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# THE EFFECTIVENESS OF USING PROJECT-BASED LEARNING ON IMPROVING NINTH-GRADE STUDENTS' CRITICAL WRITING SKILLS

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## ABSTRACT

***The current study aimed to identify the effectiveness of project-based learning (PBL) in enhancing critical writing skills among ninth-grade students at Prince Hussein Bin Abdullah II School in Wadi Al-Seer, Amman, Jordan. Employing a quasi-experimental design, the researchers involved two classes of 30 students each, where participants were randomly assigned to a control group (15 students) and an experimental group (15 students). A carefully developed critical writing test was utilized to measure five key skills: observation, interpretation, analysis, inference, and evaluation, with rigorous validation confirming the test's reliability. The results demonstrated statistically significant differences in mean scores between the control and experimental groups, with the latter showing superior performance in both overall scores and across all assessed writing skills. These positive outcomes are attributed to the implementation of project-based learning strategies. Consequently, the researchers advocated for the integration of project-based learning into the curriculum as a fundamental approach for developing critical writing skills, emphasizing its potential benefits for educational practices.***

**KEYWORDS**: Project-Based Learning; Critical Writing Skills; Ninth-Grade Students.

## 1. INTRODUCTION

The Arabic language, one of the oldest and most affluent living Semitic languages, plays a crucial role in shaping the identity of Arab and Islamic nations. It has acted as a carrier of intellectual, cultural, and civilizational heritage through the ages. Its significance increased notably due to its selection by Allah Almighty as the language of divine revelation in the Holy Quran, which bestowed upon its unique sanctity and preeminent status in both scientific and cultural realms within the global linguistic landscape (Ahmed, et al., 2010). From an educational perspective, teaching the Arabic language focuses on fostering higher-order thinking skills in learners, such as analysis, evaluation, and creativity. Language serves as a tool for cognitive development and the organization of thought. Contemporary educational trends advocate for a language teaching approach that emphasizes the development of communicative competencies and the stimulation of critical thinking. To achieve this, practical learning contexts are created, which integrate understanding, application, and problem-solving. Such an approach equips learners to utilize language effectively in real-life situations and enhances their capacity for independent and creative thought (Qpilat, et al., 2023).

Writing is a highly sophisticated language skill that embodies the convergence of thought and language, showcasing a learner's capability to articulate and organize ideas with precision and fluency. It is more than just the act of inscribing words; writing is a multifaceted cognitive process necessitating a profound comprehension of language structure. This complex skill encompasses several stages, including planning, organizing, revising, and evaluating content. Furthermore, writing serves as a vehicle for self-expression, a crucial method for human communication, and an essential medium for cultivating thinking abilities and self-directed learning (Alshehri, et al., 2021). (Alkhawaldeh, et al., 2023) defined it as "a communicative activity that allows the learner to interact with the recipient through written text, combining rational thinking associated with higher-order skills such as analysis, synthesis, and evaluation, with basic language skills such as spelling, grammar, and style, thus ensuring the production of coherent and expressive texts that simultaneously fulfill the objectives of communication and thinking."

Writing skills are divided into progressive levels that encompass spelling, functional writing, creative writing, and academic writing, each with distinct educational objectives and tailored training strategies. Spelling development emphasizes the accurate formation of letters and words, alongside adherence to writing conventions. Functional writing involves the creation of practical texts such as correspondence and official reports. In contrast, creative writing encourages the generation of ideas and their expression in a literary manner, reflecting the learner's individuality and style, thus allowing for personal expression. This progression aims to cultivate a comprehensive skill set in writing, aligning with the learner's development (Grabe, et al., 2014).

Critical writing is considered one of the most sophisticated forms of writing, as it combines the skills of comprehension, analysis, and evaluation. It relies on critical thinking and a deep awareness of meaning, making it an advanced level of conscious interaction with texts, ideas, and different situations. This type of writing is not limited to simply re-presenting or paraphrasing information, but goes beyond that to logically analyzing and evaluating it, while constructing an independent viewpoint supported by evidence and convincing arguments (Khalil, et al., 2019). Critical writing is defined as "an integrated mental and linguistic process, where a deep understanding of texts converges with the ability to make accurate judgments based on an analysis of the meanings, styles, and arguments presented. This skill requires a comprehensive cognitive awareness of the subject, an understanding of the relationships between different ideas, and the ability to formulate a personal opinion in a convincing and evidence-supported manner, reflecting the learner's ability to think critically, analyze systematically, and express ideas in a balanced and clear way" (Abdelwahab, et al., 2022). The importance of critical writing is evident in its prominent role in developing higher-order thinking skills among learners, as it encourages them to read texts consciously and thoughtfully, and enables them to formulate their own opinions in a coherent and convincing manner. This writing represents an intersection between critical thinking skills and linguistic ability Alsharayri, et al., 2023).

Critical writing is an effective means of forming an educated and independent personality, as it gives the student the ability to freely express his opinions while adhering to values and principles, and enables him to take thoughtful and conscious positions away from indoctrination or emotional reaction. Critical writing occupies a prominent place in teaching the Arabic language, as it represents one of the highest levels of linguistic and intellectual performance, and

forms a meeting point between language and thinking, and reflects the depth of the learner's linguistic and cognitive awareness. It is not limited to enabling him to express himself correctly or write correctly, but goes beyond that to develop his ability to analyze, criticize, evaluate, and take conscious positions towards the issues raised. Thus, critical writing becomes an essential tool to promote thinking at its higher levels (Abdelwahab, et al., 2022; Effendi, et al., 2023).

Critical writing skills include a set of integrated skills, most notably: analyzing texts and understanding main and sub-ideas, interpreting implicit meanings and linking them to the context, evaluating opinions and arguments presented in terms of strength, weakness and credibility, distinguishing between facts, opinions and fallacies, building a clear personal opinion supported by appropriate evidence and proofs, organizing and sequencing ideas logically and formulating them in precise and convincing language. Therefore, the students' proficiency in Arabic varies due to differing educational backgrounds, with those from Arabic or boarding schools displaying greater competency than their peers in middle and high schools. This variation presents challenges for teachers in managing instruction and meeting learning objectives. In response, educators have adopted support strategies such as storytelling, visual aids, and a reward system, which have proven effective in improving critical writing skills in Arabic language education (Safrudin, et al., 2024; Amrullah, et al., 2024).

Integrating critical writing skills into Arabic language curricula is essential for addressing the educational demands of a society increasingly driven by analysis, knowledge, and creativity. Mastery of these skills enables students to engage in systematic thinking, communicate effectively, and actively participate in addressing societal challenges. Consequently, critical writing serves as a foundational element in cultivating learners who are both reflective and engaged citizens, equipped to navigate the complexities of modern life (Al-Shamary, et al., (2018). The significance of critical writing has led to the development of various strategies aimed at enhancing this skill among students, as highlighted by multiple sources, including research for (Khalil, et al., 2019). These strategies are crucial for ensuring that students are well-prepared to meet contemporary challenges through insightful analysis and effective communication. Project-based learning (PBL) centers on learners, enhancing their metacognitive skills by addressing real-world challenges. This approach fosters problem-solving and creative thinking, leading to the development of advanced skills. Tackling social, economic, cultural, and environmental issues improves environments for metacognition, ultimately promoting creative idea generation and skill enhancement (Sart, et al., 2014). This approach facilitates student engagement by merging knowledge acquisition with real-world problem-solving, supported by teacher guidance. Students are initially provided with foundational information, followed by opportunities to apply this knowledge using digital tools and technologies. PBL is recognized for its adaptability and ability to foster creativity, enabling students to learn through personal experiences rather than solely from traditional textbooks. (Markham, et al., 2011). Furthermore, It has been shown to significantly boost academic performance compared to students in conventional learning environments and to promote reading and writing skills and student engagement among fourth graders .( Eichhorn, et al., 2025). Project-based learning (PBL) is grounded in constructivist theory, positing that learners develop knowledge through personal experiences and interactive activities rather than passive receipt of information (Andargie, et al., 2025). The central principle of PBL is to present real-world problems that inspire deep thinking, facilitating knowledge acquisition in relation to problem-solving. This educational approach can be applied in both classroom and external settings, fostering collaborative learning and active participation in activities requiring teamwork (Al-Khudair, et al., 2022). By engaging in authentic projects, students analyze complex issues and create innovative solutions, thereby enhancing critical thinking and informed decision-making skills. Ultimately, PBL cultivates students' problem-solving abilities across various contexts, promoting a deeper educational experience . (Mota, et al. 2024.; Khamis, et al., 2015). Khamis describes project-based learning as a structured approach defined by clear educational goals and objectives. It involves selecting suitable projects like presentations or website design, with the teacher acting as a planner and coordinator who assigns tasks based on students' abilities. This method enhances motivation and promotes effective student participation in the learning process. Moreover, Project-based learning fosters creativity and innovation, allowing students to enhance their intellectual and social skills. It is an effective teaching method that encourages collaboration, interaction, and teamwork, resulting in valuable educational

products and tangible projects. (Muhammad, et al., 2021).

The project-based learning strategy consists of integrated stages designed to achieve learning objectives effectively .( Larmer, et al., 2014). It begins with project selection that aligns with students' needs and abilities, followed by planning where educational objectives, activities, work type, and timelines are defined. Implementation involves applying theoretical concepts to practical scenarios, fostering active learning. The final stage includes continuous evaluation and presentation of the project, enabling students to assess and improve their performance and skills (Awamleh, et al., 2024; Yağcı, et al., ;2018); Stanley, et al., 2015). outlined key characteristics that define project-based learning (PBL), emphasizing the importance of student choice, real-world problem links, and inquiry-driven approaches with minimal teacher direction. (Anazifa, et al., 2017). Effective PBL should connect to learning objectives and develop essential skills while addressing challenges suited to students' educational levels. It must occur in a context relevant to students' interests, allowing for decision-making in project execution. Continuous reflection and evaluation by both students and teachers are crucial to assess learning strategies, activity effectiveness, and quality of work, as well as to identify challenges and devise solutions (Hazhoze, et al., 2016). Therefore, the current study sought to evaluate the effectiveness of PBL in enhancing the critical writing skills of ninth-grade students.

## 2. LITERATURE REVIEW

Studies that addressed the project method as an independent variable, or critical writing as a dependent variable, varied. Aziz explored the impact of Penzu in Computer Assisted Language Instruction (CALI) on higher secondary students' writing skills, employing a mixed-methods design with a quasi-experimental approach and semi-structured interviews. Sixty EFL students participated in the quantitative analysis, with pre- and post-tests evaluated using T-Tests in SPSS. Qualitative data from interviews with 15 EFL teachers and students were analyzed thematically via NVivo. Results indicated that the experimental group improved writing accuracy significantly over the control group. Additionally, younger EFL teachers were more likely to embrace technology, revealing variations in attitudes towards CALI influenced by gender, age, and experience. The findings carry important theoretical, practical, and pedagogical implications for EFL education and teacher development (Almuntasheri, et al., 2025). A study aimed to evaluate the impact of project-based learning (PJBL) on the laboratory report writing skills of female university students at the College of Education, Al-Baha University. The study adopted a quasi-experimental design, with the application of a pre- and post-test. The study sample consisted of (40) female students, who were equally distributed between the experimental and control groups. The content analysis tool was used to evaluate the laboratory report writing skills in its various components, which include: the introduction, methods and procedures, results and discussion. The post-test results showed that the experimental group was significantly superior to the control group, as it achieved the highest improvement in writing the methods and procedures section, while the levels in writing the introduction, results and discussion remained within the average level.

The study by (Melani et al., 2025) investigates the impact of the STEM Project-Based Learning (PBL) approach on elementary students' academic achievement in science within the UAE. Conducted in a Sharjah school following the American curriculum, it utilized a quasi-experimental design with 112 fifth-grade boys split into control (57 students) and experimental (55 students) groups. The experimental group was taught using STEM PBL for five weeks, while the control group was taught via non-STEM PBL. Quantitative data, collected via an energy transformation test, indicated significant improvement in the experimental group's posttest scores (7.38) compared to the control group's (6.07), with a statistically significant difference, $t(110) = 4.142$, $P = 0.000$. Qualitative interviews revealed that STEM PBL positively affected student motivation and interest in STEM careers, while also developing 21st-century skills. The study suggests further research with larger, diverse student populations and emphasizes the need to explore challenges in implementing STEM PBL and the role of administrators.

The study by (Fitria, et al., 2023). aimed to identify the effect of using project-based learning in learning Arabic in secondary education, especially in writing skills. This research was conducted in an Islamic junior high school (SMP) located in Malang, East Java, Indonesia. The quasi-experimental approach was adopted, employing both tests and interviews. The results showed that only about 12.6% of the students in the experimental group scored above 70 in writing skills based on essay writing assessments. The students also faced some difficulties in learning Arabic, academically and

psychologically. The results showed the superiority of the experimental group that studied according to projects over the control group.

The study by (Sungkono, et al., 2023) aimed to test the effectiveness of applying the project-based learning model in developing students' critical thinking skills and creativity skills. The study population consisted of students enrolled in the Media Scriptwriting course in the Educational Technology program at Yogyakarta State University. The study adopted a quasi-experimental approach, using a single-group pre-test and post-test design. Data related to students' critical thinking and creativity skills were collected through a questionnaire administered before and after the application of the project-based learning model in teaching activities. The results showed that both critical thinking and creativity skills achieved statistical significance, indicating statistically significant differences in favor of the post-test measurement.

(Hakimah, et al., 2023). aimed to investigate the effectiveness of project-based learning in developing the writing skills of ninth-grade students in a school in Surabaya. A quasi-experimental design was employed, and the study sample consisted of a single group of 42 ninth-grade students selected using convenience sampling. The experimental treatment involved implementing project-based learning, where students actively participated in applied activities, collaborative projects, and authentic writing tasks related to writing procedural texts. A pre-test and a post-test were administered. The results demonstrated the effectiveness of project-based learning in improving students' writing skills in the context of procedural texts. The findings also indicated that employing authentic tasks and practical experiences contributes to enhancing students' creativity, critical thinking, and problem-solving skills.

The study by (Suteja, et al., 2022). demonstrated the relationship between critical thinking skills and writing skills among primary school students, and revealed the level of writing and critical thinking skills among students in light of the use of the project-based learning model. The study adopted the experimental approach with a quasi-experimental design, and the study sample consisted of (50) male and female students, who were divided into two groups: experimental and control, each of which included (25) male and female students, from the sixth grade of primary school in one of the schools in Bandung. The study used an essay test to measure critical thinking skills, and a performance test consisting of a task of writing persuasive texts to measure the students' writing skills. The results showed a positive correlation between critical thinking skills and writing skills among the students, in addition to the existence of statistically significant differences in writing skills before and after learning using the project-based learning model among the students of the experimental group.

Effendi's study aimed to evaluate the effectiveness of caricature image media on improving students' argumentative writing skills. Utilizing a quantitative experimental design, specifically a one-group pretest-posttest model, the research involved 29 students from the Indonesian Language Education program at a private university in Palembang during the 2022/2023 academic year. Data collection included observations, document reviews, and written tests. The results were analyzed using a paired sample t-test, yielding a t-count of 8.57 against a t-table value of 2.048 at a significance level of 0.000. This indicated a statistically significant effect of caricature media on students' learning outcomes in argumentative writing. The average score difference between the posttest and pretest was 4.75, reflecting a percentage increase of 47.11%. Overall, caricature images demonstrated a positive impact on students' argumentative writing abilities (. Effendi et al., 2023).

### *2.1. Contributions of the Study*

A review of previous studies reveals that project-based learning and critical writing have garnered significant attention from researchers, highlighting the importance of these variables in teaching and their positive impact on achieving educational outcomes. All studies employed quasi-experimental design, such as, (Siregar, et al., 2025). with student participants, as well as Many previous studies utilized project-based learning as an independent variable, as in, (Fitria et al., 2023). while the dependent variables varied, including the development of critical, narrative, and creative writing skills.

The researchers benefited from previous studies by reviewing the theoretical literature, methodologies, problem formulation, research instrument development, and results interpretation and discussion. The current study differed from previous studies in its measurement of the effectiveness of project-based learning in improving critical writing skills among ninth-grade students. A critical writing test was also developed.

### *2.2. Problem Statement*

Acquiring the Arabic language entails learning and mastering linguistic skills, especially writing

skills. Writing is a means of communication that contributes to the exchange of ideas and opinions, thus giving the individual self-confidence and an awareness of their ability to express their opinions, themselves, and beliefs clearly and explicitly. This contributes to the constant motivation to interact with those around them and share enjoyable time with them. In light of the technological developments, we are currently experiencing, and relying on modern means of communication to deal with others and exchange ideas, we find the importance of writing skills in communication, as it is the skill used to connect and communicate with others through various applications (. Siregar, et al., 2025; Pakaya, et al.,.2010)

However, we still observe a weakness among learners in their mastery of these language skills, particularly writing. This has been demonstrated by several studies, including those by which emphasized the importance of using active learning strategies to improve students' critical writing skills. The first researcher also observed this weakness in students' writing skills through his extensive experience teaching Arabic and his observations of the educational landscape. This weakness was also noted by many parents and Arabic language teachers, and it may be attributed to the teaching strategies employed.

Numerous studies have confirmed the effectiveness of various teaching strategies in achieving learning outcomes, increasing student motivation, and developing several aspects of their skills. Among these strategies is project-based learning (Fitria, et al., 2023; Suteja, et al., 2022). The Ministry of Education has recommended employing diverse teaching strategies and methods in teaching writing skills, as well as other Arabic language skills, to achieve learning objectives and equip students with language proficiency. This recommendation was even included in the Arabic Language Teacher's Guide for ninth-grade students (Curriculum and Textbook management, 2022).

In light of the preceding discussion regarding the weakness in achieving critical writing outcomes and the importance of project-based learning, this study examines the effectiveness of project-based learning in improving critical writing skills among ninth-grade students.

**The study aimed to answer the following research question:**

Is there a statistically significant difference at the significance level ($\alpha = 0.05$) between the arithmetic means of the scores of the experimental and control groups in the critical writing skills test that can be attributed to the use of project-based learning versus the traditional method?

## 3. SIGNIFICANCE OF THE STUDY

The significance of this study lies in its theoretical and applied aspects, as follows:

### *3.1. Theoretical Significance:*

It contributes to enriching the educational literature related to the use of project-based learning as a modern approach in teaching Arabic, and highlights the relationship between active teaching strategies and the development of critical writing skills, thus adding to contemporary educational knowledge.

### *3.2. Practical importance*

It provides a practical model for teachers that can be applied within the classroom to effectively improve the teaching of critical writing skills, and helps to motivate students to engage in self-learning and teamwork by involving them in projects related to their lives and reality.

### *3.3 Study terms and their operational definitions*

Project-based learning: "It is a learner-centered educational method through which knowledge and skills are acquired by working for a certain period of time on a project that addresses a real-world problem or a complex question, and this includes stages of research, planning, implementation and evaluation. This type of learning aims to develop critical thinking, collaborative work, problem-solving and self-learning, by linking theoretical knowledge with practical application" (Bell, et al., 2010).

Operationally, it is defined as an educational model used in the current study, which is based on involving ninth-grade students in Jordan in implementing language educational projects that were designed and implemented within an active classroom environment, with the aim of developing their critical writing skills over a specific period of time.

Critical writing: "The ability to produce texts that reflect analytical and logical thinking, based on the study of arguments and justifications, and the balancing of evidence to choose the most strong and consistent position, which enhances the learner's critical thinking skills and develops his ability to express his opinions in an organized and thoughtful manner" (Amor, et al., 2012).

Operationally, it is defined as a set of writing skills

that were measured in a test prepared in this study. The first part included five critical writing skills, namely: observation skill, interpretation skill, analysis skill, deduction skill, and evaluation skill. The second part is writing a topic that includes the title, introduction, body, and conclusion, and presenting an opinion supported by logical evidence and organized writing.

### *3.4 Study Scope and Limitations*

**Subject Scope:** The study was limited to four teaching units from the first semester of the Arabic language curriculum for ninth-grade students in the Hashemite Kingdom of Jordan for the 2025/2026 academic year. The aim was to investigate the effectiveness of project-based learning in improving students' critical writing skills. These skills were defined as five critical writing skills: observation, interpretation, analysis, inference, and evaluation.

**Geographical Scope:** The study was conducted at Prince Hussein bin Abdullah II School in the Wadi Al-Seer district.

**Temporal Scope**: The study was conducted during the first semester of the **2025/2026** academic year.

**Population Scope:** The study was limited to a sample of ninth-grade students in Jordan.

**Study Limitations:** The study's findings were determined by the psychometric properties of the research instrument, specifically its validity and reliability, the objectivity of the participants' responses, and the nature of the procedures followed.

## 4. METHOD AND PROCEDURES

### *4.1. Methodology*

The current study used the quasi-experimental method, with an experimental and control group design, as it is the most appropriate method to achieve the study's objective. Study Participants

The study participants were purposively selected from ninth-grade students at Prince Hussein Bin Abdullah II School, affiliated with the Jordanian Ministry of Education in the Wadi Al-Seer district, during the first semester of the 2025/2026 academic year. This selection was necessary because the school has multiple ninth-grade classes, facilitating the selection of both experimental and control groups. Two classes, totaling 30 students, were randomly assigned. The first class, consisting of 15 students, served as the control group and was taught using the traditional method. The second class, also consisting of 15 students, served as the experimental group and was taught using project-based learning.

**Research Instrument:** A preliminary version of the Critical Writing Skills Test was developed after reviewing several relevant previous studies, According to study. The test included five skills: observation, interpretation, analysis, inference, and evaluation.

**Validity of the Critical Writing Test:** The validity of the scale was verified in two ways:

**Content validity:** The validity of the test's content was verified by presenting it to a select group of expert arbitrators from the faculty members in the fields of curriculum and teaching methods, and measurement and evaluation at Yarmouk University and Jordanian universities, in addition to the subject supervisors at the Ministry of Education. The arbitrators examined the correctness of the linguistic formulation and the extent to which the items were suitable for the purpose for which the test was prepared. The items that received a high level of acceptance were adopted, so that agreement was achieved among approximately (80%) of the arbitrators' opinions.

**Construct Validity:** To verify construct validity, correlation coefficients were calculated between each item and the total scale score, as well as the correlation of each item with its respective domain, and the correlations between the domains and the total score. This procedure was performed on a pilot sample of 15 students, outside the main study sample. The results showed that the correlation coefficients between the items and the test as a whole ranged from 0.42 to 0.89, while the correlation coefficients between them and their respective domains ranged from 0.48 to 0.93. The results also showed that the correlation coefficients between the domains themselves ranged from 0.747 to 0.841, and with the total score, they ranged from 0.798 to 0.921. These values indicate that all correlation coefficients were within acceptable limits and statistically significant, demonstrating that the instrument possesses a good degree of construct validity. Consequently, no items were removed from the scale.

**Reliability of the Critical Writing Test:** The inter-rater agreement method (with three arbitrators) was used to calculate scoring reliability. This method aimed to determine the degree of agreement on the applied arbitration criteria. Each arbitrator scored the responses independently. The number of instances of agreement among the arbitrators was calculated using Holsti's formula, as follows:

Agreement Percentage = (Number of instances of agreement ÷ (Number of instances of agreement + Number of instances of disagreement)) × 100. The agreement percentage reached 97%, which is considered acceptable in educational studies (Yin, et

al., 2009). The Kappa coefficient was also used to measure the degree of agreement among the arbitrators, and it reached 0.97, indicating a high degree of agreement and suitable for the purposes of this study (Denzin, et al., 2017) H. Teacher's Guide for Implementing Lesson Content Using Project-Based Learning To achieve the study's objective, a guide was developed for implementing the curriculum content related to Units 1 and 2 of the first semester using project-based learning. This guide outlines the objectives, lesson plans, and project-based learning steps, including all activities, methods, and tools implemented. It also includes assessment questions for each lesson, the distribution of lessons, their duration, and the strategies and methods chosen to develop the five critical writing skills. The curriculum was taught over a period of four weeks, with each lesson lasting 45 minutes. The experimental group was taught using project-based learning, following these steps:

1. Step 1: Defining the topic (project) and its objective
2. Step 2: Forming groups and assigning tasks
3. Step 3: Project planning
4. Step 4: Project implementation (information gathering and analysis)
5. Step 5: Project production (final product)
6. Step 6: Project presentation
7. Step 7: Evaluation and feedback
8. Step 8: Reflection and self-assessment

**Validity of the guide:** To ensure the validity of the designed educational material, the guide was presented to a group of experienced referees from the faculty members specializing in curricula and teaching methods, and measurement and evaluation, at Yarmouk University, Jordanian universities, and subject supervisors in the Ministry of Education, to ensure its suitability for application and its appropriateness for what it was prepared for, and the extent to which its general and specific objectives are appropriate for the targeted age group. The modifications were made in light of the referees' observations.

### *Group Equivalence: Critical Writing Skills Test*

To verify group equivalence, the arithmetic means and standard deviations of the dimensions and the total score of ninth-grade students on the pre-test of critical writing skills were calculated according to the group variable (experimental, control). To show the statistical differences between the arithmetic means, the t-test was used, and Table (1) illustrates this.

***Table (1): Arithmetic means, standard deviations, and t-test scores according to the group variable on the dimensions and the total score of the writing skills test***

| | Group | Number | Arithmetic Mean | Standard Deviation | Value | Degrees of Freedom | Statistical Significance |
|---|---|---|---|---|---|---|---|
| Observation | Experimental | 15 | 4.20 | 1.373 | .445 | 28 | .660 |
| | Controlled | 15 | 4.00 | 1.069 | | | |
| Interpretation | Experimental | 15 | 3.20 | 1.521 | 1.637 | 28 | .113 |
| | Controlled | 15 | 2.47 | .834 | | | |
| Analysis | Experimental | 15 | 3.73 | .961 | .189 | 28 | .852 |
| | Controlled | 15 | 3.67 | .976 | | | |
| Conclusion | Experimental | 15 | 3.73 | 1.033 | 1.129 | 28 | .268 |
| | Controlled | 15 | 3.27 | 1.223 | | | |
| Evaluation | Experimental | 15 | 3.67 | 1.447 | .282 | 28 | .780 |
| | Controlled | 15 | 3.53 | 1.125 | | | |
| Critical Writing Test | Experimental | 15 | 18.53 | 3.523 | 1.425 | 28 | .165 |
| | Controlled | 15 | 16.93 | 2.549 | | | |

**The maximum mark for the critical writing skills test is (40).**

Table (1) shows that there are no statistically significant differences (0.05) attributable to the group in all dimensions and in the overall score of the pre-test of writing skills, and this result indicates the equivalence of the groups. Study Variables and Design

**Independent variable:** Teaching method, which has two levels: (project-based learning and traditional method).

**Dependent variable:** Critical writing skills.

***The pre- and post-group designs are represented by symbols as follows:***

| EG | O1 | X | O1 |
|---|---|---|---|
| CG | O1 | __ | O1 |

EG: Experimental group.

CG: Control group.

O1: Pre- and post-critical writing test.

X: Experimental treatment: Teaching using project-based learning. Traditional method.

## 5. STUDY PROCEDURES

A test was developed to measure critical writing skills, based on theoretical literature and previous studies related to the topic. A comprehensive implementation plan was prepared for the teacher's guide, with a timeline aligned with the plan approved by the Ministry of Education, starting with the first semester of the 2025/2026 academic year. The test's characteristics were verified by confirming its validity and reliability, in addition to verifying the validity of the approved teacher's guide for teaching the subject.

The study participants were selected from ninth-grade students to apply the research procedures. The necessary approvals, official documents, and approval from the Research Ethics Committee were obtained from the relevant authorities to facilitate the implementation of the research procedures. The critical writing test was administered to both the experimental and control groups as a pre-test to measure performance levels before teaching.

A series of meetings and training sessions were conducted with the Arabic language teacher at the school to prepare them to implement the lessons using project-based learning, and they were provided with the specialized teacher's guide. The experimental group was taught the prescribed content using project-based learning, while the control group studied the same content using the traditional method. - The critical writing test was re-administered to both groups after the intervention as a post-test to measure the impact of the strategy used. The students' responses to the test were scored, the data were entered into SPSS software, and the results were statistically analyzed and organized into explanatory tables.

**Statistical treatments:** To answer the study question, arithmetic means, standard deviations, and analysis of covariance (MANCOVA) were used.

## 6. RESULTS AND DISCUSSION

Results of the main research question, which stated: "Is there a statistically significant difference at the significance level (α = 0.05) between the arithmetic means of the scores of the experimental and control groups on the critical writing skills test, attributable to the use of project-based learning versus the traditional method?" To answer this question, the arithmetic means and standard deviations of the scores of ninth-grade students on the critical writing skills test were calculated in the pre- and post-tests, according to the teaching method (project-based learning versus the traditional method), as shown in Table (2):

***Table (2): Arithmetic means and standard deviations of the scores of ninth grade students on the critical writing skills test as a whole for the pre- and post-tests according to the teaching method (project-based learning, traditional).***

| | | Pre-test | | Post-test | |
|---|---|---|---|---|---|
| **Teaching Method** | **Number** | **Arithmetic Mean** | **Standard Deviation** | **Arithmetic Mean** | **Standard Deviation** |
| **Project-based learning** | 15 | 18.53 | 3.523 | 34.60 | 4.323 |
| **Traditional** | 15 | 16.93 | 2.549 | 25.93 | 4.250 |

Table (2) shows apparent differences between the arithmetic means of the scores of ninth-grade students on the overall critical writing skills test in the pre- and post-tests according to the teaching method (project-based learning, traditional). To determine whether these apparent differences were statistically significant, a one-way analysis of covariance (ANCOVA) was used for the post-test of the overall critical writing skills test according to the teaching method (project-based learning, traditional) after neutralizing the effect of their pre-test scores. The following are the results as shown in Table (3):

***Table (3): Results of the one-way analysis of covariance (ANCOVA) for the post-test scores of ninth-grade students on the overall critical writing skills test, according to the teaching method (project-based learning, traditional), after controlling for the effect of their pre-test scores.***

| Source of variance | Sum of squares | Degrees of freedom | Mean sum of squares | Value of F | Significance level | Eta² |
|---|---|---|---|---|---|---|
| **Pre-test** | 3.148 | 1 | 3.148 | .166 | .687 | .006 |
| **Teaching Method** | 546.596 | 1 | 546.596 | 28.859 | .000 | .517 |
| **Error** | 511.385 | 27 | 18.940 | | | |
| **Total** | 1077.867 | 29 | | | | |

Table (3) shows statistically significant differences at the significance level (α=0.05) in the scores of ninth-grade students on the critical writing skills test according to the teaching method (project-based learning vs. traditional). The F-value was (28.859), which is statistically significant at (0.000), indicating an effect of the teaching method. To determine which method contributed to the

differences, the adjusted arithmetic means and standard errors were calculated according to the teaching method, as shown in Table (4). Table (3) also shows that the effect size of the teaching method was large; the eta-squared value ($\eta^2$) explained (51.7%) of the explained (predicted) variance in the dependent variable, which is the critical writing skills test.

***Table (4): Adjusted arithmetic means and their standard errors for the total score of the critical writing skills test according to the teaching method (project-based learning, traditional).***

| | Teaching Method | Adjusted Post-Rate Mean | Standard Error |
|---|---|---|---|
| | Project-based learning | 34.687 | 1.144 |
| | Traditional | 25.846 | 1.144 |

The results in Table (4) indicate that the differences favored those exposed to the project-based learning strategy compared to those who followed the traditional method. This result may be attributed to the fact that project-based learning provided a more Learning Model to Improve Critical Thinking Skills of Elementary School Students for students. This approach enables students to engage in purposeful tasks that require research, analysis, and the application of higher-order thinking skills (Melani, et al., 2025).

These skills are directly related to critical writing skills. In contrast, the traditional method often relies on rote learning or procedural exercises, which may limit students' ability to practice critical thinking skills in depth. Therefore, the results highlight that the project-based learning approach enhances opportunities for active learning and supports the practical and tangible acquisition of higher-order thinking skills and critical writing skills, as confirmed by previous studies. (Suteja, et al., 2022). Looking at the effect size revealed by the results, the eta-squared value ($\eta^2$) reached 51.7%, a high percentage indicating that more than half of the variance in students' performance on the critical writing skills test is attributable to the teaching method. This effect size is considered large according to established statistical standards, meaning that the project-based learning strategy did not merely produce small differences, but had a clear impact on developing students' critical writing skills. This result confirms that adopting active learning strategies such as project-based learning can represent a qualitative leap in Arabic language learning outcomes.

These results support modern educational trends that focus on the learner as the center of the educational process, empowering them to construct their own knowledge through applied activities and real-world projects that require them to think, analyze, and evaluate. These results provide practical evidence for educational policymakers and teachers regarding the feasibility of integrating project-based learning into Arabic language teaching strategies, particularly for writing skills that are directly linked to developing critical thinking and analytical writing. The arithmetic means and standard deviations of the pre- and post-test dimensions of the critical writing skills test were calculated according to the teaching method (project-based learning, traditional), as shown in Table (5).

***Table (5): Arithmetic means and standard deviations of the pre- and post-test measurements of the dimensions of the critical writing skills test according to the teaching method***

| Dimensions | Teaching Method | Number | Pre-test | | Post-test | |
|---|---|---|---|---|---|---|
| | | | Arithmetic mean | Standard deviation | Arithmetic mean | Standard deviation |
| **Observation** | Project-based learning | 15 | 4.20 | 1.373 | 8.07 | 1.751 |
| | Traditional | 15 | 4.00 | 1.069 | 6.13 | 1.922 |
| **Interpretation** | Project-based learning | 15 | 3.20 | 1.521 | 6.13 | .834 |
| | Traditional | 15 | 2.47 | .834 | 4.40 | 1.121 |
| **Analysis** | Project-based learning | 15 | 3.73 | .961 | 6.93 | 1.792 |
| | Traditional | 15 | 3.67 | .976 | 5.07 | 1.335 |
| **Conclusion** | Project-based learning | 15 | 3.73 | 1.033 | 5.87 | 1.060 |
| | Traditional | 15 | 3.27 | 1.223 | 4.53 | 1.246 |
| **Evaluation** | Project-based learning | 15 | 3.67 | 1.447 | 7.60 | 1.298 |
| | Traditional | 15 | 3.53 | 1.125 | 5.80 | 1.699 |

Table (5) shows apparent differences between the arithmetic means in the pre- and post-tests of the dimensions of the critical writing skills test, resulting from the difference in the teaching method (project-based learning, traditional). In order to verify the significance of the apparent differences, a one-way analysis of covariance (MANCOVA) was applied, as shown in Table (6).

***Table (6): Results of the one-way ANOVA for the effect of the teaching method (project-based learning, traditional) on the dimensions of the critical writing skills test***

| Effect | Type of Multiple Test | Value of Multiple Test | F-Total | Hypothesis Freedom | Error Freedom | Significance | Effect Size η² |
|---|---|---|---|---|---|---|---|
| **Teaching method** | Hotelling's Trace | 1.836 | 6.977 | 5.000 | 19.000 | .001 | .647 |

Table (6) shows that the teaching method had a statistically significant effect at the significance level of (0.05) on the post-test measurement of all dimensions of the Critical Writing Skills Test combined, where the value of Hotelling was (1.836) and the statistical significance was (0.001). To determine which dimension had the effect of the teaching method, a one-way analysis of covariance (ANCOVA) was performed for each dimension separately according to the teaching method after neutralizing the effect of their pre-test, as shown in Table (7).

***Table (7): One-way analysis of covariance (ANCOVA) of the effect of the teaching method on the post-test score for each dimension of the critical writing skills test after controlling for the effect of the pre-test scores.***

| Source of variance | | Sum of squares | Degrees of freedom | Mean of sum of squares | F | Significance | Effect sizeη² |
|---|---|---|---|---|---|---|---|
| **Teaching method** | **Post-observation** | 30.112 | 1 | 30.112 | 9.578 | .005 | .294 |
| | **Post-interpretation** | 20.586 | 1 | 20.586 | 19.333 | .000 | .457 |
| | **Post-analysis** | 23.150 | 1 | 23.150 | 12.320 | .002 | .349 |
| | **Post-conclusion** | 12.857 | 1 | 12.857 | 8.855 | .007 | .278 |
| | **Post-evaluation** | 19.796 | 1 | 19.796 | 9.644 | .005 | .295 |
| **Error** | **Post-observation** | 72.308 | 23 | 3.144 | | | |
| | **Post-interpretation** | 24.490 | 23 | 1.065 | | | |
| | **Post-analysis** | 43.218 | 23 | 1.879 | | | |
| | **Post-conclusion** | 33.395 | 23 | 1.452 | | | |
| | **Post-evaluation** | 47.213 | 23 | 2.053 | | | |
| **Corrected total** | **Post-observation** | 122.700 | 29 | | | | |
| | **Post-interpretation** | 49.867 | 29 | | | | |
| | **Post-analysis** | 96.000 | 29 | | | | |
| | **Post-conclusion** | 50.800 | 29 | | | | |
| | **Post-evaluation** | 88.300 | 29 | | | | |

Table (7) shows that there are statistically significant differences at the significance level (α≤0.05) according to the effect of the teaching method (project-based learning, traditional) in all dimensions. To determine which of the two study groups had the significant differences, the adjusted arithmetic means and standard errors for the dimensions were calculated according to the teaching method, as shown in Table (8).

***Table (8): Adjusted arithmetic means and standard errors for the post-test measurement of the dimensions of the critical writing skills test according to the teaching method***

| Dependent variable | Teaching method | Adjusted arithmetic mean | Standard error |
|---|---|---|---|
| **Observation** | Project-based learning | 8.158 | .471 |
| | Traditional | 6.042 | .471 |
| **Interpretation** | Project-based learning | 6.141 | .274 |
| | Traditional | 4.392 | .274 |
| **Analysis** | Project-based learning | 6.928 | .364 |
| | Traditional | 5.072 | .364 |
| **Conclusion** | Project-based learning | 5.891 | .320 |
| | Traditional | 4.509 | .320 |
| **Evaluation** | Project-based learning | 7.558 | .380 |
| | Traditional | 5.842 | .380 |

Table (8) shows that the significant differences between the adjusted post-test means in all dimensions of the critical writing skills test were in favor of those who were exposed to the project-based learning method compared to the individuals of the conventional method, noting that the effect size for the dimensions was high and ranged between (27.8%-45.7%).

These results confirm that project-based learning has a high capacity to develop critical writing skills in all their dimensions, and that the high effect sizes (27.8%–45.7%) are strong evidence of its educational impact compared to the conventional method, which often focuses on rote learning and traditional writing processes without giving students opportunities for deep thinking, collaborative work, and problem-solving.

The results of the current study were similar to the results of a number of previous studies, such as (Effendi, et al., 2023). indicated the effectiveness of teaching strategies in developing critical reading skills among second-year middle school students, and (Aziz, 2010.). which focused on developing writing skills at a higher secondary level the effect of using penzu on students, (Almuntasheri, et al., 2025). which used project-based learning to improve practical and critical writing skills, (Melani, 2025). which employed project-based learning to enhance students' critical thinking skills, (Fitria, et al., 2023). which used project-based learning to improve writing skills among primary and secondary school students, (Sungkono et al., 2023). which employed project-based learning to enhance critical thinking skills related to writing, and (Hakimah, et al., 2023). which improved writing skills among ninth-grade students through project-based learning. (Mehanni, et al., 2023). focused on developing critical writing skills through innovative educational tools, (Suteja, et al., 2022). employed project-based learning to improve students' critical thinking and writing skills.

## 7. CONCLUSION

The study investigated the impact of project-based learning versus traditional methods on ninth-grade students' critical writing skills. It found that students using project-based learning had significantly higher post-test scores compared to those taught traditionally, confirmed by a one-way ANCOVA with an F-value of 28.859 ($p = 0.000$). The eta-squared value ($\eta^2 = 0.517$) indicated that 51.7% of the variance in writing skills was attributable to the teaching method, signifying a large effect size. Furthermore, the results suggest project-based learning fosters critical thinking and writing skills more effectively than traditional rote methods, supporting the integration of active learning strategies in educational practices. Further analysis of teaching dimensions revealed similar trends favoring project-based learning across observation, interpretation, analysis, conclusion, and evaluation, confirmed through additional statistical tests.

In addition, one-way analysis of covariance (ANCOVA) indicates a significant effect of teaching methods (project-based learning vs traditional) on post-test scores across various dimensions of critical writing skills, controlling for pre-test scores. The results reveal effect sizes ranging from 27.8% to 45.7%, affirming project-based learning's superior ability to enhance critical writing skills. Specifically, the adjusted means for project-based learning surpassed those of traditional methods in all dimensions: Observation (8.158 vs 6.042), Interpretation (6.141 vs 4.392), Analysis (6.928 vs 5.072), Conclusion (5.891 vs 4.509), and Evaluation (7.558 vs 5.842). The study corroborates prior research demonstrating the effectiveness of project-based learning in fostering critical thinking and writing abilities in educational contexts, suggesting that such methods may be more effective than conventional approaches that emphasize rote learning, providing students opportunities for collaboration and deep thinking.

### Recommendations and Suggestions

In light of the findings, the study recommends the following:

Adopting project-based learning in teaching Arabic writing skills, given its clear effectiveness in improving students' observation, interpretation, analysis, inference, and evaluation abilities. Developing writing tasks that address real-world problems or social phenomena, thus providing students with opportunities for investigation, analysis, and the production of evidence-based solutions. Conducting training programs for teachers on how to design projects, guide students through them, and utilize constructive feedback to enhance critical thinking and writing skills. Promoting a culture of critical thinking in the curriculum, moving beyond rote learning activities. Conducting similar future studies to apply project-based learning in different subjects and educational stages, and to evaluate its impact on other skills such as creative thinking and problem-solving.

### Conflict of interest

The authors declare no conflict of interest.

## Author Contributions

final. conceptualized the research framework and methodology and led the writing of the abstract, introduction, and discussion. I. A. conducted the literature review and developed and adapted research instruments, ensuring their validity. And revised the manuscript for journal compliance and coordinated correspondence with the editorial team. E.R. managed data collection and organized the respondent database while also conducting MANCOVA. All authors reviewed and approved the final manuscript.

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