

Research Article

Cite this article: Amoush, S., & Khodair, R. (2025). Effectiveness of the Pentagon Strategy (PG) in Enhancing Critical Reading Skills Among Tenth-Grade Female Students in Jordan. *Educational Process: International Journal*, 16, e2025266.

<https://doi.org/10.22521/edupij.2025.16.266>

Received April 19, 2025

Accepted May 27, 2025

Published Online June 20, 2025

Keywords: Critical Reading, Pentagon Strategy (PG), Tenth-Grade Female Students.

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Effectiveness of the Pentagon Strategy (PG) in Enhancing Critical Reading Skills Among Tenth-Grade Female Students in Jordan

Siham Amoush , **Raed Khodair** 

Abstract

Objectives. This study aimed to investigate the effectiveness of the Pentagon Strategy (PG) in enhancing critical reading skills among tenth-grade female students in Jordan.

Methodology. The researchers employed an experimental approach with a quasi-experimental design involving two groups: experimental and control groups. To achieve the study's objectives, a critical reading skills test consisting of 16 items was administered to a sample of 80 tenth-grade female students from Princess Raya Bint Al-Hussein Secondary School, affiliated with the Mafraq District Directorate. The sample was selected using an available sampling method and divided into two groups: an experimental group of 40 students taught using the Pentagon Strategy (PG) and a control group of 40 students taught using the conventional method.

Results. Analysis of Covariance (ANCOVA), Multivariate Analysis of Covariance (MANCOVA), and effect size measures were employed to address the research question. The study's results revealed statistically significant differences in the performance of tenth-grade female students in critical reading skills, favoring the experimental group that the post-test mean for the experimental group was 27.00 and 18.87 for the control group, with an effect size of 0.60.9%.

Conclusion. Based on these results, the study recommends incorporating the Pentagon Strategy into the teaching of various language skills, training Arabic language teachers to implement this strategy, and conducting future studies to explore its effectiveness in enhancing other aspects of language learning.

1. Introduction

Critical reading is a fundamental skill that enables learners to engage consciously with written texts, comprehend underlying meanings, and analyze and evaluate content based on logical criteria. Numerous educational studies indicate that developing critical reading skills enhances reflective thinking and the ability to make independent decisions, particularly during the intermediate and secondary school stages. Amid the rapid transformations in the nature of knowledge, there is an increasing need to cultivate students' abilities to interact with texts critically, thereby strengthening their capacity to distinguish between facts and opinions, identify fallacies, and recognize logical inferences.

In this context, modern teaching strategies have emerged to foster critical thinking and critical reading skills, among which the Pentagon Strategy stands out. This instructional model is based on five primary analytical axes designed to guide learners toward a deeper and more interpretive reading of texts within diverse intellectual frameworks (Mohamed, 2025). The Pentagon Strategy is distinguished by its ability to organize students' thinking and train them to pose analytical, interpretive, and critical questions, making it an effective tool for teaching critical reading, particularly for students in the upper basic education stage.

Recent educational literature highlights that the level of critical reading skills among basic-stage students in Jordan remains below the desired standard, necessitating the exploration of innovative and more effective teaching strategies. Local studies have shown that students often struggle with critical engagement with texts, as instruction frequently focuses on literal comprehension without addressing higher-order thinking skills such as analysis and evaluation (Haddad, 2022).

Building on the above, this study seeks to examine the effectiveness of the Pentagon Strategy in enhancing critical reading skills among tenth-grade female students in Jordan through its practical application in a classroom setting tailored to the study's objectives. The study measures the strategy's impact on developing skills such as discrimination, analysis, inference, and judgment formation. It aims to contribute scientifically to the field of Arabic language teaching methods and guide educators toward adopting instructional models that align with advancements in critical thinking and contemporary educational trends.

Furthermore, this study addresses a research gap in the teaching of critical reading skills, as a review of the literature revealed a scarcity of local studies exploring the use of the Pentagon Strategy as an effective tool for developing these skills among learners. Despite the growing importance of critical reading in fostering analytical thinking, instructional strategies aimed at improving it remain limited in terms of variety and effectiveness. Thus, the current study investigates the effectiveness of the Pentagon Strategy in enhancing critical reading skills by providing a practical framework to advance educational practices in this domain. This study is considered, to the best of the researchers' knowledge, one of the pioneering studies conducted in Jordan that addressed this topic.

2. Literature Review

2.1. Critical Reading

Numerous researchers (Shehata, 1986; Nusr, 2003; Al-Khaza'leh, 2011) agree that reading constitutes a fundamental means of transmitting human intellectual creations, serving as a vital gateway to the world of knowledge and the acquisition of experiences aligned with contemporary demands. Scholars such as Al-Ramini (2009), Lafi (2012), and Al-Khalifa (2017) assert that reading is one of the most prominent tools for acquiring knowledge and preserving cultural and civilizational heritage. The significance of reading lies in its role as the foundation for teaching language skills, contributing to the development of linguistic competence, enhancing pronunciation, improving

expressive quality, and ensuring accurate performance. Furthermore, reading is a rich and continuously evolving resource that strengthens linguistic skills (Abdel-Hamid, 1998).

Researchers and educators have approached reading from a perspective aimed at developing the human mind and fostering intellectual growth. Ashour and Miqdadi (2005) define reading as “a transformative process in which the reader interacts with the meaning and mechanisms of the text to comprehend or interpret it.” Al-Ramini (2009) describes it as a linguistic process requiring interaction with and understanding of written language. Lafi (2012) views reading as an integrated process encompassing cognitive, physical, and emotional dimensions, involving the recognition of written symbols, their pronunciation, comprehension, appreciation, critique, problem-solving, and enjoyment of the content.

Reading is not merely a mechanical process following predetermined steps; it is a conscious activity that demands comprehension, analysis, interpretation, critique, and evaluation of the text. The primary objective is to empower learners to educate themselves, understand their surrounding environment, and effectively address challenges they may encounter (Madkour, 2015).

Al-Sayyid (2017) notes that reading skills are divided into two main dimensions: the physiological, which involves recognizing and accurately pronouncing letters and words, and the cognitive, which includes understanding the meanings of texts, drawing conclusions, critiquing content, and engaging with it. Key critical reading skills include analyzing the author’s style in presenting ideas, identifying similarities and differences among presented facts, evaluating the accuracy of source documentation, observing the sequence of ideas, exploring aesthetic elements in the text, and approaching it objectively.

Critical reading is among the most prominent skills emphasized by global educational systems, aiming to enhance learners’ awareness and enable precise text comprehension. This skill contributes to problem-solving, fosters creativity, and strengthens critical thinking, encouraging constructive engagement with content (Al-Saliti, 2006). According to Albeckay (2013), critical reading improves readers’ abilities to analyze an author’s objectives, evaluate their ideas and evidence, promote intellectual independence, and avoid uncritical acceptance of unsubstantiated opinions.

Definitions of critical reading vary, underscoring its importance in understanding and critically analyzing texts. Lafi (2012) defines it as “the process of evaluating read material and forming judgments based on objective criteria,” while Al-Sayyid (2017) describes it as “an active thinking process in which the reader integrates personal experiences to construct new criteria and draw text-based conclusions.” Madkour (2015) defines it as “the ability to perceive relationships between the connotations of words and sentences, infer results, predict accurately, and form judgments.” Similarly, Abdel-Hamid (1998) views critical reading as “a cognitive activity aimed at understanding, analyzing, and judging the content of a text.”

Marscahall (2012) defines critical reading as “the process of extracting meaning from a text by reading beyond the lines.” This aligns with Habiballah’s (2002) classification of reading levels—reading the lines, between the lines, and beyond the lines—with critical reading situated at the “beyond the lines” level.

Based on these definitions, the researchers define critical reading as an analytical thinking process aimed at deeply understanding texts and evaluating their credibility and logic, enabling the reader to form an independent, evidence-based stance toward the text.

Critical reading is a complex process requiring a set of foundational skills that readers must master to enhance their critical thinking, deepen text comprehension, and engage effectively, thereby achieving the primary goal of teaching this type of reading. Lafi (2012) identifies several skills under critical reading, including examining and studying sources to identify the author’s biases and

tendencies, evaluating the evidence provided to support ideas, and determining the text's primary purpose, whether explicit or implicit. Readers must distinguish between facts and opinions by differentiating between statements expressing views and those representing established facts. Additionally, they should infer the author's objectives, assess the logic and validity of these objectives, and extract implicit meanings. Within this analytical framework, readers must form critical judgments about the author's ideas and the text's alignment with ethical and rational principles. Finally, readers should identify propaganda techniques the author may use to persuade or influence through implicit meanings and hidden ideas.

Critical reading skills are key components of critical thinking, enhancing teachers' and learners' ability to interact with texts more effectively and objectively. Al-Abdullah (2004) states that these skills include distinguishing between facts and personal claims, differentiating between relevant information and unrelated assertions, evaluating information credibility, detecting ambiguous claims, identifying author bias, and assessing the strength of evidence. Badran (2008) categorizes critical reading skills as abilities to infer implicit meanings, distinguish between main and secondary ideas, differentiate between strong and weak arguments, identify the author's motives, evaluate the title's accuracy, and judge the evidence and examples provided.

Al-Suweifi (2023) posits that critical reading skills encompass foundational skills supported by sub-indicators clarifying their characteristics. Key skills include discrimination, which involves distinguishing between main and secondary ideas, relevant and irrelevant content, and facts versus opinions; inference, which includes deducing the author's purpose, extracting the main idea, uncovering implicit meanings, and identifying potential outcomes; problem-solving, which entails recognizing evidence supporting the issue, understanding relationships between ideas, and distinguishing between logical and illogical interpretations; literary appreciation, which involves identifying aesthetic elements and the author's genuine emotions; comparison, which includes comparing expressions with similar meanings and selecting the best sources; resistance to propaganda, which involves recognizing persuasive tactics and analyzing the author's motives; and evaluation and judgment, which includes assessing the logical sequence of ideas, evaluating the author's sources, judging the title's accuracy, and assessing the author's objectivity.

The National Center for Curriculum Development in Jordan (2024) has established an educational framework for reading skills, emphasizing the nature of Arabic language learning by focusing on students' reading abilities. This framework aims to enhance learners' capacity to understand and analyze standard Arabic texts, including both auditory and written forms, and to enable students to engage with diverse texts and build linguistic competencies in reading. It highlights key standards for the Arabic language curriculum for tenth-grade students, notably comprehension and analysis of texts, as well as appreciation and critique of read material.

Critical reading enables learners to construct logical thinking, aiding in text critique. Training in critical reading skills improves learners' ability to express opinions, fosters freedom of thought and creativity, and enhances analytical capabilities. The International Assessment Center for Educational Progress in the United States emphasizes the importance of directing school reading programs to achieve key objectives, including improving learners' critical thinking, analysis, interpretation, and ability to construct arguments and evidence (Lafi, 2012). Critical reading also helps readers organize information, solve problems, make decisions, promote clear thinking, and draw conclusions, thereby contributing to personality development and enhancing abilities in inference, analysis, discrimination, and judgment (Al-Zuhairi & Al-Saadi, 2020).

Based on educational classifications and the Arabic language curriculum framework detailing critical reading skills, the researchers selected four core skills to develop critical reading proficiency: discrimination, which requires readers to engage with the text by posing questions to identify the

author's purpose, main and secondary ideas, distinguish between facts and opinions, relevant and irrelevant ideas, and causes and effects; analysis, which involves identifying the text's emotional impact on the reader, organizing the text using precise structures (e.g., chronological order, comparisons), recognizing the main issue, and analyzing the text's technical and aesthetic features; inference, which aims to understand implicit and explicit cues, extract evidence supporting the author's stance, deduce the writing's purpose, and identify lessons learned; and judgment formation, which entails evaluating the text for author bias, objectivity, sufficiency of evidence, language quality, and suitability for the intended audience.

2.2. The Pentagon Strategy

Acquiring critical reading skills necessitates the use of strategies that foster critical thinking and other higher-order thinking skills. The Pentagon Strategy (PG) is a modern instructional approach suitable for this purpose. The strategy originated in 1992 with Richard Evan Schwartz, who drew inspiration from the pentagonal structure of the Pentagon, the U.S. Department of Defense headquarters, to develop the Pentagon map for teaching mathematics, initially applying it in this field (Ovenhouse, 2019).

The term "Pentagram" derives from two components: "penta," meaning five-sided, and "gram," implying circular, together denoting a five-sided circular design. It is a contemporary teaching strategy defined as a structured plan with systematic, sequential, and purposeful procedures aimed at problem-solving. This approach enhances individuals' awareness and insight in thinking processes, decision-making, and idea evaluation through reflection, assessment, and mental activities before, during, and after addressing a problem (Abdel-Aziz & Morsi, 2017). Hu et al. (2017) describe it as a five-sided circular design based on the questions "Why?" and "How?" to derive interconnected answers.

As a modern teaching strategy, the Pentagon Strategy seeks to cultivate higher-order thinking skills, such as planning, monitoring, and evaluation, while establishing an innovative educational system. It is applicable across all educational and university levels and various disciplines (Abdel-Aziz, 2016). Abdel-Aziz and Morsi (2017) outlined the phases of the Pentagon Strategy, detailing the associated skills, indicators, and questions as follows:

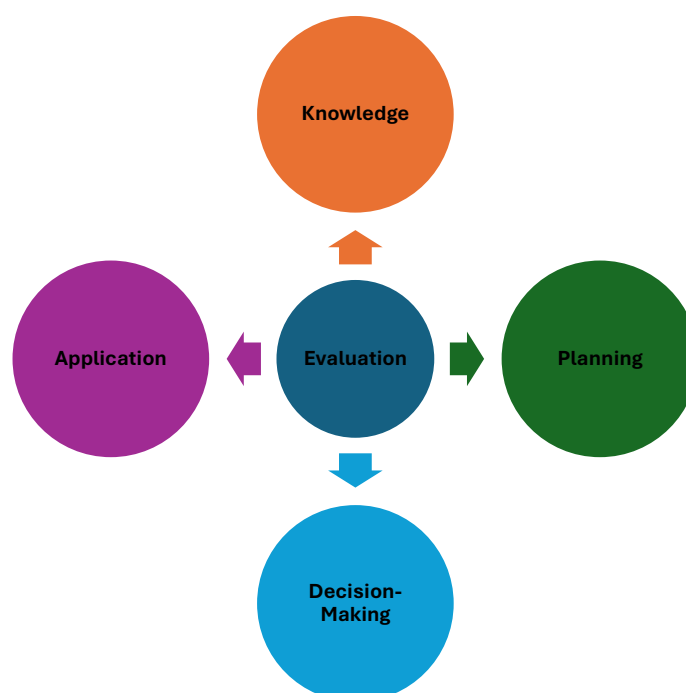


Figure 1. The Phases of the Pentagon Strategy

First: Knowledge

This phase emphasizes knowledge and comprehension skills, where learners aim to understand facts and interpret available information. It requires processing information through intellectual comprehension and systematic analysis, including identifying the task's purpose, collecting data, and linking it logically to ensure comprehensive understanding. Key indicators include clearly defining and classifying information, comparing data, analyzing relationships, and fostering curiosity for further exploration. Learners pose self-directed questions to clarify ambiguities and leverage sensory and cognitive perception. Questions include: What is the task's objective? What skills are required? How can I address challenges?

Second: Planning

The planning phase focuses on preparing a preliminary plan to achieve objectives before practical activities. Learners define the task's primary goal, understand the subject's characteristics, identify prior experiences, manage time effectively, and optimize available information. Indicators include analyzing and organizing situations logically, creating mind maps to sequence ideas, and prioritizing critical activities. Relevant questions are: What is the task's objective? What information is essential? How can potential problems be addressed? What is the adequate time for completion?

Third: Decision-Making

This phase involves organizing plans within interconnected relationships to facilitate sound decision-making. Learners set priorities, create timelines, list activities, and propose solutions to challenges. It is critical to manage priorities, make decisions based on resources, and consider alternatives when ideal solutions are unattainable. Key questions include: What do I want to learn? What is the appropriate decision? What are the expected outcomes?

Fourth: Application

In the application phase, the most effective possibilities from prior planning are implemented through methodical procedures to achieve objectives. Learners actively organize ideas and activities, verify learning resources, and distribute them appropriately. Indicators include recall and fluency in applying information and flexibility in adapting to changes. Questions reflecting self-awareness include: How can I achieve my goal using the plan? Is my method appropriate?

Fifth: Evaluation

The evaluation phase assesses outcomes against predefined objectives, reviewing what was learned and determining task success. It involves making informed judgments about decisions based on objective criteria, continuous self-criticism, and periodic progress assessment. Questions include: Was the task executed as planned? Was comprehensive understanding achieved? How can goal attainment be verified? Were responses logical?

According to Dolk and Granat (2012), the "Pentagram Strategy" is composed of five fundamental dimensions. The first dimension, "Intervention," entails a precise identification of the problem and the selection of the most suitable method for resolving it while drawing upon existing knowledge to inform the problem-solving process. The second dimension, "Intelligence," involves the systematic gathering and scientific analysis of data relevant to the problem, enabling the formulation of solutions grounded in empirical evidence. The third dimension, "Imagination," emphasizes the generation of creative and original ideas that pertain to the task, thereby encouraging innovative thinking beyond conventional frameworks. The fourth dimension, "Interaction," highlights the value of engaging in dialogue and exchanging viewpoints with others, which contributes to more comprehensive and multidimensional solutions. Lastly, the fifth dimension, "Integration," refers to the unification of diverse types of knowledge and the establishment of interconnections among them, fostering a deep

and coherent understanding of the creative process and facilitating the development of well-rounded, integrative knowledge.

The Pentagon Strategy represents a dynamic instructional model that evolves from basic engagement to higher-order cognitive construction, emphasizing the integration of various instructional phases (Glick & Pylyavskyy, 2016). This strategy encompasses three core stages: pre-task, during-task, and post-task. The pre-task phase involves brainstorming, motivation, and reflective thinking, while the during-task phase centers on time management, the use of motivational language, and illustrative examples. The post-task phase encourages interactive dialogue, the extraction of key lessons, and the reinforcement of student self-confidence (Abdel-Aziz & Morsi, 2017).

Teachers play a critical role throughout each of these stages. Prior to the task, they are responsible for structuring the learning environment, clarifying learning objectives, and stimulating student interest. During the task, they offer guidance and provide relevant examples to facilitate understanding. Following task completion, teachers promote reflective dialogue and assess learning outcomes (Abdel-Aziz, 2016).

2.3. Previous Studies

The topic of the Pentagon Strategy appears to require further attention, as the researchers identified only a limited number of studies addressing its effectiveness in enhancing Arabic language skills, including critical reading. The researchers attribute this scarcity to the strategy's initial development within scientific disciplines, with its application later extending to humanities. For instance, Omar (2021) conducted a study to examine the effectiveness of a program based on the Pentagon theory in developing grammatical reasoning and rhetorical appreciation skills among student-teachers of Arabic at the Faculty of Education, Alexandria University. To measure the strategy's effectiveness, tests for grammatical reasoning and rhetorical appreciation were designed, revealing statistically significant differences favoring the experimental group.

Al-Sawalqah (2022) investigated the impact of teaching using the Pentagon Strategy on learning Arabic grammar and fostering positive attitudes toward it among first-year secondary female students. Employing an experimental design with experimental and control groups, pre-and post-tests in grammar were administered to 44 students (22 in each group). The results indicated statistically significant differences in favor of the experimental group.

Taha and Al-Masarawi (2022) explored the effect of the Pentagon Strategy on developing persuasive writing skills among second-year intermediate female students. The study sample consisted of 52 students, purposefully selected from Al-Shaheed Najm Abdullah School in Baghdad, divided into an experimental group (26 students taught using the Pentagon Strategy) and a control group (26 students taught conventionally). An essay-based persuasive writing test was used, and the study found a statistically significant difference favoring the experimental group.

Al-Asadi and Al-Fatlawi (2023) examined the impact of the Pentagon Strategy on deep comprehension among fifth-year literary stream students in Arabic language textbooks. The study sample included 61 students, divided into a control group (30 students taught conventionally) and an experimental group (31 students taught using the Pentagon Strategy). A deep comprehension test was employed, and the results showed the experimental group outperformed the control group in the post-test.

Harahsheh (2024) investigated the effect of teaching English using the Pentagon Strategy on achievement and critical thinking among seventh-grade female students in Jordan. Adopting an experimental design, the study involved 60 students, equally divided into experimental and control groups (30 each). A critical thinking test was used, and the results revealed statistically significant differences in favor of the experimental group.

The researchers note that prior studies on the Pentagon Strategy demonstrate its effectiveness in improving grammatical reasoning, rhetorical appreciation, persuasive writing, deep comprehension in Arabic, and critical thinking. The current study aligns with these studies in exploring the strategy's impact on enhancing student skills but distinguishes itself by examining its effectiveness in improving critical reading skills among tenth-grade female students in Jordan, marking it as the first study of its kind in Jordan the researchers' knowledge. In conclusion, while the previous studies provide valuable insights into the Pentagon Strategy's potential in improving various language skills, they leave several areas unexplored. These include the strategy's specific impact on critical reading in Arabic and its broader applicability across different educational settings. Further research is needed to address these gaps and resolve the contradictions surrounding the strategy's effectiveness in diverse learning environments.

2.4. Problem Statement

Critical reading skills are advanced linguistic competencies that foster analytical and reflective thinking, enabling students to engage consciously with written texts, distinguish between facts and opinions, evaluate arguments, and draw conclusions. Several studies have highlighted noticeable weaknesses in these skills among basic-stage students, attributing this to traditional teaching methods that emphasize memorization and superficial comprehension over analysis and critique (Haddad, 2022; Al-Balushiah, 2012). Consequently, there is a need for effective teaching strategies that enhance critical reading skills and suit the characteristics of learners at this age.

The Pentagon Strategy is a modern approach designed to stimulate critical thinking through five phases—knowledge, planning, decision-making, application, and evaluation—represented by the points of a pentagram. Some studies indicate that this strategy enhances text interaction and higher-order thinking skills (Mohamed, 2025). However, its application in Arab educational contexts, particularly in Jordan, remains limited, raising questions about its effectiveness in this setting.

The problem of the current study stems from the need to verify the feasibility of integrating critical thinking-based teaching strategies into Jordanian classrooms and their potential to develop students' abilities to analyze and evaluate texts, thereby enriching educational practices and promoting more effective teaching. Specifically, the study seeks to answer the following question: Are there statistically significant differences at the $\alpha=0.05$ level in the performance of tenth-grade female students on the critical reading skills test (collectively and individually) attributable to the teaching method (conventional vs. Pentagon Strategy)?

2.5. Importance of the Study

The importance of this study lies in its theoretical and practical contributions. Theoretically, it enriches educational literature on teaching reading skills by focusing on the Pentagon Strategy as a modern, innovative methodology for developing critical thinking, offering new insights into the relationship between instructional strategies and deep text comprehension. Practically, the study is directly relevant to teachers and curricula, providing an applicable model of the Pentagon Strategy for classroom use to enhance students' critical reading skills, thereby improving their analysis, interpretation, and evaluation abilities—essential competencies in light of modern education and future labor market demands.

2.6. Study Limitations and Constraints

The study was defined by specific limitations and constraints that shaped its framework and guided its outcomes. Spatially, it was confined to a random sample of tenth-grade female students at Princess Raya Bint Al-Hussein Secondary School for Girls, affiliated with the Mafraq District Directorate of Education in Jordan. Temporally, the study was conducted during the first semester of the 2024–2025 academic year. Regarding human scope, it included 80 tenth-grade female students from the

aforementioned school. The study's constraints were related to the critical reading skills addressed, the measurement tool used, its validity and reliability indicators, and the implementation procedures followed.

2.7. Terminological and Operational Definitions

The study includes the following concepts:

- **Pentagram Strategy (PG):** A term comprising “penta” (five-sided) and “gram” (circular), denoting a five-sided circular design. It is a modern teaching strategy defined as a structured plan with systematic, sequential, and purposeful procedures for problem-solving, enabling individuals to develop awareness and insight in thinking, decision-making, and idea evaluation through reflection and mental activities before, during, and after addressing a problem (Abdel-Aziz & Morsi, 2017). Operationally, it is defined as a modern active learning strategy involving five main phases—knowledge, planning, decision-making, application, and evaluation—specifically aimed at enhancing critical reading skills among tenth-grade female students during text interaction.
- **Critical Reading:** The process of evaluating and judging read material based on objective criteria, requiring the reader to understand implied meanings and logically interpret the text's content in relation to its knowledge framework (Lafi, 2012). Operationally, it is defined as a type of reading involving advanced thinking levels, represented by discrimination, analysis, inference, and judgment formation skills, to enhance tenth-grade female students' conscious interaction with texts, develop critical perspectives, and measured in this study by the scores obtained on a tailored critical reading skills test.
- **Tenth-Grade Female Students:** Female students enrolled in the final year of the basic education stage in public schools under the Jordanian Ministry of Education, aged between 15 and 16 years.

3. Methodology

3.1. Study Design

This study employed an experimental approach with a quasi-experimental design featuring experimental and control groups, selected for its suitability in investigating the effectiveness of the Pentagram Strategy (PG) in enhancing critical reading skills among tenth-grade female students in Jordan. Pre- and post-tests for critical reading were administered to both groups. The use of this methodology was driven by the educational environment's nature, where pre-existing classroom sections within the school system prevented random assignment of participants. Consequently, one section was designated as the experimental group and another as the control group (Shadish et al., 2002).

3.2. Study Subjects

The study was conducted with 80 tenth-grade female students from Princess Raya Bint Al-Hussein Secondary School, affiliated with the Mafrq District Directorate of Education, selected using an available sampling method. The sample was divided into two groups: an experimental group of 40 students taught using the Pentagram Strategy (PG) and a control group of 40 students taught using conventional methods. These groups were randomly assigned during the first semester of the 2024–2025 academic year.

3.3. Study Instrument

To achieve the study's objectives, critical reading skills targeted for improvement were first identified by referencing the tenth-grade Arabic language textbook, the Jordanian Arabic language curriculum framework (2024), and prior studies, such as Al-Balushiah (2012) and Al-Waeli and Abu

Al-Ruz (2011). Accordingly, four sub-skills were finalized: discrimination, analysis, inference, and judgment formation, each with four indicators, totaling 16 indicators. The test comprised 16 items, including multiple-choice and short-answer questions.

3.3.1. Content Validity of the Critical Reading Test

The test's content validity was verified by presenting its initial 20-item version to 10 evaluators, including faculty members specializing in Arabic language curricula and teaching methods at Jordanian universities, educational supervisors, and Arabic language teachers. They were asked to provide feedback on the critical reading skills test items. The evaluators suggested deleting one indicator per skill and rephrasing some items. Based on their recommendations, the final test consisted of 16 items evenly distributed across the four skills—discrimination, analysis, inference, and judgment formation—with a total score of 32 (two points per item).

3.3.2. Construct Validity of the Critical Reading Test

To assess the construct validity of the critical reading test, it was administered to an exploratory sample of 30 students from the study population, excluding the main study participants. Pearson correlation coefficients were calculated between each indicator's score and the total skill score, as well as between each indicator's score and the overall test score. Table 1 presents these results:

Table 1. Construct Validity Indicators of the Critical Reading Test

Skill Domain	Indicator	Correlation with Skill Total	Correlation with Test Total
Discrimination	1	.816**	.702**
	2	.920**	.872**
	3	.916**	.886**
	4	.910**	.834**
Analysis	5	.903**	.845**
	6	.910**	.885**
	7	.921**	.857**
	8	.848**	.861**
Inference	9	.933**	.900**
	10	.913**	.845**
	11	.908**	.881**
	12	.865**	.795**
Judgment Formation	13	.953**	.916**
	14	.910**	.851**
	15	.944**	.953**
	16	.740**	.659**

Table 1 shows that Pearson correlation coefficients between indicators and total skill scores ranged from 0.740 to 0.953, while correlations between item scores and the total test score ranged from 0.659 to 0.953. All values exceed the minimum acceptable threshold (0.30), indicating the construct validity of the critical reading test.

3.3.3. Reliability of the Critical Reading Test

To verify the reliability of the critical reading test, it was administered to an exploratory sample of 30 students from the study population, excluding study participants. The test-retest method was used to measure result consistency, re-administering the test to the same group after a two-week interval. Cronbach's alpha coefficients (internal consistency) were calculated for the four skills and the overall test. Table 2 presents these results:

Table 2. Reliability Indicators for the Critical Reading Test

Skill Domain	Test-Retest Reliability	Cronbach's Alpha (α)
Discrimination	.884**	.913
Analysis	.837**	.915
Inference	.739**	.925
Judgment Formation	.693**	.912
Total Score	.890**	.974

Table 2 indicates that test-retest reliability coefficients ranged from 0.693 to 0.884, and Cronbach's alpha coefficients for internal consistency ranged from 0.912 to 0.925. All values exceeded the cutoff point (0.70), confirming the reliability of the critical reading test.

Additionally, inter-rater reliability for short-answer items was assessed. Table 3 presents these results:

Table 3. Inter-Rater Reliability Indicators for the Critical Reading Test

Skill Domain	Inter-Rater Reliability
Discrimination	.845
Analysis	.837
Inference	.817
Judgment Formation	.812
Total	.856

Table 3 shows inter-rater reliability coefficients of 0.845 for discrimination, 0.837 for analysis, 0.817 for inference, 0.812 for judgment formation, and 0.856 for the overall test, all exceeding the cutoff point (0.70), further confirming the reliability of the critical reading test.

3.4. Equivalence of Study Groups

The equivalence of the experimental and control groups was tested using pre-test performance on the critical reading test, employing a t-test for independent samples. Table 4 presents these results:

Table 4. T-Test Results for Equivalence of Study Groups in Pre-Test Performance on the Critical Reading Test (Individual and Combined Skills)

Dependent Variable	Group	Mean	Standard Deviation	t-value	Degrees of Freedom	Statistical Significance
Discrimination	Control	3.26	1.59	-1.502	78	.137
	Experimental	3.86	1.95			
Analysis	Control	4.28	2.02	-.074	78	.941
	Experimental	4.32	2.48			
Inference	Control	4.20	1.66	1.180	78	.242
	Experimental	3.70	2.09			
Judgment Formation	Control	4.25	1.98	.936	78	.352
	Experimental	3.83	1.95			
Total (Critical Reading Score)	Control	16.00	4.84	.215	78	.830
	Experimental	15.72	6.45			

**Note: The total score for the critical reading test is 32.*

Table 4 indicates no statistically significant differences between the mean pre-test performance of the study groups for individual and combined critical reading skills, suggesting statistical equivalence between the groups before the intervention. Establishing group equivalence prior to the intervention is a critical step to ensure the study's internal validity, allowing subsequent statistical differences to be attributed to the experimental intervention without interference from potential external variables or initial group differences (Shadish et al., 2002).

3.5. Study Implementation Procedures

The study was executed through a series of methodical procedures to ensure the achievement of its research objectives, following these steps:

1. The theoretical framework and problem identification were established by reviewing relevant educational literature and prior studies, which facilitated precise formulation of the research problem and objectives.
2. The study instrument was developed by selecting appropriate reading texts for applying the Pentagon Strategy and constructing a preliminary critical reading skills test. This instrument was reviewed by a panel of specialized evaluators, and necessary revisions were made based on their feedback, resulting in the final version of the test.
3. The study sample was selected using available sampling method from Princess Raya Bint Al-Hussein Secondary School and divided into experimental and control groups. A pre-test for critical reading skills was administered to both groups to verify their equivalence.

4. Teacher training and instructional implementation were conducted. Four 45-minute training sessions were held for the teacher responsible for applying the Pentagon Strategy to ensure effective implementation. Subsequently, the experimental group was taught using the strategy, while the control group received conventional instruction over eight weeks, comprising 16 sessions.

5. After the instructional period, the critical reading post-test was administered to both groups. The resulting data were collected, test papers were scored, and the data were analyzed using the Statistical Package for the Social Sciences (SPSS) to address the study's research question.

6. Results discussion and recommendations were formulated through a comprehensive analysis of the findings, comparing them with prior studies, leading to recommendations and proposals to enhance teaching practices and develop students' critical reading skills.

3.6. Study Variables

The study included the following variables: The independent variable was the teaching method, with two categories: the Pentagon Strategy (PG) and the conventional method. The dependent variable was the mean performance of tenth-grade female students on the critical reading test, both collectively and for individual skills.

3.7. Statistical Analysis

To address the study's research question, a One-Way Analysis of Covariance (ANCOVA) was employed. Additionally, One-Way Multivariate Analysis of Covariance (MANCOVA) was used to analyze multiple dependent variables.

4. Results

The results address the research question: "Are there statistically significant differences in the performance of tenth-grade female students on the critical reading test, both collectively and individually, attributable to the teaching method (Pentagon Strategy (PG) vs. conventional)?" To answer this means and standard deviations for the pre-and post-test performance of study participants on the critical reading skills test (collectively) were calculated based on the teaching method variable (Pentagon Strategy (PG) vs. conventional). Table 5 presents these results:

Table 5. Means and Standard Deviations for Study Participants' Performance on the Critical Reading Test (Collectively) by Teaching Method

Group	Mean (Pre-test)	SD (Pre-test)	Mean (Post-test)	SD (Post-test)
Control	16.00	4.84	18.87	4.77
Experimental	15.72	6.45	27.00	3.14
Total	15.86	5.67	22.93	5.73

**Note: The total score for the critical reading test is 32*

Table 5 indicates an apparent difference in the post-test mean performance between the experimental and control groups on the critical reading test (collectively), favoring the experimental group. To test the statistical significance of this difference in post-test performance after adjusting for pre-test performance, a One-Way Analysis of Covariance (ANCOVA) was conducted. Table 6 presents these results:

Table 6. One-Way ANCOVA for Testing the Statistical Significance of the Difference in Post-Test Performance on the Critical Reading Test (Collectively) After Adjusting for Pre-Test Performance by Teaching Method

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	Statistical Significance	Eta Squared (Effect Size)
Pre-Test Performance	403.651	1	403.651	35.696	.000	.317
Teaching Method	1355.351	1	1355.351	119.857	.000	.609
Error	870.724	77	11.308			
Adjusted Total	2594.688	79				

Table 6 shows a statistically significant difference between the mean post-test performance of the experimental and control groups on the critical reading test (collectively), favoring the experimental group. The eta squared value (0.609) indicates that the teaching method accounts for 60.9% of the variance in performance on the critical reading skills test (collectively). To compare the adjusted and unadjusted means, standard deviations, and standard errors for the experimental and control groups' performance, Table 7 presents these results:

Table 7. Unadjusted and Adjusted Means, Standard Deviations, and Standard Errors for the Experimental and Control Groups on the Critical Reading Test (Collectively)

Dependent Variable	Group	Mean (Pre-adjustment)	SD (Pre-adjustment)	Mean (Post-adjustment)	SE (Post-adjustment)
Critical Reading Skills (Combined)	Control	18.87	4.77	18.82	0.532
	Experimental	27.00	3.14	27.05	0.532

Table 7 confirms a difference in performance between the experimental and control groups on the critical reading test (collectively), favoring the experimental group. Means and standard deviations for pre- and post-test performance on individual critical reading skills were also calculated based on the teaching method variable. Table 8 presents these results:

Table 8. Means and Standard Deviations for Study Participants' Pre- and Post-Test Performance on Individual Critical Reading Skills by Teaching Method

Critical Reading Skills	Group	Pre-Test Mean	Pre-Test Standard Deviation	Post-Test Mean	Post-Test Standard Deviation
Discrimination	Control	3.26	1.59	4.57	1.70
	Experimental	3.86	1.95	6.70	1.32
	Total	3.56	1.8	5.63	1.85
Analysis	Control	4.28	2.02	4.76	1.73
	Experimental	4.32	2.48	6.96	1.42
	Total	4.3	2.25	5.86	1.92
Inference	Control	4.2	1.66	4.63	2.06
	Experimental	3.7	2.09	6.53	1.34
	Total	3.95	1.9	5.58	1.97
Judgment Making	Control	4.25	1.98	4.90	2.02
	Experimental	3.83	1.95	6.80	0.93
	Total	4.04	1.97	5.85	1.83

Table (8) shows apparent differences in the post-test mean performance of the experimental and control groups on individual critical reading skills, favoring the experimental group. To test the statistical significance of these differences after adjusting for pre-test performance, a One-Way Multivariate Analysis of Covariance (MANCOVA) was conducted. Table (9) presents these results:

Table 9. One-Way MANCOVA for Testing the Statistical Significance of Differences in Post-Test Performance on Individual Critical Reading Skills After Adjusting for Pre-Test Performance

Source of Variance	Hotelling's Trace (F-Value, Significance)	Critical Reading Skill	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	Statistical Significance	Eta Squared
Pre-Test (Discrimination)		Discrimination	47.802	1	47.802	28.065	.000	.275
Pre-Test (Analysis)		Analysis	42.649	1	42.649	23.914	.000	.244
Pre-Test (Inference)		Inference	62.488	1	62.488	29.344	.000	.284
Pre-Test (Judgment Formation)		Judgment Formation	56.960	1	56.960	31.575	.000	.299
Teaching Method	F = 27.319, Sig = .000	Discrimination	62.854	1	62.854	36.902	.000	.333
		Analysis	88.303	1	88.303	49.514	.000	.401
		Inference	87.278	1	87.278	40.985	.000	.356
		Judgment Formation	72.418	1	72.418	40.144	.000	.352
Error		Discrimination	126.042	74	1.703			
		Analysis	131.972	74	1.783			
		Inference	157.583	74	2.130			
		Judgment Formation	133.494	74	1.804			
Adjusted Total		Discrimination	271.488	79				
		Analysis	292.988	79				
		Inference	309.387	79				
		Judgment Formation	267.200	79				

Table (9) indicates statistically significant differences in the mean post-test performance of the experimental and control groups on the four individual critical reading skills, favoring the experimental group. The eta squared values (0.333, 0.401, 0.356, 0.352) suggest that the teaching method accounts for 33.3%, 40.1%, 35.6%, and 35.2% of the variance in performance for discrimination, analysis, inference, and judgment formation, respectively. Thus, the effect size of the Pentagon Strategy (PG) on all critical reading skills is high, as per Al-Kilani and A-Shariefeen's (2016) criterion that an effect size above 16% is considered high.

5. Discussion

The study results revealed statistically significant differences in the performance of tenth-grade female students on the critical reading test, both collectively and for individual sub-skills, attributable to the teaching method employed. The experimental group, taught using the Pentagon Strategy (PG), outperformed the control group and taught conventionally on the post-test, with a mean score of 27.00 compared to 18.87 for the control group. A (60.9%) effect size indicates a substantial and exceptional difference between the performance of the experimental group and the control group in critical reading skills. This very high value reflects that the Pentagon strategy not only improves performance but leads to a significant transformation in skill level, demonstrating its very high effectiveness as an instructional tool. These findings underscore the effectiveness of the Pentagon Strategy in enhancing critical reading skills among students. The results align with previous studies (Omar, 2021; Al-Sawalqah, 2022; Taha & Al-Masarawi, 2022; Al-Asadi & Al-Fatlawi, 2023; Harahsheh, 2024), which collectively confirmed the strategy's effectiveness in enhancing students' performance across various skills, including reading skills.

The significant difference and effect size can be attributed to the Pentagon Strategy's effectiveness in stimulating critical thinking and fostering deep content comprehension. The strategy promotes higher-order thinking skills, including planning, monitoring, and evaluation (Abdel-Aziz, 2016). Through its five phases—knowledge, planning, decision-making, application, and evaluation—the strategy actively engaged students in the learning process, as it is an active learning approach that encourages collaboration and teamwork.

The Pentagon Strategy operates across three dimensions—before, during, and after the task—each fostering student motivation, breaking classroom monotony, and transforming the classroom into an interactive environment to achieve instructional objectives. This contributed to the development of critical reading skills among tenth-grade students. The strategy emphasized the teacher's role in fostering innovation, overcoming instructional challenges, and promoting competition and challenge among students, thereby enhancing their critical reading skills. In contrast, conventional methods may lack these elements essential for developing critical reading competencies.

The results also showed statistically significant differences in post-test performance favoring the experimental group across all four critical reading sub-skills addressed in the study: discrimination, analysis, inference, and judgment formation. These differences indicate that the Pentagon Strategy led to notable improvements in the experimental group's performance compared to the control group. Specifically, the strategy significantly enhanced discrimination skills by providing a structured visual framework that supports systematic text analysis. This framework enabled students to distinguish between elements such as facts and opinions, main and secondary ideas, relevant and irrelevant content, and causes and effects. By breaking texts into clear visual components, the strategy facilitated analysis and comprehension, making it easier to identify essential elements and secondary details.

Regarding analysis skills, the results suggest that the Pentagon Strategy substantially improved students' ability to identify the emotional impact of texts and understand their influence on readers.

The strategy's indicator of organizing texts according to precise structures helped students comprehend text organization, including introductions, bodies, and conclusions, enhancing their ability to analyze texts deeply. Additionally, the strategy enabled students to clearly identify the main issue in a text, improving their understanding of its primary purpose. The analysis of technical and aesthetic text features further empowered students to examine literary styles and linguistic structures, enriching their reading experience. Thus, the Pentagon Strategy effectively strengthened critical analysis skills, promoting systematic and deep text comprehension.

For inference skills, a significant improvement was observed in the experimental group's performance compared to the control group, indicating the strategy's effectiveness in enhancing this skill. The strategy improved students' ability to extract main ideas and meanings from texts by breaking them into specific components, facilitating the identification of evidence supporting the author's perspective, the text's primary objectives, and both explicit and implicit meanings. This structured approach enabled students to better understand the text's purpose and interpret the author's intended messages. Additionally, the strategy enhanced students' ability to derive lessons and insights from texts, deepening their critical understanding and improving systematic information extraction.

For judgment formation skills, the effectiveness of the Pentagon Strategy in improving this skill among tenth-grade students can be attributed to the interplay of cognitive, pedagogical, psychological, and social factors. Cognitively, the strategy organizes thinking processes by categorizing and analyzing information within a systematic framework, enabling students to distinguish between facts, opinions, evidence, and values, thus fostering logical and evidence-based judgments. Pedagogically, it provides an interactive learning environment that engages students in reflective practices and constructive discussions, stimulating critical thinking and reinforcing evaluation and decision-making skills. Psychologically, the strategy boosts students' confidence in their analytical abilities through a clear framework that reduces hesitation and promotes intellectual independence. Socially, collaborative learning groups offer opportunities to exchange perspectives and accept diverse viewpoints, refining judgment formation skills by developing the ability to evaluate alternatives and balance positions. Consequently, the Pentagon Strategy serves as an effective educational tool that integrates various learning dimensions to enhance this higher-order skill. Thus, the strategy proved not merely a tool for developing reading skills but a powerful means to foster critical and analytical thinking across multiple dimensions.

6. Conclusion and Recommendations

The study results demonstrated the effectiveness of the Pentagon Strategy in enhancing critical reading skills, including discrimination, analysis, inference, and judgment formation, compared to conventional methods. This suggests that employing innovative teaching methods can significantly improve students' performance in higher-order critical thinking skills. Based on these findings, the researchers recommend that those responsible for developing Arabic language curricula in the Jordanian Ministry of Education incorporate the Pentagon Strategy into teaching Arabic language skills, particularly critical reading. Additionally, they suggest conducting training courses for teachers on using this strategy to develop critical reading skills and their associated indicators. The researchers also advocate for future studies to explore the strategy's effectiveness in enhancing various Arabic language skills, contributing to the development of teaching methods and the improvement of linguistic learning outcomes.

Declarations

Author Contributions. All authors have read and approved the published version of the article.

Conflicts of Interest. The authors declare no conflict of interest.

Funding. The authors received no financial support for this research.

Data Availability Statement. The data can be supplied by the corresponding author upon request.

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