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Revolutionizing Arabic Language Learning: The Effect Of Programmed Instruction On Eighth Graders In Jordan

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Abstract

This study aimed to investigate the impact of teaching the Arabic language using programmed instruction on the achievement and attitudes of eighth-grade students in Jordan. To achieve this objective, an achievement test consisting of 25 items and an attitude scale towards the Arabic language consisting of 39 statements were prepared. Additionally, two units from the eighth-grade Arabic language textbook were designed according to programmed instruction. The study sample comprised 72 students selected intentionally during the second semester of the 2022/2023 academic year. The sample was divided into two groups: a control group of 33 students taught using the traditional method and an experimental group of 33 students taught using programmed instruction. The study results revealed statistically significant differences between the mean scores of the students in the post-achievement test, attributed to the teaching method, in favor of the experimental group. Similarly, the study showed statistically significant differences between the mean scores of the students on the attitude scale, attributed to the teaching method, in favor of the experimental group. The study recommended programming and designing some Arabic language lessons at all educational levels for use in teaching through programmed instruction.

Keywords: *Programmed Instruction, Attitude, Arabic Language, Achievement.*

INTRODUCTION

As every social change is accompanied by educational change, it has become essential for education to address this new technological and informational revolution by employing computers for various educational purposes (Deek et al., 2025). These changes have led to the emergence of multiple patterns and methods of teaching and learning, including programmed learning (Collins & Halverson, 2018).

The Arabic language, one of the important languages that has evolved and place, has seen developments in its teaching methods and approaches. Those interested in the Arabic language have pursued numerous studies that have led to the development of these methods and approaches, aiming to keep pace with scientific and technological advancements in the age of the scientific and information revolution. In Arabic language teaching, the richness of knowledge and personal strength alone are insufficient to convey information to students' minds with a clear and engaging understanding, unless the teacher understands the technical aspects that assist in teaching and utilizes resources such as computers and the internet (Alhirtani, 2020). When the goals of using computers and the internet are achieved, it is essential to instill a positive attitude among teachers regarding the importance and benefits of these technologies in education. Teachers urgently need specific tools in teaching that bring information closer to the students' minds.

Using programmed instruction through a computer in this study, aimed at overcoming difficulties in learning Arabic, which is the focus of this study, in addition to improving students' attitudes towards the subject, represents a cornerstone for studies seeking to use modern technology. This includes enhancing learning motivation towards inquiry-based learning, problem-solving, creativity, and equipping them with the skills needed for the future, particularly 21st-century skills such as self-directed learning, self-assessment, and communication. This has led to the development of teaching methods that keep pace

with and embrace these advancements, linking modern technology with learning and education (Bello, Oludele, & Ademiluyi, 2018).

Globalization and the rapid growth of technology have posed a significant challenge to the education system worldwide, as learning has begun to shift from group instruction to more individualized teaching with absolute flexibility to provide learning opportunities for all willing members of society, regardless of their age, gender, or race (Atoum et al., 2024; Kareem, 2015). To facilitate the achievement of educational goals and objectives for comprehensive growth and development, the recent trend of the information revolution and the knowledge explosion in technology has enabled changes in the education system of every country (Alshaketheep et al., 2024). Technological tools are used in teaching and learning to simplify the learning process (Almomani et al., 2023). This has necessitated a shift from teacher-centered education to individualized or learner-centered education. The rapid growth of technology and its use in classrooms has enabled learners to access optimal opportunities for receiving education. This is due to the efforts of teachers and school administrations who have focused on using technology to enhance education, proving its effectiveness and efficiency (Ghavifekr & Rosdy, 2015).

The use of technological facilities in teaching and learning is very beneficial for educational management and effective content delivery. For many years, various machines and tools have been invented to facilitate activities that individuals are supposed to perform (Alzboun et al., 2023). The most influential technology in the past millennium has been the introduction of a machine called the computer (Ayres, 2021).

In the age of cognitive explosion in which we live, where knowledge and its sources have diversified, including printed and digital newspapers, satellite channels, online social networking sites, and amidst population explosion, which has led to an increase in recipients, learners, and students seeking knowledge in various professional and non-professional fields, there was a necessity for methods, strategies, and approaches that accommodate this information revolution permeating all aspects of life. Among the most important means of transmitting this knowledge are languages, because language is considered one of the fundamental components of human civilization, through which the history of nations is conveyed. It serves as a communication system among members of society and represents identity and culture (Mudkor, 2006).

At present, computers are used to create a conducive learning environment for learners. The instructions provided on computers are interactive, illustrative, and rich in information through aesthetic animations, sound, demonstrations, and annotated images. Computers facilitate individualized learning and create a student-friendly environment, providing quick, instant feedback and motivation (Al-Zaidiyeen, Mei, & Fook, 2010). Computers offer various activities that enable a shift from teacher-centered to student-centered approaches, as well as the implementation of group instructions. They are among the most effective methods for providing individualized, flexible instruction along with self-learning. They cater to individual differences and allow for the delivery of instructions with ease. Moreover, they accommodate learners' mistakes without the risk of ridicule or embarrassment from peers or the teacher (Bennet, 2012).

The application of technological tools in language teaching and learning has led to the emergence of the concept of Computer-Assisted Language Learning (CALL), which involves the use of computers for language education. The extensive use of CALL began in the 1960s. Since then, the development of CALL programs has followed modifications in educational pedagogy. As teaching approaches shifted to audio-lingual and communicative methods, CALL software included more interactive simulations. Studies have indicated that the methods used in CALL affect the quality of language learning and teaching. However, CALL still lacks clear methodologies and theoretical foundations. Therefore, the use of computers in language teaching is not a new trend; it has been widely applied in most developed countries where technological tools are affordable and accessible. The use of computers in language teaching has significant educational benefits as it makes learning highly enjoyable (Chhabra & Dhamija, 2013).

Bobadilla (2021) indicates that the development and use of computers in teaching have led to the creation of numerous terms such as Programmed Instruction (PI), Computer-Based Instruction (CBI), Computer-Based Learning (CBL), Standard-Based Approach, Web-Based Learning (WBL), and Computer Assisted Instruction (CAI). Initially, these were all considered educational facilities, but later they gained recognition as useful methods for teaching and learning. They can be used for gaming and achieving learning objectives by providing individualized learning with maximum flexibility. Among all self-learning approaches, Computer Assisted Instruction (CAI) has been widely used due to its flexibility and extensive nature.

Purpose of the Study:

To successfully plan and implement technology in language teaching classrooms, teachers and learners must clarify their objectives. Additionally, all complexities and difficulties, such as cultural, structural, and infrastructural issues, should be considered for integrating technology into the curriculum (Harasim, 2017). Technology has become an integral part of people's lives over the past decades. It underlies a wide range of forms of communication among people worldwide, making the world a global village. It also enhances linguistic communication, leading many to feel the need to improve their communication skills. Many learners have engaged in initiating new relationships and communicating with people from diverse cultural backgrounds. They also pursue their academic goals through the use of communication technologies. Among these goals, language learning has always been a primary concern for groups of people striving academically to achieve this objective. Various types of technologies can facilitate language learning, with Computer-Assisted Language Learning (CALL) being the most significant (Dala & Rani, 2013).

The integration of technology into our daily lives in the 21st century has transformed the shape of CALL programs. Various commercial entities, government and non-government organizations, universities, and institutes have started offering comprehensive language courses online, including programs and mobile applications (Alslaiti et al., 2024). Hwang, Hung, and Chen (2020) examined the effectiveness of a contextual gaming approach in enhancing grammatical performance and learning behaviors among EFL university students in Taiwan. Using a quasi-experimental design, the study compared an experimental group that learned grammar through a mobile game-based system with a control group that received conventional technology-assisted instruction. The findings revealed that the game-based method significantly improved grammar acquisition, particularly among low-achieving students. Behavioral analysis further indicated that high-achieving learners employed deeper learning strategies, whereas low achievers tended to rely on surface-level approaches. These results highlight the potential of context-aware, game-based learning environments to improve grammar instruction and address the needs of underperforming students. The authors recommend incorporating such innovative approaches into language education to foster engagement and narrow achievement gaps. The shortcomings of e-learning led to the creation of a new term called "blended learning," which combines online interactions with face-to-face sessions. Web technologies have gained popularity since 2004, providing diverse educational opportunities for language learners through socialization with native speakers of the target language via social networking sites and applications such as MySpace, Facebook, blogs, wikis, podcasts, vodcasts, Social Networking Services (SNS), and social media tools (Hubbard, 2014).

Recently, the emergence and widespread availability of portable and mobile devices such as smartphones and laptops have led to the formulation of a new term called Mobile Assisted Language Learning (MALL). Although some scholars believe that MALL differs from CALL (Al-Khayyat, 2019), there is no doubt that Information and Communication Technology (ICT) affects the way languages are taught and learned. It can now be said that CALL is a mid-life interdisciplinary field with a wealth of expertise from various parts of the world. In light of these advancements, it can be argued that CALL has reached a stage of stability in language education. Moreover, the use of language learning programs and applications has become a common social phenomenon (Papi & Hiver, 2020).

The field of Computer-Assisted Language Learning (CALL) involves using computers in the language learning process. Various materials can be taught through CALL programs, such as grammar, speaking, pronunciation, writing, and any other required skills. It can also provide feedback, which is a crucial feature in any educational practice. However, some teachers perceive this educational focus as a distraction from the true goals of education (Chapelle, 2008). Some also believe that simply providing students with a set of words, expressions, and other materials endlessly drilled in various exercises regularly does not necessarily constitute reliable language teaching (Liu, 2008).

The stakeholders in the educational process have given significant attention to academic achievement due to its importance in students' lives and its implications for crucial educational decisions. Academic achievement serves as a fundamental criterion in decisions related to students, curricula, and the educational process. It helps gauge students' progress in their studies and determines their allocation to different types of education. Furthermore, it plays a role in selecting educational programs that suit students. Academic achievement, both cognitively and emotionally, influences the formation of students' personalities and determines their academic and social status (Al-Saadi Al-Shammari, 2012).

The role of education has evolved beyond teachers and textbooks, with learners now taking an active part in acquiring knowledge through modern, engaging, and motivating methods. Programmed instruction, highlighted by Fullan (2015) as crucial for addressing cognitive and intellectual challenges, is significant in educational environments for its interactive approach, which fosters continuous study and student-educator interaction. This method not only enhances student engagement but also positively influences their inclination towards this type of education. Attitudes, which significantly impact individuals' educational and career choices, are essential in adapting education to individual needs. Education's critical function is to help youth develop attitudes that adapt to societal developments and challenges, while also changing undesirable attitudes that hinder growth. Studies have shown varying findings on attitudes towards language learning, particularly Arabic, influenced by the nature and delivery of educational programs and the role of educators. Teachers, as noted by Ya'qut (2017), play a pivotal role in shaping students' attitudes towards learning Arabic. This study aims to evaluate the impact of programmed instruction on Arabic language learning for eighth graders, considering how this innovative method can enhance learning outcomes and student attitudes.

Based on the above, this study aims to investigate the impact of teaching Arabic language using programmed instruction on the academic achievement and attitudes of eighth-grade students towards the subject in Jordan.

Research Problem and Questions:

Through the researchers' review of various studies and problem-solving methods, which incorporate scientific deduction and induction using programming tools in education, it was found that programmed instruction may provide an optimal solution to address the prevalent shortcomings in Arabic language learning. Educational technology is an essential component of the integrated support system needed by students who experience decreased achievement rates, particularly in language skills. These students often suffer from a general weakness in various language skills. Supportive educational technology controls the presentation of desired linguistic material in terms of size, color, shapes, and images, thereby motivating students to perform better. Devices, tools, materials, and educational means work to raise achievement rates among these students and reduce the difficulties and obstacles they face in their learning process (Metwally, 2022).

The justification for the current study is supported by several studies indicating students' weaknesses in Arabic language skills in general education. Studies by Ritonga, Widodo, and Nurdianto (2021) and Qureshi, Mahdiyyah, Mohamed, and Ardchir (2022) emphasized the necessity of employing technological innovations and modifying attitudes towards them by raising awareness of their importance and ways to benefit from them in the educational process.

In summary, the research problem is defined by the need to evaluate the effectiveness of programmed instruction in improving the achievement of eighth-grade students in Arabic language learning and their attitudes towards it. This leads to the following primary research question:

Within the framework of this primary research question, the study aimed to answer the following two questions:

1. Are there statistically significant differences at the significance level (α=0.05) in students' achievement attributed to the teaching strategy (impact of programmed instruction on achievement versus traditional method)?
2. Are there statistically significant positive attitudes at the significance level (α=0.05) in the mean scores of the experimental group on the attitude scale towards programmed instruction?

The significance of this study lies in its contributions to both theoretical and practical aspects of education. The research translates global and local educational trends towards integrating technology into the classroom by focusing on one of the latest technological tools: programmed instruction. It addresses the general weaknesses and negative attitudes towards Arabic language learning that arise from traditional teaching methods, aiming to evaluate the effectiveness of computer-based programmed instruction compared to conventional approaches. By exploring this innovative method, the study seeks to offer solutions to these issues and leverage the benefits of programmed instruction. Additionally, it highlights the potential role of this method in enhancing students' academic performance and attitudes towards Arabic, potentially aiding Arabic language teachers in refining their teaching and assessment strategies. Furthermore, the study may pave the way for future research on the application of programmed instruction across various educational stages and subjects, thereby expanding its impact on educational practices.

LITERATURE REVIEW

After reviewing previous studies and their indexes directly or indirectly related to this study, many researchers, both Arab and international, have examined the impact of programmed instruction on students' achievement in the Arabic language, recognizing its importance. Dahlan (2014) aimed to determine the effect of using an interactive whiteboard on academic achievement and retention of learning among seventh-grade students in Arabic and their attitudes toward it. To achieve the study's objectives, the researcher used the quasi-experimental method, with the study tools being an achievement test and an attitude scale. The sample consisted of 70 seventh-grade students, equally divided into a control group and an experimental group. The study results showed statistically significant differences between the mean scores of the students in the experimental and control groups on the post-achievement test, the deferred test, and the attitude scale, in favor of the experimental group.

Ali's study (2017) aimed to identify the impact of programmed instruction on academic achievement at the basic education stage. The researcher used both the descriptive analytical method and the quasi-experimental method to achieve the study's objectives. The study was conducted in East Nile Province, Khartoum State, Sudan. The study sample consisted of 106 students from Al-Waha Basic Schools, divided into two groups: an experimental group of 53 students who were taught using programmed instruction, and a control group of 53 students who were taught using traditional teaching methods. To answer the research questions, the researcher designed a programmed text in the Arabic grammar curriculum for seventh-grade students. The study tool was an achievement test administered to the experimental group students who studied using programmed instruction. The results showed differences in students' achievement attributed to the teaching method, in favor of the experimental group.

Mahmoud (2017) conducted a study aimed at understanding the impact of using programmed instruction in learning Arabic grammar rules for second-year secondary students (specifically the topic of "weak verbs and substitution") using computers compared to traditional methods. The researcher followed the experimental method, and the study sample consisted of 40 female students from Al-Barari Model Secondary School for Girls. The sample was divided into two equivalent groups: one studied the educational material using programmed instruction with computers, and the other studied using traditional methods. The study reached several results, the most important of which were: the existence of statistically significant differences between the experimental and control groups in post-test achievement in favor of the experimental group using programmed instruction with computers, and statistically significant differences between the two groups in delayed test achievement in favor of the experimental group.

Khallaf (2021) conducted a study aimed at understanding the impact of the flexibility and clarification strategies on achievement, improving linguistic intelligence skills, and attitudes towards the Arabic language subject among vocational education students in Iraq. The study adopted a quasi-experimental method, applying it to experimental and control groups of vocational education students in Iraq. The researcher selected two sections of vocational education students in Iraq, with 30 students in the experimental group and 30 students in the control group. The educational program was applied to the experimental group, while the control group was taught using traditional methods. The educational program, linguistic intelligence test, and achievement test were used. After conducting a statistical analysis, the study reached the following results: there were no statistically significant differences at the level of 0.05 in the achievement scores attributed to the gender of the student.

As for the study conducted by Muqdadi (2021), it aimed to explore the effectiveness of employing programmed instruction using computers in teaching Arabic to the first three grades from the perspective of their teachers in the Kasbah of Irbid. The study was applied during the first semester of the 2020/2021 academic year, using the descriptive survey method. The study population consisted of Arabic language teachers for the first three grades in government schools in the Kasbah of Irbid. The sample included 181 teachers, selected through simple random sampling. The study concluded that the effectiveness of employing programmed instruction using computers in teaching Arabic was at a moderate level of approval.

Commentary on Previous Studies: Upon reviewing the previous studies, it can be said that researchers have successfully identified the theoretical framework that these studies contained, which helps in determining the theoretical framework for the current study. This includes defining its objectives, significance, sample selection, study methodology, preparation of tests and surveys in terms of domains,

the content of each domain, scale of response gradients, determining statistical methods, and presenting and interpreting the results.

Furthermore, it is evident that these studies unanimously agree on the importance of using programmed learning in teaching. Some studies have also emphasized a clear interest in programmed learning, considering it one of the most significant technological innovations in education. Additionally, there are studies that have addressed the effectiveness of programmed learning in enhancing academic achievement and developing reading skills and Arabic language grammar.

Due to the scarcity of research and studies focusing on eighth-grade students, particularly in the Directorate of Education in Irbid Governorate, regarding the use of programmed learning in teaching Arabic language, as known to researchers, there is a clear need for conducting this study.

METHODOLOGY

Programmed instruction is a teaching method where educational material is presented logically, sequentially, and in a segmented format, with each segment containing information followed by a stimulus in the form of a question. The program guides the learner independently toward learning without the teacher's intervention, except for guidance (Shahwan, 2017).

In this study, the researchers operationally define it as a self-learning method in which the learner interacts with the program to achieve educational and instructional goals. This method relies heavily on organizing educational content into a programmed booklet that divides the study topic into a series of sequentially ordered steps aimed at achieving specific foundational competencies. Each step is followed by a question that helps the learner express a response, and this response is followed by feedback. This feedback serves to correct the learning path for learners who made errors and to provide self-reinforcement for those who answered correctly.

The study utilized a quasi-experimental design involving two non-equivalent groups (non-equivalent groups design, pre-test and post-test design) to assess the achievement of eighth-grade students in Arabic language in Jordan. The experimental group received instruction using programmed learning methods aimed at enhancing academic performance, while the control group was taught using traditional methods. Additionally, a descriptive and analytical approach was employed to develop and administer a questionnaire assessing the attitudes of eighth-grade students in Jordan towards Arabic language, comprising 40 items measuring various study variables. The study population included all eighth-grade students in government schools within the education directorates of Irbid for the academic year 2022/2023. A purposive sampling method was used to select 66 students, randomly assigned into experimental and control groups, each consisting of 33 students, during the second semester of the academic year.

Study Boundaries:

The study is confined to the following boundaries:

- **Subject Boundaries:** The study is limited to examining the effectiveness of employing programmed instruction using computers in teaching Arabic to eighth-grade students and their attitudes toward the Arabic language in the Qasbah Irbid district.
- **Human Boundaries:** The study sample consists of eighth-grade students from public schools under the jurisdiction of the Education Directorates in the Qasbah Irbid district.
- **Spatial Boundaries:** All public schools under the jurisdiction of the Education Directorates in the Qasbah Irbid district.
- **Temporal Boundaries:** The study was conducted in the second semester of the 2022/2023 academic year.
- **Performance Boundaries:** The tools used in the study were prepared by the researchers. Therefore, the accuracy of the results depends on the validity and reliability of these tools, and the generalization of the study results is determined by the scope of achievement and attitudes toward the Arabic language addressed.

An achievement test was developed for eighth-grade students in Arabic language in Jordan, comprising 25 multiple-choice questions. It underwent validation by being reviewed by a panel of experts, supervisors, and teachers to ensure its reliability as an assessment tool. The responses from an external sample of 15 students were analyzed to compute the difficulty and discrimination indices for the test items. The consistency of eighth-grade students' achievement in Arabic language in Jordan was assessed using the test-retest method, where the test was applied to a separate group of 15 students outside the study sample and

then reapplied two weeks later. The Pearson correlation coefficient between the scores obtained on both occasions was 0.868, indicating a high degree of consistency. Additionally, the internal consistency reliability coefficient, calculated using the Kuder-Richardson-20 formula, was 0.871, affirming the reliability of the test for this study's purposes.

The "Assessment of Eighth-Grade Students' Attitudes towards Arabic Language in Jordan" scale, in its finalized version, comprises 39 items. The researcher utilized a five-point Likert scale to gauge the opinions of the study participants. Face validity of the tool was confirmed by presenting it to a panel of experts, including university professors, who provided feedback on its validity. The researcher addressed the experts' feedback, and an agreement rate of 80% among the experts was adopted (Robles-Medranda et al., 2018). The tool stabilized with 39 items to measure the study variables in its final form. Cronbach's Alpha test was employed to assess the reliability and internal consistency of the measurement tool in measuring the study's items.

To address the study's questions, several statistical procedures were employed. First, descriptive statistics such as means and standard deviations were used to analyze individual scores on the attitude and achievement scales within the experimental and control groups. Second, a two-way analysis of variance (ANOVA) was conducted to assess the significance of differences in mean scores between the experimental and control groups, both before and after the implementation of programmed instruction, to test the study's hypotheses. Finally, a t-test was employed to examine differences between groups in pre-test and post-test measurements. These statistical analyses were crucial in providing insights into the effectiveness of the intervention and validating the study's findings.

RESULTS AND DISCUSSION

First: Achievement in Arabic Language A) Results Related to the Equivalence of Study Groups: To ensure the equivalence of the study groups before the implementation of the study procedures regarding achievement, the pre-achievement test in Arabic was administered to the students in the study sample. A t-test was conducted on the pre-achievement test scores of the students in the study sample, which was administered before the experimental treatment began. Table (3) shows the results of this analysis.

Table (3) Results of the Independent Samples t-test to Detect Differences Between the Experimental and Control Groups on the Pre-Test for Eighth-Grade Students' Achievement in Arabic Language in Jordan

Skills on Pre-Test	Group	N	Mean	Std. Deviation	Degrees of Freedom	t-value	Statistical Significance
Arabic Achievement for Eighth-Grade Students in Jordan (Overall)	Experimental	-	-	-	64	0.308	0.759
	Experimental	-	33	12.212	-	-	
	Control	-	33	11.970	-	-	

It is evident from Table 3 that there are no statistically significant differences at the significance level (α=0.05) between the control and experimental groups in the pre-test measurement of eighth-grade students' achievement in Arabic language in Jordan. The "t" value was (0.308) with a statistical significance of (0.759). The significance level was greater than (α=0.05), indicating equivalence between the two groups in the pre-test measurement.

B) Results Related to the Study Groups' Outcomes After the Experimental Treatment

The following are the results related to the hypothesis that the study aimed to answer:

Hypothesis One: There are no statistically significant differences at the significance level (α=0.05) in the enhancement of achievement attributed to the teaching strategy (effect of programmed instruction on achievement, traditional method).

To answer this question, the means and standard deviations for the achievement of eighth-grade students in the Arabic language in Jordan were calculated according to the teaching strategy variable (effect of programmed instruction on achievement (experimental), traditional method (control)). Table (4) illustrates this.

Table (4) Means, standard deviations, and adjusted means for the achievement of eighth-grade students in Arabic language in Jordan according to the teaching strategy variable

Group	Pre-test		Post-test		Adjusted Performance		Number
	Mean	SD	Mean	SD	Mean	SD	
Effect of programmed instruction on achievement (Experimental)	12.212	3.324	18.152	3.447	18.098a	0.464	33
Traditional method (Control)	11.970	3.067	14.424	2.463	14.477a	0.464	33
Total	12.091	3.176	16.288	3.516	16.288a	0.328	66

It is observed from Table 4 that there is an apparent difference in the performance of the study sample in both groups (experimental and control) in the pre-test and post-test achievement of eighth-grade students in Arabic language in Jordan. Based on the apparent differences in the means related to the achievement of eighth-grade students in Arabic language in Jordan, it was decided to test the effect of the teaching strategy model on the performance of basic stage students in their achievement in Arabic language in Jordan. The analysis of covariance (ANCOVA) was used, considering the students' scores in the pre-test achievement as a covariate, and Table 5 shows these results.

Table (5) Results of the Analysis of Covariance (ANCOVA) to detect the differences between the experimental and control groups in the post-test, with the pre-test as a covariate, and the effect size measurement (Eta)

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F-Statistic	Significance Level	Effect Size
Pre-test Skills (Covariate)	126.172	1.000	126.172	17.738	0.000	0.220
Group	216.002	1.000	216.002	30.366	0.000	0.325
Error	448.131	63.000	7.113			
Adjusted Total	803.530	65.000				

From Table (5), it is observed that there are statistically significant differences ($\alpha = 0.05$) between the mean scores of eighth-grade students' achievement in Arabic language in Jordan attributed to the effect of the teaching strategy, with an F value of (30.366) and a significance level of (0.000), which is less than the statistical significance level ($\alpha = 0.05$). It is evident from the adjusted means in Table 5 that this difference was in favor of the experimental group based on the effect of programmed instruction on achievement, with the adjusted mean score for the experimental group being (18.098) while the adjusted mean score for the control group was (14.477). To determine the effectiveness of the programmed instruction on the achievement of eighth-grade students in Arabic language, the effect size was calculated using Eta squared (η^2), which was found to be (0.325). This means that 32.5% of the variance in the achievement of eighth-grade students in Arabic language in Jordan is due to the teaching strategy, specifically the programmed instruction, while the remaining variance is attributed to other uncontrolled factors.

It is evident from the previous statistical analysis related to the study questions that there are statistically significant differences between the mean scores of the experimental group and the control group in the post-achievement test, attributed to the teaching method. This confirms the presence of statistically significant differences in favor of the experimental group that studied the unit using the programmed instruction method.

Thus, we observe a positive effect of using the programmed instruction method on the achievement of eighth-grade students in Arabic language. The study results showed an improvement in the Arabic language achievement of students who studied using this method. We can say that if educational activities are designed in a way that can motivate students, attract their attention, and give them the ability to

control the educational activities, the learner will be able to reach knowledge independently through their interaction with these activities. This interaction achieves educational objectives more effectively than traditional teaching methods, positively reflecting on their achievement (Nabah, Hussain, Al-Omari, and Shdeifat, 2009).

These results can be attributed to the new teaching method used for teaching Arabic, instead of the traditional method. The study utilized educational software rich with multimedia elements, such as sounds, static and animated images, and texts. These elements transformed abstract scientific concepts, which are difficult for students at this age to understand and comprehend, into tangible concepts and vivid experiences. Students interacted with these elements in an engaging and exciting environment, controlling the pace of their learning according to their speed and learning ability. Additionally, the learning process could occur without the teacher's presence, at home, or outside of class time. This approach activates the concept of self-learning and individualized education advocated by modern educational theories. It allows students to assess themselves, receive immediate feedback, and get instant reinforcement for correct responses, which positively impacts their achievement.

In addition, students in the experimental group felt reassured and enjoyed the learning process. They could correct their mistakes without feeling embarrassed or afraid, due to the reuse of the educational software, unlike students in the control group. Simply using the new learning method acted as a motivator for them, igniting their drive to learn in an environment filled with challenges and competition to achieve better performance.

Researchers attribute this superior performance to the distinct advantages of programmed instruction compared to traditional teaching methods. These advantages include precise goal setting, breaking down tasks into manageable steps that increase the likelihood of success, enhancing learner motivation, and allowing learners to progress according to their capabilities without comparison to peers. The logical sequencing of steps also promotes logical thinking among learners. Additionally, within a single program, there is diversity in educational tools, enabling the presentation of stimuli through animations, static slides, images, audio recordings, and other media (Al-Ibrahimi & Hassan, 2023). These features create an engaging and stimulating learning environment, fostering student autonomy and immediate feedback, thereby positively impacting their academic achievement in Arabic language education.

The findings of this study align with those of Said et al. (2008) regarding individualized education, emphasizing the importance of individualized learning through programmed instruction. This method relies on self-knowledge across cognitive, emotional, psychological, and physical development, aiming to set goals based on each student's needs and allowing them to progress at their own pace. Similar to studies by Ali (2017), Mahmoud (2017), and Dahlan (2014), this study showed a statistically significant difference favoring the use of computers or programmed instruction over traditional methods. However, it contrasts with studies by Muqdadi (2021) and Khalaf (2021), which found no significant difference in student achievement based on teaching methods.

Secondly: Attitudes Towards the Arabic Language

a. Results Related to the Equivalence of Study Groups

To ensure the equivalence of study groups before implementing the study procedures regarding attitudes, a pre-attitude scale towards the Arabic language was applied to the students in the study sample. An Independent-Samples T Test was conducted to identify the differences in the average attitudes of eighth-grade students in Jordan towards the Arabic language between those who were taught using the programmed instruction method and those who were taught using the traditional method. Table 6 illustrates this

Table 6 Results of the Independent-Samples T Test to identify differences between the experimental and control groups on the pre-test for the achievement of eighth-grade students in Arabic language in Jordan

Skills on Pre-test	Group	N	Mean	Std. Deviation	df	t-value	Significance (p)
Achievement of Eighth-Grade Students in Arabic Language in Jordan	Experimental	33	12.212		64	0.308	0.759
	Control	33	11.970				

It appears from Table 6 that there are no statistically significant differences at the significance level (α=0.05) between the control and experimental groups in the pre-test for the achievement of eighth-grade students in Arabic language in Jordan, as the t-value was 0.308 with a significance level of 0.759. The significance level was greater than (α=0.05), indicating the equivalence of the two groups on the pre-attitude scale.

b. Results Related to Study Groups After Experimental Treatment

The following are the results related to the hypothesis that the study aimed to address:

Hypothesis 2: There are statistically significant positive attitudes at the significance level (α=0.05) in the average scores of the experimental group on the attitude scale towards programmed instruction. To answer this question, the means and standard deviations for the items of the "Attitudes of Eighth-Grade Students in Jordan Towards the Arabic Language" scale were calculated. Table 7 shows this.

Table 7 Means and Standard Deviations for items "Attitudes of Eighth-Grade Students in Jordan Towards

Rank	Item	Statement	SD	Mean	Grade
1	s17	I find it difficult to apply what I learn in	1.034	4.288	High
2	s26	I feel that learning Arabic language adds	0.834	4.167	High
3	s8	I suffice with the prescribed textbook in	0.959	4.136	High
4	s7	Arabic language classes interest me.	0.959	4.136	High
5	s19	I feel bored in Arabic language classes.	1.074	4.121	High
6	s9	Arabic language classes provide me with	0.920	4.121	High
7	s20	Arabic language classes enable me to	0.869	4.121	High
8	s25	I would be pleased if Arabic language were	0.844	4.106	High
9	s18	I enjoy constantly reading various Arabic	0.953	4.015	High
10	s5	I borrow books related to Arabic language	1.038	4.000	High
11	s3	I want to reduce Arabic language classes.	1.038	4.000	High
12	s37	I do not like participating in Arabic	0.841	3.970	High
13	s11	I apply what I learn in Arabic language	0.976	3.970	High
14	s27	I believe it is possible to learn without	0.859	3.970	High
15	s1	Increasing Arabic language classes helps me	1.176	3.970	High
16	s12	I am happy when Arabic language class is	1.007	3.970	High
17	s29	I find Arabic language to be an easy and	1.100	3.924	High
18	s24	I eagerly follow my Arabic language	0.836	3.909	High
19	s21	I find Arabic language to be quickly	1.034	3.909	High
20	s35	I believe Arabic language is necessary in our	1.077	3.909	High
21	s15	I find it difficult to solve questions related	1.054	3.894	High
22	s34	I benefit from Arabic language in studying	0.920	3.879	High
23	s4	I am troubled by the multitude of Arabic	1.094	3.864	High
24	s38	I eagerly follow programs discussing Arabic	1.145	3.833	High
25	s22	I feel happiness in learning Arabic	1.158	3.833	High
26	s10	I find learning Arabic language difficult.	1.149	3.818	High
27	s23	I believe learning Arabic language is	0.932	3.803	High
28	s28	I prefer Arabic language classes over other	1.056	3.803	High
29	s36	I would like to become an Arabic language	1.089	3.788	High
30	s32	I like Arabic language because it is the	1.107	3.773	High
31	s13	I can explain any Arabic language lesson to	0.912	3.758	High
32	s16	I want to know more about Arabic	1.001	3.727	High
33	s30	I feel that Arabic language rules are not	1.134	3.712	High
34	s6	Few students succeed in Arabic language.	1.209	3.652	Moderat
35	s2	I eagerly await Arabic language classes.	1.289	3.591	Moderat
36	s39	I do not like participating in discussions	1.140	3.485	Moderat
37	s31	I believe Arabic language is important only	1.243	3.485	Moderat
38	s33	I believe Arabic language helps learners	1.212	3.288	Moderat
39	s14	I find it difficult to apply what I learn in	1.253	3.242	Moderat
		Attitudes of Eighth-Grade Students in	3.870	0.552	High

the Arabic Language."

Table (7) shows the means and standard deviations for the items related to "Eighth-grade students' attitudes towards Arabic language in Jordan." The overall range is between (3.242 - 4.288). The highest

mean was for item (17), which states, "I am very annoyed by Arabic language classes because of the variety of skills and numerous activities," with a mean of 4.288, indicating a high degree. The second highest mean was for item (26), which states, "I think learning Arabic does not add anything to my knowledge," with a mean of (4.167), also indicating a high degree. The lowest mean was for item (14), which states, "I find it difficult to apply what is learned in Arabic language classes to everyday life," with a mean of (3.242), indicating a moderate degree. The overall mean for the domain "Eighth-grade students' attitudes towards Arabic language in Jordan" was (3.870), indicating a high degree.

To reveal the differences in the means of eighth-grade students' attitudes towards Arabic language in Jordan between those who studied using the effect of programmed instruction on achievement and those who studied using the traditional method, a t-test was used to detect the differences in means of attitudes towards the Arabic language according to the teaching strategy (effect of programmed instruction on achievement, traditional method). Table (8) illustrates this.

Table (8) Results of the t-test to detect differences in the means of attitudes towards the Arabic language according to the teaching strategy (effect of programmed instruction on achievement, traditional method):

Domain	Group	N	Mean	Standard Deviation	t-value	Degrees of Freedom	Statistical Significance
'Eighth-grade students' attitudes towards Arabic language in Jordan" overall	Experimental	33	4.294	0.271			
	Control	33	3.447	0.420	9.738	64	0.000

Table (8) shows statistically significant differences at the significance level (α≤0.05) in "Eighth-grade students' attitudes towards Arabic language in Jordan" overall according to the teaching strategy (effect of programmed instruction on achievement, traditional method). The t-value was (9.738) with a statistical significance of (0.000). Since the significance level was less than (α=0.05), it is statistically significant. The differences favored the experimental group that used the effect of programmed instruction on achievement. Thus, the results indicated statistically significant differences in eighth-grade students' attitudes towards Arabic language attributed to the teaching strategy (programmed instruction and traditional method). The difference was in favor of the students who learned through programmed instruction compared to their peers who learned through the traditional method.

Researchers explain that the higher mean scores of the experimental group students compared to the control group students on the attitude scale are due to the abundance of movements, stimuli, video sounds, colors, and various activities, as well as the variety of reinforcements accompanying the activities included in programmed instruction. Additionally, the role of programmed instruction in eliminating boredom from students' minds through educational situations provided enjoyment and excitement during learning, increasing students' self-confidence. This developed a positive feeling towards the Arabic language due to the diversity in teaching methods and the interaction between the student and the device by repeating the lesson multiple times and frequent reinforcement and confirmation of the answers.

This result aligns with many studies that measured attitudes towards computers and the subject matter, including Madhkur's study (2018), Al-Atyawi's study (2021), and Cheng and Tsai's (2020) study. These studies found differences in favor of the group that studied using computers regarding their attitude towards the subject. Additionally, Sahin and Yilmaz's (2020) study highlighted the development of visual thinking skills and attitudes towards mathematics, and Bitar's (2018) study corroborates these findings.

The superiority of the experimental group may also be attributed to the programmed instruction, which provided students with an appropriate environment for interaction freely and easily. This led to the development of positive tendencies, such as self-esteem, increased self-confidence, a sense of reassurance, psychological comfort, accompanying reinforcement, and respect for different viewpoints. These factors fostered principles of freedom, frankness, objectivity, flexible cooperation with peers, and self-reliance in learning (self-directed learning), thereby enhancing their attitudes towards the Arabic language compared

to the traditional method that limits student activity, especially in an atmosphere of silence, stillness, and strict discipline, generally devoid of reinforcement.

This result can be explained by the characteristics of programmed instruction that encouraged students to engage in learning Arabic, stimulated their memory, and provided opportunities for cooperation, planning, organization, creativity, and interaction with the content of the units flexible. This explanation is consistent with what was indicated by Qawas's study (2006) and Dahlan's study (2014), which showed that technology-based education helps improve achievement, positively reflecting on the attitudes of the experimental group students.

The experimental group's superiority over the control group in the eighth-grade students' performance on the attitude scale towards the Arabic language can be attributed to the fact that the information and ideas were visually observed rather than abstract, as in the traditional method. The information was associated with images, colors, or shapes, making it more stimulating, attractive, and enjoyable. This led to the formation of positive attitudes among eighth-grade students towards learning Arabic, aligning with the second question of this study and the results it reached.

Study Recommendations

In light of the results of the study, the researchers recommend the following:

1. **Encouraging Teachers**: Motivate teachers to use programmed instruction in teaching Arabic language topics and skills specifically, as well as other academic subjects generally.
2. **Programming and Designing Lessons**: Develop and design some Arabic language lessons at all educational levels from the eighth grade for use in teaching through programmed instruction.
3. **Training Courses for Teachers**: Organize training courses for teachers to help them design and produce multimedia elements, such as animated images, written texts, drawings, and provide the necessary devices to incorporate video clips, still images, educational drawings, and other tools that contribute to exemplary lessons in every educational situation.
4. **Further Studies**: Conduct more studies on the use of programmed instruction in teaching various subjects across different educational levels and its impact on various learning outcomes.

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