participants and Sampling Techniques

The researcher employed a multistage sampling technique to select the target population for this study. Initially, the institute was chosen using convenience sampling, while Second-year management students who were registered to take a basic writing course, which was crucial for the experimental and comparison groups, were selected purposively. Within this department, which consisted of three sections labeled A, B, and C, a pretest was administered to all sections to assess baseline writing skills. Both sections A and B of 51 students were ultimately selected for the study due to their similar results, ensuring homogeneity among participants who were concurrently enrolled in basic writing courses. Quasi-experimental design ensured that participants shared comparable educational backgrounds and was actively engaged in similar coursework during the research period. By carefully selecting and grouping participants in this manner, the study aimed to provide vigorous insights into how design thinking methods can enhance academic writing performance and creative thinking skills.

2.2 Data Collection Instruments

A pretest was conducted to ensure that the two groups were homogeneous and to evaluate the existing the students' writing performance and creative thinking abilities. A posttest was then used to measure the effectiveness of the intervention and to determine if the students' writing abilities and creative thinking skills had significantly improved. The essay performance was evaluated using a rubric adapted from [British Council, 2018], which assessed task completion, coherence and cohesiveness, lexical resources, and grammatical range and accuracy. Creative thinking was evaluated based on four dimensions of fluency, flexibility, originality, and elaboration, (E. Paul, 2018) during the intervention, students' maintained reflective journals, documenting their daily feelings, thoughts, and experiences with design thinking-based writing. This "dairy analysis" (Donyaie & Afshar,, 2019) provided valuable qualitative insights into the learning process.

2.3 Data Collection Procedures

The methodology employed in the primary study mirrored that of the pilot study. The initial essay writing assessments and student-reflective journals were created, followed by the development of teaching materials. In order to gather data for the primary study, the English teacher was contacted with the approval of the head of the English language department at Debremarkos University, using a letter of cooperation obtained from Bahir Dar University. At this stage, the study's aim was explained, the teacher's position was determined, and the experiment schedule was coordinated with the English teacher. The intervention that was implemented for five weeks did not cause any harm to the students and was solely conducted for research purposes. The pretest was administered to all students in both sections (A and B) and their test sheets were collected. Two raters graded the tests, and the sections were randomly assigned to the experimental (section A) and comparison (section B) groups. The data collection procedures were identical for the pre-intervention and post-intervention stages, with the post-intervention data collected once for both sections. At the end of the experiment, all students who had taken the pretest were given the posttest to assess any statistically significant differences in the students' writing performance and creative thinking skills between the two groups. I would like to express my gratitude to the department head and the English teacher for their valuable assistance during the intervention at the university.

2.4 Reliability and Validity of Data Collection Instruments

In the study, the reliability of a measuring instrument was assessed using Cronbach's alpha. The result indicated a high level of reliability (0.80), meaning that the instrument was consistent, stable, and dependable. Face and content validity of tests were confirmed through evaluation by TEFL experts, including two supervisors and two university ELT lecturers who were PhD candidates. The study also included a student-reflective journal that focused on various aspects of learning writing skills in a design thinking-based approach. The journal evaluated the effectiveness of teaching materials, student motivation, feelings of accomplishment, contributions to writing performance, and major problems encountered during instruction. The same team of TEFL experts evaluated the validity of journal items.

2.5. Implementation Time

The experiment conducted in this study involved a design thinking-based writing instruction that spanned over five weeks. In the first week, students were introduced to the fundamentals of design thinking such as practicing empathy, defining, and ideating. They primarily focused on defining the writing topic and generating ideas by asking many questions individually and collaboratively. They also read relevant books and articles to gain inspiration and understand the topic. In addition, they shared their prior experience and generated students' interest. In the second for two weeks, students were introduced to prototype and testing models and were asked with making a draft of the writing topic. They then collected comments and revised the draft based on the received feedback. The main objectives of this stage were to involve students in drafting and providing feedback iteratively. Students were encouraged to ask themselves "How should we structure our essay?" As a result, they had many notes, which they could organize into introduction, body, and conclusion sections based on divergent ideas. They then composed their first draft, underlining and testing their ideas. Students edited their work in response to feedback from peers and teachers. During the last two weeks of the course, the students were introduced to the publish model, which involved creating a written product to launch it to a specific target audience. This exercise aimed to help the students develop their writing and communication skills, as well as to learn how to present their ideas effectively to a wider audience. After completing their initial drafts, the students spent time revising and refining their work, with the instructor's guidance. Once they were satisfied with their final drafts, the students presented their work to a large audience, including their classmates and other academic community members. In addition to the live presentation, the students also published their written pieces on a bulletin board, which provided a platform for them to showcase their work to a wider audience. This exercise helped the students gain valuable experience in writing, presenting and publishing their work, in the future for academic and professional hunts will be useful.

2.6. Data Analysis Methods

The study employed an independent sample t-test and thematic narrations. An independent sample t-test was used to determine if the mean scores between experimental and comparison groups were statistically significance difference or not. To evaluate whether design thinking-based instruction significantly impacted experimental groups of students' performance or not, paired samples t-test were conducted. Using SPSS v. 26.0., the data were analyzed. Furthermore, to gain qualitative insights into the study, a thematic analysis of student reflective journals was employed.

3. Result and Discussion

3.1. Argumentative Essay Writing Tests and Textual Analysis in Pretest Results

The primary goal of this study was to investigate the effects of design thinking- based instruction on students' performance to write persuasive essays. A quantitative comparison of the experimental and comparison groups' argumentative essay writing performance before and after the design thinking-based instruction was made using the independent samples t-test in order to examine the test results. To ensure that the two randomly selected intact classes were homogeneous (there were no statistically significant differences) in terms of students' argumentative essay writing skills prior to receiving their own treatments in the experimental group and the comparison group, the independent samples t-test was used to assess the students' pre-intervention writing performance. Descriptive statistics (the means and standard deviations for each group of participants on the argumentative essay writing performance) are therefore displayed in table I below. As indicated in Table 1 shows the pre-test results of the experimental and comparison groups scored nearly similar mean writing performance and creative thinking skills (M = 2.53, 2.46 ; and 1.63, 1.57 respectively), Table I's independent samples t-test revealed that there was no statistically significant difference in the experimental and comparison groups of writing performance at ($t(49) = 0.420$, $p > 0.05$). On the creative thinking skills, the independent samples t-test result also revealed no statistically significant differences between the experimental and comparison groups at ($t(49) = .560$, $p > 0.05$). This implies conducting the intervention by taking the groups was sound.

Table I The pretest mean scores of experimental and comparison groups on argumentative essay writing Performance and creative thinking skills.

Variable	Group	N	M	SD	T	df	P
AEWP	Experimental	24	2.53	.66	.429	49	.67
	Comparison	27	2.46	.46			
CT	Experimental	24	1.63	.44	.560	49	.57
	Comparison	27	1.57	.34			

Note: AEWP=argumentative essay writing performance, CT=creative thinking, M = mean, and SD = standard deviation.

3.2 Post Test Results Of Writing Performance and Creative Thinking Skills

A posttest that measured the students' argumentative essay writing performance and creative thinking skills was given after the experiment conducted, and the results were analyzed using independent sample t-tests. Eventually, the posttest results of the experimental and comparison groups were discussed accordingly. As can be seen in Table II, there was the mean scores difference between the experimental (M=4.90, SD=.459) and comparison group (M=2.65, SD=.279) on their argumentative essay writing performance. Furthermore, there was also the mean difference between the experimental (M=4.70, SD=.34 and the comparison group (M=1.67, SD=219) on their creative thinking skills. The independent samples t-test portrayed in Table II, the experimental and comparison groups have statistically strong differences in their argumentative essay writing skills at($t = 20.890$, $df = 37.09$, $p < 0.05$). Overall, the independent samples t-test indicated that there are statistically significant differences of the mean scores between the experimental and comparison groups in essay writing performance, with the mean of the experimental group being significantly higher than the mean of the comparison group. In addition, in creative thinking skills, independent samples t-test showed that there are statistically significant differences between the experimental and comparison groups of creative thinking skills at ($t = 37.84$, $df = 38.86$, $p < 0.05$).

Table II The posttest results of experimental and comparison groups for argumentative essay and creative thinking skills

Variable	Group	N	M	SD	T	df	P
AEWP	Experimental	24	4.90	.459	21.47	49	.000
	Comparison	27	2.65	.279			
CT	Experimental	24	4.70	.335	38.76	49	.000
	Comparison	27	1.67	. 219			

The paired sample t-test was conducted to compare the pretest and posttest mean scores of the experimental and comparison groups independently. The paired sample t-test results in Table 3 below showed that there were a difference in pretest results (M=2.53) and post test results (M=4.90) of the experimental group. To make it more brief, the post test results of experimental group was significantly higher than the pretest scores confirmed that the design thinking strategy has played a positive and significant role in improving students argumentative essay writing performance at($t = 13.48$, $df = 23$, $p < 0.05$). In contrast, although the pre and post test results of the comparison group was different, the difference between them was not statistically significant that showed the conventional/existing teaching strategy could not play a role in improving students' argumentative essay writing skills at ($t = -1.97$, $df = 26.09$, $p > 0.05$).

Table III A paired sample t-test between pre- and post-test scores of each experimental and comparison groups on writing performance

Pair 1	N	Mean	SD	Std. Error Mean	MD	df	T	P
pre-test EG	24	2.5313	.66477	.13570				
post-test EG	24	4.9063	.45928	.09375	2.375	23	13.484	.000
pre-test CG	27	2.4630	.46360	.08922				
post -test CG	27	2.6481	.27959	.05381	.18519	26	-1.971	.059

Experimental group=EG, comparison group=CG

Table IV showed that the pretest and posttest results of the experimental and comparison groups were compared separately using the paired sample t-test which showed that there was a mean scores difference between the experimental group's pretest results (M=1.6354) and posttest results (M=4.7083). To make it more brief, the post test results of experimental group's showed a statistically significant improvement over the pretest score, confirming the positive and significant impact of the design thinking technique on students' ability of creative thoughts at ($t = 26.703$, $df = 23$, $p < 0.05$). Nevertheless, the pre and posttest results of the comparison group were different and these differences were not statistically significant, indicating that the conventional teaching strategy was unable to enhance students' creative thinking ability at ($t = -1.78$, $df = 26$, $p > 0.05$).

Table IV A paired sample t-test between pre- and post-test scores of each experimental and comparison groups on Creative thinking skills

Pair 2	N	Mean	Std. D	Std. Error Mean	MD	df	T	P
pre-test EG	24	1.6354	.44220	.09026				.000
post-test EG	24	4.7083	.33514	.06841	3.07292	23	-26.703	
pre-test CG	27	1.5741	.33837	.06512				
post -test CG	27	1.6667	.21926	.04220	.09259	26	-1.78	.086

The result of the student reflective journal

The results of the qualitative data obtained from student reflective journal showed that the promising effects of the intervention based on design thinking on improving the students' argumentative essay writing and creative thinking abilities. The analysis of students' reflective journals revealed that the intervention helped them improve the quality of their essays and their creative problem-solving skills, indicating that design thinking-based instruction can effectively

improve students' writing and creative thinking abilities. For instance, student (S3) and student (S4) explained their feeling about design thinking-based instruction:

Student (S3) noted:
Throughout the course, I gained valuable insights into different essay writing strategies and design thinking models that significantly helped me improve my writing skills. From generating ideas and developing titles to defining problems clearly, prototyping, and delivering essays, I learned various techniques that allowed me to easily tackle different writing challenges. Moreover, I found the course particularly helpful in the publishing stage, where competition is high, as it taught me how to refine my work, make it more engaging, and stand out in a crowded market. In addition,

Student (S4) stated:
I am now able to produce persuasive argumentative essays by using multiple justifications. I couldn't refer to articles like this before, but now I know how to include strong evidence in the introduction, body, and conclusion. In addition, I understand how to employ coherence, cohesion, and grammar standards.
During the design thinking-based argumentative essay writing instruction, the students learned various techniques such as to discover, choose, and clarify their writing topics. They also learned how to gather supportive information and organize controversial ideas in their essays. The students were able to develop strong introductions, supportive ideas, and conclusions for their essays. Based on self-reports of the students, it can be concluded that the students clearly were able to understand the concept of argumentative essay writing, learn the appropriate writing procedures, and write their own argumentative essays. The second student who is denoted by S4 revealed that implementing design thinking-based instruction in writing classes led to significant improvement in their writing performance. The results of the tests and the students' reflective journals showed that design thinking-based instruction effectively enhanced students' writing performance. To illustrate students in the experimental group, who received design thinking-based instruction, outperformed students in the comparison group regarding writing performance rubric (task achievement, coherence and cohesion, lexical resource, grammatical range and accuracy) and creative thinking skills such as fluency, flexibility, elaboration, and originality, as reflected in their post-test.

4. Discussion of Results

The students' writing performance and creative thinking skills results in the pretest didn't show a statistically significant mean difference between the experimental and comparison groups ($p<0.05$). But the students' writing performance and creative thinking skills results in the post-test revealed that the experimental group significantly outperformed the comparison group ($p<0.05$). This indicates that design thinking-based teaching writing helped students apply relevant models to achieve their writing goals while improving their overall writing performance and creative thinking skills. This was also supported by the analysis of the students' reflective journal, which further yielded the significant contribution of design thinking based writing instruction to improve the writing performance and creative skills of the students. This means that students in the design thinking-based learning condition performed better on the writing performance and creative thinking objectives given in class. The reflective journals collected from the students in the experimental group's demonstrated greater conformity to the positive outcomes of the design thinking based approach in generating ideas, explicitly defining challenges, creating prototypes, and testing what they have drafted.
The findings of this study have provided corroborative evidence on the complimentary writing academic models proposed by (Rahardjanto et al, 2019). On the contrary, the results contradicted the findings of previous studies such as (Esra, 2019), (Lynch, et al, 2021), and (Panke, 2019), who reported that the students experienced confusion and frustration, a lack of good ideas, a lack of creativity, and difficulties with teamwork when they learned through design thinking-based writing instruction. These challenges confronted students who were unaware of empathy, which identified their desire in avoiding frustration and uncertainty, and the ideating stage, which can even assist them produce ideas, among other things. In contrast, in the current study, the students' journey through the recursive procedures was a fascinating experience. A possible explanation to this result might have been because the design thinking models were appropriately established for them to attain. To illustrate, these discrepancies could have resulted from the widespread adoption of design thinking models or techniques. Other researchers supported this claim, believing that teaching writing through the design thinking process has improved learners' writing skills in terms of organization, development, cohesion, structure, and mechanism, as well as their active participation and satisfaction (Rahardjanto et al, 2019).
I also believe that design thinking can help to improve teamwork, creativity, and generating ideas in and writing classes to the, opposite of (Esra, 2019), (Lynch, et al, 2021) and (Panke, 2019) remarked that design thinking is lack of teamwork, lack of creativity and generating ideas, but paradoxically, it takes place in groups. In spite of the intense focus on collaborative learning and writing by compositionists and the now global presence of small group discussions, peer response, and group projects in composition classes, writing classes typically assign and evaluate individual work (Rahardjanto et al, 2019). In the same vein, the design thinking process fosters and enhances creative thinking, confidence, teamwork, and communication skills. And also, thinking creatively entails generating ideas, providing context, reorganizing, analyzing, synthesizing, and incorporating more original ideas (Cleminson, and Cowie, 2021). The present study is hoped to advance the field of English as foreign language pedagogy.

Samah, (2020) pointed out that design thinking-based instruction on writing performance, focusing on empathy, define, ideate, prototype, test, and publish models, investigates how these principles can transform the writing process and enhance writing outcomes. Empathy in writing enhances Communication and engagement, leading to more relevant, persuasive, and impactful writing. Cheng et al, (2023) added that design thinking-based instruction encourages students to understand their audience's needs and preferences. The define stage in design thinking-based instruction involves clearly defining the problem or writing task, guiding students' efforts and ensuring they stay focused on the intended goals, leading to more targeted and meaningful outcomes. Design thinking-based instruction encourages divergent thinking in students, fostering creativity and innovative solutions. Ideate helps students brainstorm ideas, explore perspectives, and think creatively, resulting in original, expressive, and engaging writing. Prototyping is a process where students create rough drafts or outlines to test ideas before finalizing their writing. This iterative process helps students clarify their thinking, identify improvement areas, and refine their writing effectively based on feedback received. Design thinking-based instruction encourages students to test their writing prototypes, incorporating feedback from peers, instructors, or readers. This feedback helps students to identify strengths and weaknesses, aids effective revision, and informs informed decisions. The publish stage of the writing process, which involves sharing the final product with the intended audience; can boost student motivation, confidence, and pride, and design thinking-based instruction encourages various publishing options such as submitting work for publication, sharing it online, on telegram groups, bulletin board, or presenting it in a public forum (Rahardjanto et al, 2019). Regarding this, the students in this study, published only on bulletin board and presented it in a public forum.

To sum up, incorporating design thinking concepts into the writing process could help to improve writing performance, and creative thinking abilities. This is demonstrated by design thinking-based instruction on writing performance, which strongly emphasizes the design thinking models. These are empathize, define, ideate, prototype, test and publish be used by teachers to help students become more skilled and self-assured writers who can better communicate in both academic and professional settings.

5. Conclusion

Conclusion could be drawn based on the findings and the review literatures. Post-test results indicated that the experimental group, which received design thinking-based instruction, outperformed the comparison group in both writing performance and creative thinking skills. Specifically, the mean scores for the experimental group were significantly higher than those of the comparison group, demonstrating the effectiveness of the instructional approach. Direct quotes from students in their reflective journals provided qualitative insights into how design thinking-based instruction helped them in various aspects of writing, such as generating ideas, defining problems clearly, prototyping, and refining their work. These reflections highlight specific skills and techniques learned through the instructional model. The findings were compared with existing academic models and research studies which supported the notion that design thinking-based approaches can enhance writing skills, organizational development, and student satisfaction. The best argumentative essays from the experimental group were presented to a large audience and published on a bulletin board, indicating confidence in their work and recognition of their writing achievements and creativity beyond the classroom.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Bogale, Y. N. (2018). Conceptualizing reading to learn: strategy instruction and EFL students' reading comprehension. *International Journal of Curriculum and Instruction*, *10*(2), 93-117.
2. BURÇAK, F., & Ernst, J. (2019). Young Children's Contributions to Sustainability: The Influence of Nature Play on Curiosity, Executive Function Skills, Creative Thinking, and Resilience.
3. British Council. (2018). IELTS Task 2: Writing Band Descriptors: Public Version.
4. Cleminson, T., & Cowie, N. (2021). Using design thinking as an approach to creative and communicative engagement in the English as a Foreign Language (EFL) classroom. *Journal of University Teaching & Learning Practice*, *18*(4), 7.
5. Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
6. Donyaie, S., & Afshar, H. S. (2019). EFL Teachers' Reflective Journal Writing: Barriers and Boosters. *Iranian Journal of Language Teaching Research*, *7*(3), 71-90.
7. Fatmawati, B., Jannah, B. M., & Sasmita, M. (2022). Students' Creative Thinking Ability Through Creative Problem Solving Based Learning. *Jurnal Penelitian Pendidikan IPA*, *8*(4), 2090-2094.

8. Gonen, E. (2020). Tim brown, change by design: how design thinking transforms organizations and inspires innovation (2009). *Markets, Globalization & Development Review*, *4*(2).
9. Khan, Z. (2021). Causes of Poor Performance in English at Secondary School Level in Pakistan. *University of Chitral Journal of Linguistics and Literature*, *5*(I), 293-310.
10. Lynch, M., Kamovich, U., Longva, K. K., & Steinert, M. (2021). Combining technology and entrepreneurial education through design thinking: Students' reflections on the learning process. *Technological Forecasting and Social Change*, *164*, 119689.
11. Mohammed Fahim El Sakka, S. (2020). A Design Thinking–Based Strategy for Enhancing EFL Students' Writing Performance and their Sustainability Awareness. , *80*(80), 15-42.
12. Padala, S. S., & Maheswari, J. U. (2017). A study on 'design thinking'for constructability. In *Research into Design for Communities, Volume 1: Proceedings of ICoRD 2017* (pp. 361-370). Springer Singapore.
13. Panke, S. (2019). Design thinking in education: Perspectives, opportunities and challenges. *Open Education Studies*, *1*(1), 281-306.
14. Rahardjanto, A., & Fauzi, A. (2019). Hybrid-PjBL: Learning Outcomes, Creative Thinking Skills, and Learning Motivation of Preservice Teacher. *International Journal of Instruction*, *12*(2), 179-192.
15. Rahmawati, S. A. (2018). The Implementation of Mind Mapping in Teaching Writing of Recount Text to Eighth Graders of Junior High School. *RETAIN: Journal of Research in English Language Teaching*, *6*(2).
16. Spycher, P. (2021). Scaffolding Writing with the" Teaching and Learning Cycle" for Students in Grades 6-12. *WestEd*.
17. Torrance, E. P. (2018). Scholastic Testing Service, Inc., 480 Meyer Road, Bensenville, Illinois 60106–1617.
18. Trisnayanti, Y., Sunarno, W., & Masykuri, M. (2020, April). Creative thinking profile of junior high school students on learning science. In *Journal of Physics: Conference Series* (Vol. 1511, No. 1, p. 012072). IOP Publishing.
19. Tsai, C. A., Song, M. Y. W., Lo, Y. F., & Lo, C. C. (2023). Design thinking with constructivist learning increases the learning motivation and wicked problem-solving capability—An empirical research in Taiwan. *Thinking Skills and Creativity*, *50*, 101385.
20. Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.