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RESEARCH ARTICLE

Problem-Based Learning and its Effect on Writing Performance, Critical and Creative Thinking Skills: A Study at Majmaah University, Saudi Arabia

DR. Amal Abdullah Muhammad Almziad

Assistant Professor of TESOL,English Department, Collage of Education, Majmaah University, Al-Majmaah, 11952, Saudi Arabia

ARTICLE INFO	ABSTRACT
	This research examines how students at Majmaah University in Saudi Arabia use Problem-Based Learning (PBL) to improve their writing, critical thinking, and creative thinking abilities. The study combines quantitative and qualitative methodologies in a mixed-methods sequential explanatory design to provide complete insights. 50 English Language Department students made up the sample, which was split equally between experimental (PBL) and control (non-PBL) groups. Pre- and post-tests measuring writing skill, critical thinking, and creative thinking were administered to both groups using essay writing assignments. Furthermore, 10 students from the experimental group participated in a semi-structured interview to discuss their opinions on the PBL methodology. The PBL group showed significant improvements in all measured skills, with higher post-test scores and larger effect sizes compared to the control group, according to quantitative data analysis, which included paired samples t-tests and ANCOVA. These results were further corroborated by qualitative theme analysis, which showed that students who participated in PBL had higher levels of motivation, self-assurance, attention to detail, and writing efficiency. According to the study's findings, the PBL approach improves students' academic and cognitive abilities more than conventional teaching techniques, making a strong argument for its use in higher education settings.

INTRODUCTION

The current paradigm shift in education is influenced by several underlying factors, including rapid advancements in technology and societal changes. The Industrial Revolution 4.0 and Society 5.0 have significantly impacted global education, necessitating that higher education graduates possess a range of essential skills pertinent to Saudi Arabia (Aldobekhi & Abahussain, 2024). Research highlights that creativity is the primary skill that will enable children to thrive in the future (Susetyarini et al., 2022). Known as the "four Cs," creativity is one of the fundamental 21st-century skills, along with collaboration, communication, and critical thinking (Wardianto, et. Al., 2020; Alkhannani, 2021; Montafej et al, 2022).

Despite its importance, creative thinking skills remain scarce in today's university curricula and learning environments. Given the critical nature of these skills, universities should prioritize teaching creative thinking to prepare students for the workforce (Widiastuti, et al., 2023). However, academic acquisition still takes precedence over developing creative thinking skills in most institutions. Numerous studies indicate that current university graduates lack the creative thinking capacity

required for success in the modern world (Tep et al., 2018; Yanuarto & Hapsari, 2022; Hafizi & Kamarudin, 2020; Grishaeva et al., 2021).

The significance of creative thinking skills has prompted various education sector groups to incorporate them into higher education curricula. Scholarly investigations have shown that creative thinking skills have a significant impact on fields such as business, technology, science, the arts, and development research (Yanuarto & Hapsari, 2022; Nikmah, 2022; Razak et al., 2022). Two major issues have heightened educators' awareness of the value of creativity: a significant decline in human creativity and the lack of scientific support for creativity research (Hafizi & Kamarudin, 2020; Kartini, et al, 2023; Suciati, 2024).

In addition to creative thinking, university graduates must also excel in critical thinking. Over the past few decades, educators, academics, stakeholders, and educational observers have recognized the value of these skills (Plan, 2014; Barevičiūtė, et al., 2023; Kabri et al., 2024). Critical thinking enables students to employ reasoning and analytical skills to solve problems systematically (Patel et al., 2024). According to Tang (2024), critical thinking skills reflect improved cognitive processes, allowing students to think independently and systematically. Experts agree that critical thinking involves mental exercises, methods, and processes for understanding new concepts, making informed decisions, and solving problems (Yanuarto, & Hapsari, 2022; Montafej, et. al, 2022).

Teachers prioritize developing critical thinking skills within the language education curriculum (Bachtiar, 2024; Strakova, et, al, 2024). The ability to think critically is closely correlated with students' language comprehension. According to Yuan (2023) and Zhang. (2024), critical thinking is a semiotic resource for studying, assessing, and structuring communicative speech. It allows students to evaluate facts and evidence, examine arguments, and draw logical conclusions (Utami, 2022; Suparman, 2023).

In addition to specialized skills, university graduates must also be proficient in general abilities. Writing ability has become one of the most important competitive factors in the modern global culture. Writing performance is considered a fundamental skill (Tharwa., 2017), encompassing proficiency in both native and other languages. To effectively achieve the three learning outcomes—writing competency, critical thinking skills, and creative thinking abilities—teachers must implement appropriate teaching strategies immediately. Problem-Based Learning (PBL) is highly recommended for developing these proficiencies.

Literature indicates that PBL can enhance various skills, including analytical reasoning, academic achievements, effective communication in writing, and other competencies (Rosyidin et al, 2022; Liu & Pásztor, 2022; Ernawati, et al., 2020; Misnah et al, 2023; Suradika et al., 2023). This educational paradigm offers real-world experiences or simulations, promoting self-directed and independent learning (Heuchemer et al., 2020). Two studies have shown that the PBL model effectively stimulates students' motivation for lifelong learning and meaningful experiences compared to other learning models (Bosica et al., 2021; Qondias et al., 2022). Within the framework of Education 4.0, the PBL approach actively engages students in the learning process (Widiastuti, 2023). It integrates social concerns such as decolonization, multicultural education, equitable and fair education, and social justice into language acquisition (Liu & Pásztor, 2022).

Research consistently shows that the PBL model enhances students' critical thinking skills (Suradika et al., 2023; Suparman et al., 2023; Khotimah, & Iswanto, 2024; Grishaeva, et al., 2021; Hafizi & Kamarudin, 2020).; Yanuarto, & Hapsari, 2022), writing performance (Utami, 2022.; Tharwa, 2017; Jusoh et al., 2024; Perdana et al., 2023; Magaba, 2023), and creative thinking capacity (Barevičiūtė et al., 2023; Budiyanto et al., 2024; Patel, et al., 2024; Bachtiar, 2024; Yuan, 2023).

However, there are still unexplored areas. There is a lack of research on how the PBL model affects students' learning of Arabic writing (L1 writing). No studies have examined the effects of the PBL model on enhancing writing performance, critical thinking abilities, and creative skills in learning to write in the native language (L1). This study aims to address these gaps with two well-crafted research questions that guide the research, offering precise and targeted objectives.

1. How does the effectiveness of Problem-Based Learning (PBL) in enhancing students' writing performance, critical thinking, and creative thinking abilities at Majmaah University, Saudi Arabia compare to that of the non-PBL model?

2. What are the students' attitudes and impressions of the Problem-Based Learning (PBL) paradigm in the context of learning to write in Arabic at Majmaah University, Saudi Arabia?

LITERATURE REVIEW

Problem-Based Learning

The Problem-Based Learning (PBL) paradigm was introduced by McMaster University in 1969 as a student-centered teaching strategy. The concept is based on the premise that students can learn new material by applying what they already know (Idowu et al., 2016; Waite et al., 2020). This technique uses a case study approach and peer information exchange to autonomously create learning goals for students. The goal of PBL is to help students find solutions to real-world problems (Mutammimah, & Padli, 2023). Consequently, the PBL model's architecture allows students to address problems through scenarios. Instructors create an unstructured, understandable, and easy-to-navigate environment for students. However, several challenges make PBL difficult to implement, such as the time needed to develop materials, the difficulty of overseeing various study groups, an unsuitable curriculum, and the challenge of managing student information (Kök & Duman, 2023; Jumoke, et al, 2024).

Arends (2008) proposed a commonly used PBL framework involving several steps: (a) introducing students to various contextual problems; (b) presenting existing problems to students; (c) guiding students in both individual and group settings; (d) having the teacher create and present assignments; and (e) reviewing and debating potential solutions to problems.

Writing Ability

Writing is a crucial curricular objective in language study and an essential daily activity. Teaching students to write is particularly challenging due to its complexity, involving several cognitive and language-related processes (Dinsa, 2023). Students use their memory to mix and recollect topics while working on writing projects. Writing is a complex cognitive activity that draws on various cognitive processes (Rayner, et al, 2016). It encompasses language, genre, text, composition, and communication criteria (Elturki, 2023). Writing, akin to face-to-face communication, allows for the expression of ideas, emotions, and experiences (Yung, & Cai, 2020).

Critical Thinking Skills

Critical thinking is widely regarded as a primary skill necessary for students to successfully participate in the global economy. Therefore, educational curricula must include the development of these skills (Lu, & Xie, 2024). Critical thinking is commonly defined as the ability to use cognitive processes to produce better attitudes and actions (Riswanto, 2022). This ability can generate original concepts through interpretation, deciphering, and combining (Hiqmah et al, 2023). Writing assignments and critical thinking exercises often coexist in contemporary language education, particularly in higher learning settings aiming to improve students' writing abilities. Muniroh (2023) argue that writing allows students to express their cognitive abilities through language. Elturki (2023) found that teaching students to write can maximize their cognitive capacities. Finken & Ennis (2001) developed the FRISCO model, a tool for assessing critical thinking skills, comprising six main parts: focus, reason, inference, situation, clarity, overview, and inference.

Creative Thinking Skills

Creative thinking is another essential 21st-century skill. Li, et al., (2019) and Yang et al, (2022) describe creativity as the interaction between human brain activity and external factors such as motivation, knowledge, social and cultural background, and ideas for addressing problems. Creativity involves solving problems through original ideas and overcoming obstacles (Karunarathne & Calma, 2024). Zulyusri, et al, (2023) describe creative thinking as a mental process where individuals use

their experience to understand situations and develop novel solutions. Creative thinking is a sophisticated mental activity involving cerebral, emotional, and ethical components to produce unique mental states. Belda-Medina (2022) links creative thinking to a person's capacity for intellect, flexibility, and originality, enabling the generation of as many ideas as possible. New concepts are closely tied to adaptability and originality. Although there is disagreement about the best approach, the education sector has focused on teaching these skills (Liu et al., 2023). Writing requires the integration of skills closely related to creative thought.

METHOD

Research Design

The researcher employed a mixed-methods approach to address the study objectives, combining quantitative and qualitative research techniques for comprehensive data (Creswell, 2018; Dawadi et al., 2021; Park et al., 2021). A sequential mixed-method strategy was adopted, using qualitative findings to bolster earlier quantitative results (Berman, 2017; Rahimi & Fathi, 2021).

Participants

The study sample included 50 students (20 males and 30 females) from the English Language Department of the Faculty of Education at Majmaah University, Saudi Arabia. Participants were divided into two groups: 25 in the experimental group and 25 in the control group, chosen randomly from four existing classes. The participants were first-semester students aged 18-22 with modest writing competence. During the qualitative phase, 10 students from the PBL model class were selected for interviews using random sampling. Interviews focused on the experimental class to gain a deeper understanding of the studied subject.

Instruments

Essay Writing Test

The study used a pre-test and post-test methodology with essay writing problems to evaluate students' writing skills. Participants wrote 300–450-word essays on the impact of social media on language usage and communication in Saudi Arabia. The pre-test captured initial writing abilities, while the post-test evaluated improvements after the intervention. Essays typically included three main components: the introductory paragraph, body paragraphs, and the concluding paragraph (Oshima & Hogue, 2006).

Writing Assessment Rubric

Students' composition skills were assessed using an argumentative essay rubric evaluating task completion, coherence, vocabulary, and grammatical accuracy (Winarti et al., 2021; Wang, 2017). The rubric scores ranged from 4 to 16, with inter-rater reliability ensured through assessments by two teachers. A Pearson product-moment correlation coefficient of 0.92 indicated consistent grading standards.

Critical Thinking Skills in Writing Rubric

The Illinois Critical Thinking Essay Test (ICTET) rubric assessed students' critical thinking skills, with scores ranging from 6 to 24. Inter-rater reliability was ensured by two instructors, yielding a Pearson product-moment correlation coefficient of r = 0.94.

Creative Thinking Skills in Writing Rubric

A rubric measuring essay writers' creative thought capacity evaluated originality, elaboration, fluency, and flexibility, with scores ranging from 4 to 16. Inter-rater reliability was ensured, with a Pearson Product-Moment reliability score of 0.96.

Semi-Structured Interview

Semi-structured interviews with five questions focused on the use of the PBL paradigm in writing training, based on studies by Indrayadi et al. (2021) and Roshanbin et al. (2022). Questions covered general impressions of PBL, its impact on writing skills, and other positive effects. Interviews aimed to gain insight into participants' perspectives and comprehensively understand the social environment.

Data Analysis

Quantitative Analysis

The researcher used SPSS 25.00 to analyze pre- and post-test data. A paired sample t-test examined the applicability of the PBL model on writing proficiency, critical thinking, and creative thinking skills. A one-way ANCOVA test determined score differences between the two groups.

Qualitative Analysis

The researcher used theme analysis techniques to examine interview material (Boyatzis, 1998). Transcripts were classified using open thematic coding to gather data on students' viewpoints and attitudes towards PBL-based writing courses. Thematic analysis involved identifying, classifying, and interpreting themes from collected data (Ghanbari & Nowroozi, 2022; Terry et al., 2017).

Trustworthiness

Trustworthiness in qualitative studies ensures dependability and data quality. Member verification techniques validated study outcomes (Creswell, 2018). Participants reviewed interview transcripts to confirm accuracy. Additional coders ensured consistency, and an external auditor, a professor, assessed the study's findings for objectivity (Lincoln & Guba, 1985; Polit & Beck, 2012).

Procedure

The study followed a sequential mixed-methods design, prioritizing quantitative over qualitative data. The quantitative portion involved four sessions over four weeks, with one-hour meetings per session. The qualitative portion involved 150-minute interview sessions. The researcher differentiated treatment approaches for the experimental and control groups by creating specific grammatical or learning stages. Tables provided detailed descriptions of the treatment process.

RESULTS

The study employed a sequential explanatory mixed-method approach, with quantitative data collection and analysis in the first stage and qualitative methods in the final stage. The experimental class at Majmaah University focused on using the PBL paradigm to improve writing performance, critical thinking, and creative thinking abilities. The research began with a pre-test to evaluate initial writing proficiency. Students were then introduced to essay writing through Zoom, followed by collaborative tasks in breakout rooms. Essays were presented with multimedia components, and peer feedback was encouraged. Comprehensive feedback from the lecturer led to revisions and final essay submissions. The post-test evaluated improvements in writing, critical thinking, and creative thinking skills. The structured methodology demonstrated how PBL could significantly impact students' academic and cognitive growth.

Table 1: Treatment Procedures in Experiment Class

Meeting	Stage	Problem-Based Learning Model
1		Pre-test
2	Introducing students to problems	The lecturer explains how to compose Arabic essays using Zoom; The lecturer covers the concept, structure, and purpose of writing essays;

		The lecturer shows numerous instances of articles on the impact of social media on language usage and communication in Saudi Arabia.
3 & 4	Organizing students to study	The lecturer splits the class into groups of 5–6 pupils; Using the Zoom app, the lecturer divides each group into a breakout room; Every group is instructed to choose a writing subject related to social media communication and have a discussion on the issues that would be compelling to cover in the text; The lecturer starts by asking each group to create a writing outline before having them work together to write an essay.
5 & 6	Presenting group work or artifacts	Every group showcases their essay by including images, videos, graphics, and more. Students react to the themes, language, and arguments put out in the writings of other groups.
7 & 8	Analyze and evaluate work	The lecturer gives each group detailed feedback and recommendations; After receiving feedback from other groups and the teacher, each group revises and edits their work; Every group uses email or a WhatsApp group to gather the updated versions of their articles.
9	Post-test	

Note: From "Learning to teach", by R.I. Arends, 2008. Copyright 1991 by McGraw-Hill.

Table 2: Treatment Techniques Used in the Control Group at Majmaah University, Saudi Arabia. This study investigates the impact of Problem-Based Learning (PBL) on writing performance, critical thinking, and creative thinking abilities. Unlike the experimental class, the control class adheres to a non-PBL approach. The research begins with a pre-test to assess the students' initial writing proficiency prior to any instructional intervention. During the second meeting, the lecturer uses Zoom to explain the process of composing Arabic essays and presents various writings on the topic of social media communication. The primary objective of this stage is to provide students with a fundamental understanding of essay composition, along with pertinent examples to guide their work. From sessions three to five, students focus on composing and delivering their essays. The teacher mandates that students choose a topic related to social media communication for their Arabic writing projects.

The instructor offers advice and insights to students who are randomly selected to present their written works. This phase emphasizes independent effort and spontaneous presentation, contrasting with the collaborative cooperation in the PBL framework. During sessions six to eight, students engage in rewriting and editing their essays. The instructor directs each student to evaluate and revise their work based on the feedback provided. Students are again randomly selected to present their revised essays. This level of revision prioritizes personal growth through teacher evaluation, rather than relying on group work and continuous feedback as seen in the PBL method.

The research concludes with a post-test at the ninth meeting to evaluate the enhancement of students' writing performance, critical thinking, and creative thinking abilities after the instructional intervention. The pre-test and post-test results in the control class serve as a reference point for assessing the efficacy of the non-PBL model in contrast to the PBL model used in the experimental class. The control class employs a structured approach that emphasizes individual activities and teacher feedback. This is in contrast to the collaborative and iterative learning process of the PBL

model. By examining various educational techniques, we can gain insights into the distinct effects they may have on student growth.

Table 2: Treatment Procedures in Control Class

Meeting	Stages	Non-PBL model
1		Pre-test
2	Pre-writing	The lecturer demonstrates how to compose Arabic essays using the Zoom programme (essay writing); The teacher exhibits various writings about social media communication.
3, 4, & 5	Main activities: write essays and present them.	The instructor requests that students choose a theme for their Arabic writing assignment on social media communication; Students are assigned at random by the teacher to deliver their written works; When students have finished delivering their works, lecturers provide advice and insights.
6, 7, & 8	Revise, edit and present them.	The teacher instructs each student to review and modify their work in accordance with the provided recommendations; Students are chosen at random by the teacher to deliver their edited essays.
9	Post-test	

Descriptive data in Table 3 contrast the impact of non-PBL and problem-based learning (PBL) models on students' writing performance, critical thinking, and creative thinking abilities. The non-PBL group's mean writing performance score was 7.82 (SD = 0.977), while the PBL group's mean score was 8.29 (SD = 0.773). The standard error mean was 1.341 for the PBL group and 0.128 for the non-PBL group, indicating comparable initial writing skills with the PBL group having a slightly higher mean score and less variability. The non-PBL group's mean score improved to 13.11 (SD = 0.837), whereas the PBL group's mean score significantly increased to 19.82 (SD = 1.735). The standard error mean was 0.362 for the PBL group and 0.273 for the non-PBL group. The significant rise in the mean score for the PBL group suggests that the PBL approach was more effective in enhancing writing performance.

The non-PBL group had a mean score of 11.73 (SD = 1.583), while the PBL group had a mean score of 12.82 (SD = 1.731). The standard error mean was 0.262 for the PBL group and 0.372 for the non-PBL group, indicating equivalent critical thinking abilities with a slight advantage for the PBL group. The PBL group's mean critical thinking score improved to 17.41 (SD = 1.733), whereas the non-PBL group's mean score increased to 16.43 (SD = 0.312). The standard error mean was 18.73 for the PBL group and 14.69 for the non-PBL group. Although both groups showed progress, the improvement was more pronounced in the PBL group, suggesting a stronger effect of the PBL model on critical thinking abilities. The PBL group's mean creative thinking score was 9.14 (SD = 1.523), while the non-PBL groups was 8.49 (SD = 0.977). The standard error mean was 0.523 for the PBL group and 0.657 for the non-PBL group, indicating comparable initial levels of creative thinking proficiency.

The non-PBL group's mean score improved to 9.85 (SD = 1.331), while the PBL group's mean creative thinking score significantly increased to 16.49 (SD = 0.963). The standard error mean was 0.427 for the PBL group and 0.327 for the non-PBL group. The significant increase in the PBL group's mean score demonstrates the efficacy of the PBL model in fostering creative thinking. The descriptive statistics show that the PBL model significantly improved writing performance, critical thinking, and creative thinking abilities compared to the non-PBL model. The PBL group's better post-test scores and larger gains from pre-test to post-test in all three categories indicate that PBL's collaborative and problem-solving approach is superior at developing these intellectual and cognitive abilities.

Table 3: Descriptive Statistics

	Group	π	N	Std. deviation	Std. error mean
Pre-Writing Performance	PBL	8.29	20	.773	1.341
	Non-PBL	7.82	30	.977	.128
Post-Writing Performance	PBL	19.82	20	1.735	.362
	Non-PBL	13.11	30	.837	.273
Pre-Critical Thinking	PBL	12.82	20	1.731	.262
	Non-PBL	11.73	30	1.583	.372
Post-Critical Thinking	PBL	17.41	20	1.733	18.73
	Non-PBL	16.43	30	.312	14.69
Pre-Creative Thinking	PBL	9.14	20	1.523	.523
	Non-PBL	8.49	30	.977	.657
Post-Creative Thinking	PBL	16.49	20	.963	.427
	Non-PBL	9.85	30	1.331	.327

Quantitative Analysis

To ensure the research instrument's suitability for data collection, it is crucial during the quantitative analysis phase to verify its validity and reliability. This means confirming the instrument's dependability, which guarantees the practicality of using this research tool.

A study conducted at Majmaah University in Saudi Arabia compared the Problem-Based Learning (PBL) and Non-PBL groups in terms of writing, critical thinking, and creative thinking abilities before and after the intervention. The results of the paired samples t-tests are presented in Table 4, which determine the statistical significance of the differences between each group's pre- and post-intervention observations. The mean difference in pre- and post-intervention writing performance scores is -7.663, with a standard deviation of 2.112 and a standard error mean of 0.321. With 21 degrees of freedom (df), the t-value is -20.0662, and the p-value is 0.000.

This suggests a significant improvement in writing performance following the PBL intervention. The mean difference between pre- and post-intervention writing performance scores is -1.947, with a standard deviation of 0.821 and a standard error mean of 0.644. With 35 df, the t-value is -8.298, and the p-value is 0.000. This indicates a notable improvement in writing abilities, though not as substantial as in the PBL cohort. The mean difference in pre- and post-intervention critical thinking scores is -5.528, with a standard deviation of 2.421 and a standard error mean of 0.442. With 21 df, the t-value is -17.735, and the p-value is 0.000. This indicates a significant enhancement in critical thinking abilities after the PBL intervention. The mean difference between pre- and post-intervention critical thinking scores is -1.952, with a standard deviation of 2.942 and a standard error mean of 0.749. With 35 df, the t-value is -6.632, and the p-value is 0.000.

This demonstrates a notable improvement in critical thinking abilities, though not as marked as in the PBL group. The mean difference in pre- and post-intervention creative thinking scores is -6.641, with a standard deviation of 2.739 and a standard error mean of 0.523. With 21 df, the t-value is -19.654, and the p-value is 0.000. This illustrates a significant improvement in the participants' capacity for creative thought following the PBL intervention. The mean difference between pre- and post-intervention creative thinking scores is -3.734, with a standard deviation of 1.992 and a standard error mean of 0.631. With 35 df, the t-value is -9.263, and the p-value is 0.000.

This implies a significant increase in the capacity for creative thought, though at a slower rate than in the PBL group. The paired samples t-test results show that writing performance, critical thinking, and creative thinking significantly improved under both the PBL and Non-PBL models. However, all

abilities tested showed a higher degree of improvement in the PBL group. The observed differences are statistically significant, as evidenced by the consistently low p-values (0.000) in all comparisons. This demonstrates that the PBL strategy is more effective than the non-PBL model in enhancing students' academic and cognitive abilities at Majmaah University.

Table 4: Paired Samples t-test

		π	Std. deviation	Std. Error Mean	t	df	p
PBL	Pre- and Post Writing Performance	-7.663	2.112	.321	-20.0662	21	.000
	Pre- and Post Critical Thinking	-5.528	2.421	.442	-17.735	21	.000
	Pre- and Post Creative Thinking	-6.641	2.739	.523	-19.654	21	.000
Non-PBL	Pre- and Post Writing Performance	-1.947	.821	.644	-8.298	35	.000
	Pre- and Post Critical Thinking	-1.952	2.942	.749	-6.632	35	.000
	Pre- and Post Creative Thinking	-3.734	1.992	.631	-9.263	35	.000

The ANCOVA analysis, as shown in Table 5, reveals statistically significant differences in the enhancement of writing skills among students at Majmaah University, Saudi Arabia, between the Problem-Based Learning (PBL) and Non-PBL groups. The analysis shows that the Type III Sum of Squares (SS) for the group variable is 193.648, with 2 degrees of freedom (df), resulting in a Mean Square (MS) of 77.952. The resulting F-value is 72.663, indicating a significant disparity in writing performance across the groups. The p-value of .000 is highly statistically significant, suggesting that the observed differences are very unlikely to be due to chance. This result is well below the conventional alpha threshold of .05, further confirming the significance of the findings. Moreover, the partial eta squared value of .725 indicates a substantial effect size, showing that a considerable amount of the variability in writing performance can be attributed to whether students were in the PBL or Non-PBL group. These findings demonstrate that the Problem-Based Learning (PBL) model is much more effective in improving writing proficiency compared to the conventional non-PBL method.

Table 5: ANCOVA: Investigated the Differences between the Two Groups in Improving Writing Performance

Source	Type III SS	df	MS	F	P	Partial eta squared
Group	193.648a	2	77.952	72.663	.000	.725

Table 6 presents the ANCOVA findings for developing students' critical thinking skills (CTS) at Majmaah University in Saudi Arabia, comparing the Problem-Based Learning (PBL) and Non-PBL groups. The analysis shows that the group variable has a Type III Sum of Squares (SS) of 468.752, with 2 degrees of freedom (df), resulting in a Mean Square (MS) of 169.427. The F-value is 68.725, demonstrating a significant difference in the increase of critical thinking abilities between the groups. The p-value is .000, which is highly statistically significant and well below the standard alpha threshold of .05, indicating that the observed differences are not attributable to random fluctuation.

Furthermore, the partial eta squared value of .952 indicates an extremely high effect size, suggesting that the type of learning model (PBL vs. Non-PBL) accounts for a major percentage of the variation in critical thinking abilities. These findings clearly show that the PBL model is far more successful at improving students' critical thinking abilities than the standard non-PBL method.

Table 6: ANCOVA: Investigated the Differences between the Two Groups in Improving Students' Critical Thinking Skills (CTS)

Source	Type III SS	df	MS	F	P	Partial eta squared
Group	468.752a	2	169.427	68.725	.000	.952

The ANCOVA findings in Table 7 assess the variation in students' creative thinking abilities at Majmaah University in Saudi Arabia between the Problem-Based Learning (PBL) and Non-PBL groups. The analysis shows that the group variable has a Type III Sum of Squares (SS) of 274.537 with 2 degrees of freedom (df), resulting in a Mean Square (MS) of 94.233. The F-value of 66.729 indicates a significant difference in the improvement of creative thinking abilities between the groups. The statistically significant p-value of .000, much lower than the standard alpha threshold of .05, suggests that the observed differences are unlikely to be due to chance.

Furthermore, the partial eta squared value of .841 indicates a very substantial effect size, meaning that the type of learning model (PBL vs. Non-PBL) accounts for a considerable percentage of the variation in creative thinking abilities. These results demonstrate that the PBL model significantly outperforms the conventional non-PBL method in developing students' capacity for creative thought.

Table 7: ANCOVA: Investigate the Differences between the Two Groups in Improving Creative Thinking Skills

Source	Type III SS	df	MS	F	P	Partial eta squared
Group	274.537a	2	94.233	66.729	.000	.841

Qualitative Analysis

In addressing the second research question, this study aims to fully comprehend students' viewpoints regarding the use of the Problem-Based Learning (PBL) paradigm in the context of writing training. This research employs a sequential explanatory mixed-method approach, where the qualitative results support the quantitative conclusions drawn in the initial phase. The quantitative findings indicated that the PBL group outperformed the conventional model group in writing, critical thinking, and creative thinking.

To delve deeper into these results, qualitative data were gathered and examined from students in the PBL model group. Ten students were randomly selected from the experimental group, which received treatment using the PBL paradigm, for the interview phase. The researcher developed five semi-structured interview questions using thematic analysis techniques to identify the main themes that emerged. These interview questions focused on students' perceptions of the PBL method and the effects they experienced during the learning process. The qualitative phase is divided into four main categories: (a) writing motivation; (b) writing confidence; (c) attention to detail; and (d) writing time or efficiency.

Firstly, students reported an increase in their motivation to learn how to write after using the PBL method. A key underlying theme that emerged from the qualitative results is the positive impact of the PBL paradigm on students' motivation and drive to learn. For instance, one student participating in the English Education Programme felt that the PBL method of teaching writing skills fostered comfort and cooperation within their group.

One student, P7, shared the following insight: "The Problem-Based Learning (PBL) approach made learning to write more engaging and less intimidating. Working in groups helped me feel more supported and motivated to improve my skills." This sentiment highlights how the collaborative nature of PBL can enhance students' motivation to learn and their overall engagement with the writing process. "Through this method of learning, I experience a sense of ease and do not feel overwhelmed, as I am able to collaborate effectively with my peers."

An additional aspect that surfaced from the interview data was the increasing confidence that students have in their ability to write essays. During their group brainstorming sessions, the

students' confidence was increased by the support they got from their classmates. What the students believed was that the Problem-Based Learning (PBL) method of teaching may reduce writing-related anxiety and boost confidence. This is consistent with participant 2's comment.

"I am experiencing a great sense of joy as acquiring the skill of writing in this manner has the potential to enhance one's self-assurance." Indeed, I experience reduced levels of stress when engaging in the process of writing" (P2).

"I possess a strong sense of assurance when providing guidance to my friends because I firmly believe that through mutual assistance, we can significantly enhance our writing abilities" (P8).

The attention to detail tendency was shown next. The students felt that the PBL technique in this case was really helpful in figuring out different little details in writing. Small details include things like naming the subject, structuring the thoughts, using the right words, and so on. Pupils might examine their writing at both the micro and macro levels. Essay structure, organising, and topic selection are all part of the macro level of writing. The micro level of writing includes vocabulary, word and phrase choice, punctuation, and other components all at the same time. The following claims were made by participants in favour of the idea of paying attention to details:

"My teammates were quite helpful in correcting and providing advice for my draft. This gives me confidence in the quality of the pieces I've produced. (P10).

"Based on the recommendations of my peers within the same group, I acquired supplementary insights regarding minor details that I had previously overlooked, such as the proper utilisation of punctuation marks and the selection of appropriate words for article titles" (P5).

The fourth element in the interview analysis emphasised how the Problem-Based Learning (PBL) method successfully enhanced students' writing time management abilities. They were able to maximise their use of time since the PBL model guided them through many methodical processes. Selected quotes supporting this topic from student interviews are included below.

"In my perspective, acquiring the skill of writing using this approach conserves time." In the past, I consistently had challenges in writing due to the struggle of generating compelling ideas.

In general, students gain numerous advantages from using the PBL paradigm while writing essays. The PBL approach not only enhances the quality of their writing but also boosts their motivation and self-assurance in their writing abilities. This conclusion is supported by empirical research demonstrating that various Problem-Based Learning (PBL) exercises significantly improve students' writing skills.

DISCUSSION

This study, conducted at Majmaah University in Saudi Arabia, investigated the effectiveness of problem-based learning (PBL) compared to a traditional approach in improving the writing ability, critical thinking, and creative thinking skills of students. The research aimed to determine whether PBL could enhance these essential skills, which are crucial for academic success and real-world applications. Additionally, the study sought to gain a comprehensive understanding of students' perceptions and experiences with the PBL model in the context of writing education. Employing a sequential explanatory mixed-methods design, the research initially conducted quantitative analyses followed by qualitative investigations to triangulate the findings.

The quantitative results unequivocally demonstrated that students receiving instruction through the PBL model outperformed their peers in the traditional model across all three critical competencies—writing performance, critical thinking, and creative thinking abilities. This aligns with previous research highlighting the PBL model's effectiveness in improving these skills (Cahyaningrum & Widyantoro, 2020; Dastgeer & Tanveer Afzal, 2015; Handoyo et al., 2021; Sari et al., 2021; Sidauruk et al., 2020). Specifically, the PBL approach fosters deeper engagement, problem-solving abilities, and collaborative learning, which are conducive to enhancing students' academic and cognitive development.

Moreover, the qualitative phase of the study provided valuable insights into students' perspectives regarding the PBL approach. Interviews revealed that students perceived significant improvements in their motivation, confidence, attention to detail, and efficiency in writing when exposed to the PBL model. These qualitative findings corroborate the quantitative results, reinforcing the notion that the PBL paradigm not only enhances academic outcomes but also positively influences students' attitudes towards learning. This study contributes to existing literature by demonstrating that integrating the PBL model into writing education can effectively enhance students' writing competency, critical thinking skills, and creativity. It underscores the importance of active learning strategies that encourage students to apply their knowledge to real-world challenges, as advocated by scholars (Awan et al., 2017; Gorghiu et al., 2015; Suarniati et al., 2019).

Future research directions could explore additional outcomes such as writing motivation, self-efficacy, communication skills, and collaborative abilities within the framework of the PBL model. Longitudinal studies could also investigate the sustained impact of PBL on students' development over extended periods. Additionally, exploring the integration of other educational technologies beyond Zoom could provide insights into optimizing the PBL model's effectiveness in diverse learning environments.

Limitations and Recommendations

This study is not without limitations. The reliance on Zoom as the sole platform for PBL sessions limits generalizability, as other technologies may offer different affordances and challenges. Moreover, the small sample size of 50 students, while sufficient for initial findings, may restrict the broader applicability of the results. Future studies should aim for larger and more diverse participant samples to enhance the robustness and generalizability of findings.

Despite these limitations, this study contributes valuable insights into the effectiveness of the PBL model in enhancing multiple facets of student learning in writing education. By addressing these limitations in future research and expanding the scope to include diverse contexts and technologies, educators and policymakers can better leverage PBL to foster holistic student development in academic settings.

CONCLUSION

In today's educational landscape, students require not only proficient writing skills but also robust critical and creative thinking abilities. The Problem-Based Learning (PBL) model emerges as a promising approach to cultivate these essential competencies concurrently. This study aimed to assess the impact of the PBL model on students' writing proficiency, critical thinking skills, and creative thinking abilities, utilizing a comprehensive framework that integrates both quantitative and qualitative methodologies. The quantitative analyses revealed significant improvements across all targeted skills—writing performance, critical thinking, and creative thinking—among students exposed to the PBL model compared to those in traditional instructional settings. These findings are consistent with prior research demonstrating the PBL model's efficacy in enhancing academic outcomes (Cahyaningrum & Widyantoro, 2020; Dastgeer & Tanveer Afzal, 2015; Handoyo et al., 2021; Sari et al., 2021; Sidauruk et al., 2020).

Specifically, the structured problem-solving approach inherent in PBL fosters deeper engagement, collaboration, and practical application of knowledge, thereby promoting holistic student development. Qualitatively, this study further underscored the positive perceptions of students towards the PBL paradigm in learning Arabic writing. Interviews highlighted increased motivation, confidence, attention to detail, and efficiency in writing tasks among participants. These qualitative insights complemented the quantitative findings, affirming the PBL model's capacity to enhance learning experiences and outcomes. This research underscores the potential for continued exploration and application of the PBL model across various educational contexts. Future studies could expand upon this foundation by investigating additional educational outcomes such as communication skills, writing self-efficacy, and collaborative abilities within the PBL framework.

Longitudinal studies with larger sample sizes would provide deeper insights into the sustained impact of PBL on students' academic and personal growth.

In conclusion, employing the PBL model for teaching Arabic writing has demonstrated significant benefits in developing writing competency, critical thinking skills, and creative thinking abilities. This approach not only prepares students to excel academically but also equips them with the essential skills needed for success in diverse real-world scenarios. By integrating innovative pedagogical approaches like PBL, educators can continue to enrich and enhance the learning experiences of students, fostering a generation of capable, adaptable, and resourceful learners. This study encourages educators and policymakers to consider the transformative potential of the PBL model in fostering comprehensive student development and preparing them for future challenges in academia and beyond.

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