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The Effect of Using Conceptual Maps in Raising the Academic Achievement of Third-Year Primary Students in the Arabic Language

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Abstract Modern educational trends seek to facilitate and simplify learning, by adopting applied models that motivate the learner to build a knowledge base in various study units, including the Arabic language, where we find the 'Ozopel' theory of meaningful cognitive learning, from which the 'conceptual maps strategy' emerges, which organizes the data in a logical way that is summarized in hierarchical models with which the learner interacts and understands and then takes root in him through the forms and colors that activate his memory, so he integrates it into his knowledge structure and recovers it when needed. From this point of view, we conducted this study, which aims to measure the impact of using the conceptual mapping strategy in teaching Arabic on a sample of third-year primary students (78) The student adopted the semi-experimental method, where the study sample was divided into two groups, an experimental group (taught by the conceptual maps we built) and a statistical group (taught in the usual way), and we built a collective test to be used in the measurement before and after, and after processing the data statistically, the results resulted in statistically significant differences for the benefit of the experimental group.

Keywords Strategy. Conceptual maps. Academic achievement. Arabic Teaching. Meaningful cognitive learning.

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1 Introduction

Modern societies are committed to enhancing their core competencies across diverse fields such as economics, health, and social life. Among these, education is fundamental, serving as the cornerstone of societal development due to its crucial role in advancing scientific and technological progress and integrating global civilization. Consequently, educational specialists are continuously seeking optimal methods to advance the educational sector, aiming to streamline the processes of teaching, learning, and knowledge construction by leveraging the latest research developments.

Contemporary educational trends emphasize the need to facilitate knowledge construction through innovative methods that move beyond rote learning. A notable advancement in this area is the development of concept maps, introduced by Novak and Gowin. These maps are grounded in Ausubel's theory of meaningful learning, offering a schematic representation that illustrates the relationships between concepts. Concept maps visually organize information hierarchically or linearly, which highlights the structure of learners' cognitive frameworks and elucidates the conceptual systems of various subjects. As noted by Shehata (2012), concept maps exemplify principles such as progressive differentiation and complementary reconciliation (Shehata 2012, 115-17).

The emergence of various teaching models and strategies aimed at addressing learning difficulties has led to the development of modern educational methods that focus on enhancing cognitive skills. Among these, conceptual maps stand out as a valuable tool for representing the structure of knowledge. According to Novak and Gowin (1986), conceptual maps are defined as methods for depicting knowledge structures by organizing concepts and their relationships. They emphasize that conceptual maps foster meaningful learning by enabling learners to establish significant connections between ideas, thus facilitating a constructive rather than merely exploratory approach to acquiring knowledge (Novak, Gowin 1986, 10, 25).

The use of conceptual maps as a teaching strategy highlights their importance in facilitating learning, aiding students in understanding the structure of knowledge and its interrelationships. These maps help learners distinguish between fundamental concepts and their relationships, thereby increasing engagement by presenting information in a hierarchical sequence. This approach transforms the learner's role from passive to active, as it clarifies the primary ideas that represent the lesson's objectives (Martin 1991).

Additionally, the concept of hemisphericity is relevant when planning educational experiences, as it delineates where different types of mental functions occur in the brain. Research suggests that the right hemisphere is associated with visual, non-verbal, spatial, and

intuitive thinking, while the left hemisphere is linked to convergent, detailed, and logical thinking. For instance, the right hemisphere processes visual information necessary for face recognition, whereas the left provides the corresponding name (Sylwester 1995; Caine, Caine 1997; Jensen 1998). Effective cognitive functioning is achieved when both hemispheres collaborate, integrating convergent and divergent thinking processes (Baker, Martin 1998).

This context places an additional burden on the management and leadership within these institutions to adopt the best administrative and leadership practices and to expand the practice of administrative creativity. Achieving alignment with the requirements for change, modernization, and renewal – such as embracing various educational theories and approaches that advocate for the development of education and its strategies – is essential. This enables institutions to fulfil the expectations of their communities (Salah, Shahwan, Alnasr 2024, 2-3).

Moreover, engaging learners' senses through strategies such as conceptual maps can enhance motivation and learning. For example, repeating key concepts in maps during lessons stimulates auditory memory, while visual representations of concept maps activate visual memory, thereby organizing and entrenching information within learners' cognitive structures. The cognitive model of information processing, as illustrated in Figure 1.

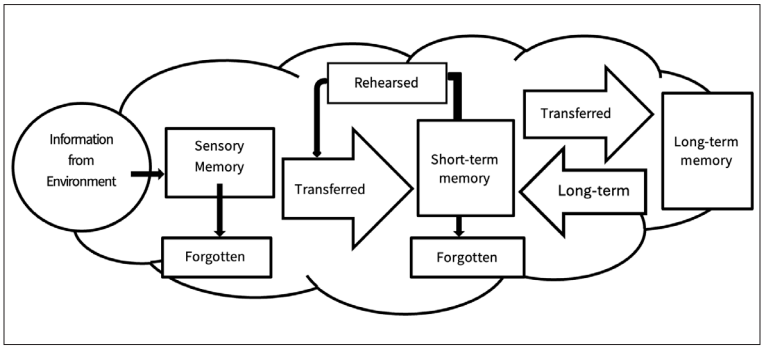

Figure 1 An Information – Processing Model of Memory. Source: Gagne, Medsker 1996

The cognitive model of information processing, as illustrated in Figure 1 (Gagne, Medsker 1996), shows how external stimuli like sounds and images trigger information processing. These stimuli capture the learner's attention, transitioning information from short-term sensory memory to short-term or working memory. Short-term memory represents what we are aware of at any given moment but has limited storage capacity. Information in short-term memory is

processed, and if it is repeatedly encoded, it may be transferred to long-term memory, which has a vast storage capacity and is less susceptible to forgetting (Gage, Berliner 1998). This interplay between different memory systems underscores the significance of employing strategies that enhance cognitive processing and retention.

2 The Statement of the Problem

The primary objective of education is to foster the holistic and integrative development of individuals, enhancing their physical, social, psychological, emotional, and moral balance. This goal is achieved by equipping individuals with specialized knowledge, values, and skills that enable them to be positive, effective, and productive members of society, capable of addressing personal and community challenges. To realize this aim, individuals must acquire essential knowledge, values, and productive skills, along with social and communication skills, and develop positive interactions such as cooperation skills. These competencies contribute to enhancing the learner's cognitive proficiency (Safar 2014).

With the rapid advancements in technology and science, and the emergence of new theories and strategies in education, it has become imperative to improve both teacher and learner performance to meet the evolving demands of educational reforms and innovations. This requires adopting new educational methods, employing advanced techniques, and implementing innovative teaching strategies. Supervisors and teachers must be trained to apply these changes effectively and subsequently develop and innovate based on their expertise and field skills. Such efforts are essential for enhancing educational quality and improving the learning experience in light of recent developments in education and technology (Novak 1995).

Ausubel's theory is a significant educational framework, particularly in promoting meaningful learning. The strategy of conceptual mapping is a crucial constructive method for achieving effective, meaning-based learning. This approach uses planning tools to organize and interconnect new cognitive concepts within the learner's cognitive structure. Concept maps, with their hierarchical format, visually represent the learner's cognitive structure, thereby activating visual and auditory memory. Spencer (2013) describes this as an innovative and unique learning strategy that enhances memory recall and creates a new environment for information processing.

Conceptual maps help harmonize modern educational data by placing the student at the center of the educational process. This strategy supports knowledge construction and the correction of prior knowledge. Research highlights that conceptual maps are vital for

fostering critical and creative thinking and achieving meaningful learning, which is the desired form of active learning (Safar 2014).

The significance of conceptual maps lies in their ability to establish an organized thinking approach that aligns with the brain's natural processes. Recent research (Novak 1995; Johnson 2000) indicates that conceptual maps enhance academic achievement and the understanding of scientific concepts. For instance, the Arabic language, rich in knowledge, concepts, and structures, benefits from the conceptual map strategy as it organizes content in an easily understandable manner. This method supports concept development, skill acquisition, and feedback provision, aiding learners in predicting and summarizing key ideas (Al-Falahat 2010; Rosan 2005).

Arabic is a vital element reflecting national identity and culture, facilitating the expression of ideas and emotions, and enhancing social communication. Its unique features such as capacity, derivation, brevity, abstraction, and expression enable various classifications of concepts, which improve the organization of educational materials. Clear concept classification stimulates thinking and interaction among learners and between learners and teachers, promoting positive engagement. Research, such as Pancrius (1990), has demonstrated the effectiveness of concept maps in improving academic achievement in high school physics. Similarly, Youssef (2019) found that conceptual maps significantly improved grammar skills among seventh-grade students. These studies underscore that deficiencies in Arabic language learning, particularly in grammar, often stem from a lack of modern pedagogical methods. Therefore, many conferences and seminars have advocated for simplifying Arabic grammar teaching. This study aims to explore the effectiveness of the conceptual map strategy in enhancing students' achievement in Arabic language subjects at the primary school level by addressing the following research question: are conceptual maps effective in raising the academic achievement of third-year primary students in the Arabic language subject?

3 Hypothesis

Based on the study problematic the sub-questions, as initial answers to them, the following hypothesis were formulated: conceptual maps are effective in raising the academic achievement of third-year primary students in the Arabic language subject.

4 Objectives of the Study

- Employing the strategy of conceptual maps in removing the thumb, branching and difficulty of the Arabic language subject in each of grammar, sheter formulas, and spelling phenomena, especially in the early level, so that the learner has a correct linguistic rule.
- Increases the learner's motivation and desire to learn because of its different summaries, shapes, colours, and coding of knowledge.
- The strategy of conceptual maps can be invested in building, summarizing and consolidating knowledge in several subjects and stages of study.

5 The Importance of Study

The importance of this study lies in demonstrating the effectiveness of modern teaching strategies, particularly the use of conceptual maps, in enhancing the academic achievement of third-year primary students in Arabic language education. By focusing on how conceptual maps can improve understanding and retention of linguistic rules, grammar, spelling, and other language components, this study aims to provide valuable insights into how these strategies can address common learning difficulties at an early educational stage. Additionally, the research will shed light on how the visual and organizational benefits of conceptual maps can boost student motivation and engagement, ultimately contributing to higher academic performance. This investigation is crucial for educators seeking effective methods to enhance language instruction and support student success in primary education.

6 Limitation of the Study

- Spatial boundaries: The study was conducted at Ahmed Shire School in Blida.
- Time limits: The study was conducted in the second semester of the academic year (2022-23).
- Human boundaries: The study was conducted on third-year primary students with two experimental groups and an officer group.

7 Definition of Key Term: In this Study We Use the Operational Definition

- Strategy: It is a set of sequential organized steps to achieve a specific educational goal.
- Conceptual maps: It is a teaching strategy consisting of a set of organized and sequential schemes linked by phrases or words that are a basic and meaningful idea of the basic topic to be explained to the learner.
- Academic achievement: The total number of points obtained by the learner in the lesson achievement of a particular subject after receiving its lessons.

8 Previous Studies

Considering the importance of previous studies, we have selected a group of them based on two main criteria: The first is the direct relationship of the previous study to the research topic, and the second is the novelty of the topic. A sample of Arabic and foreign studies was selected.

Safayeni 2007

The study aimed to analyse the impact of concept maps on students' dynamic thinking. The study employed an experimental methodology to measure the effect of concept maps. The sample consisted of 112 third-year university students. The study found a significant increase in dynamic and critical thinking among the students.

Mok, Whitehill, Dodd 2014

The study aimed to analyse concept maps to evaluate students' learning in a problem-based learning curriculum. The study employed a longitudinal approach and analysis of concept maps. The sample consisted of second-year students, with no participation from third-year students. The study found a noticeable improvement in students' personal learning progress.

Hung, Lin 2015

The study aimed to evaluate the use of concept maps in improving students' understanding of basic science concepts. The study

employed an approach to assess students' learning outcomes. The sample consisted of third-year students in physical therapy programs. The study found an improvement in the understanding of basic science concepts.

Bossahla, Ferhaoui 2020

The study aimed to evaluate the effect of using concept maps on academic achievement in Arabic for first-year primary education students. It involved 56 deliberately selected students, divided into an experimental group using concept maps and a control group receiving traditional instruction. An empirical method was employed, and both groups were tested for equivalence in age and Arabic proficiency. Teaching plans were based on concept maps, and a multi-test achievement assessment was conducted. The results showed that the experimental group, which used concept maps, significantly outperformed the control group in terms of academic success.

Polancos 2021

The study aimed to compare the impact of using Vee Diagrams versus Concept Maps on student achievement in chemistry. The study employed an experimental methodology using measures to assess achievement outcomes. The sample consisted of two classes of third-year students. The study found that Vee Diagrams had a more positive impact on achievement compared to Concept Maps.

9 Aspects of Benefit from Previous Studies

Building on the insights from these studies, it is evident that concept maps offer significant benefits in enhancing various cognitive and academic outcomes. Safayeni's (2007) study underlines the potential of concept maps to boost dynamic and critical thinking, which can be crucial for developing advanced cognitive skills. Similarly, the improvements noted by mok at (2014) in personal learning progress through problem-based learning environments suggest that concept maps can support continuous development in learning, even though their research was limited to second-year students.

Lin's (2015) findings further substantiate the effectiveness of concept maps in facilitating a deeper understanding of subject-specific concepts, such as basic science, among third-year students. This aligns with the evidence provided by Hanan and Ferhaoui (2020), who demonstrated that concept maps significantly enhance academic

achievement in Arabic, particularly for first-year primary education students. Their research highlights the practical advantages of using concept maps to improve language learning outcomes.

Nevertheless, Polancos (2021) introduces a comparative dimension by showing that Vee Diagrams had a more pronounced impact on chemistry achievement than concept maps. This suggests that while concept maps are valuable, their effectiveness can vary depending on the subject and educational context.

Therefore, while concept maps have proven beneficial across various domains, their impact on academic achievement in Arabic for third-year primary students should be evaluated with consideration of these findings. It is essential to compare them with other instructional tools and adapt their use to the specific educational context to maximize their effectiveness.

10 Study Procedures: Study Methodology

The semi-empirical method was used in this study, due to its conformity with the assumptions and objectives of the study, and (Al-Assaf) in 2011 states that "the experimental method is the method by which the researcher can know the effect of the cause (independent variable) on the result (the dependent variable)" (Al-Assaf 2011, 277). Which requires random inspection, and therefore we adopted the simple design with two groups, an experimental group and a control group with a tribal and post-size.

11 The Study Population and Sample

Study sample: The study relied on a sample estimated at (78) male and female students distributed over two parts (39) of which are in the experimental group and (34) for the control group. They were selected from three sections in a random manner, with the researcher verifying the conditions of equivalence of groups such as: learning within the same school, the homogeneity of the two groups in academic achievement in the Arabic language subject, studying the two groups in the same section because the system applied in the school is the whirty system.

12 Study Tools

As a first step, the following documents were reviewed:

- Curriculum;
- The annual distribution of the Arabic language subject to third-year primary students;
- A guide to using the Arabic language book for third-year primary students;
- Daily memos to ensure that teachers do not employ conceptual map strategy in the educational-learning process;
- The document accompanying the Arabic language for third-year primary students. Then each of: was built;
- Conducting a work class with the teacher of the experimental group (applied) to be in building and employing conceptual maps in the educational-learning process;
- Conceptual maps: for the lessons in which we will employ the concept map strategy.

12.1 Educational Test

Mahmoud Jamal (2013) defines Educational test as: "A level of achievement efficiency in school work that can be determined by the standardized tests to evaluate the student's work" (Al-Salkhi 2013, 25). As "Abd Rabbo" points out in the year 2008, "one achieves for himself good levels of science and knowledge, which is usually compared to study, so we say the level of academic achievement and we mean the degree obtained by the learner in the exam and reflects his level" (Fadl 2008).

The importance of academic achievement: Academic achievement is very important because it is related to or expresses the level of the learner. Therefore, it is necessary to study all the factors associated with it, which affected it with great accuracy, so that the educational return of the learner is very acceptable by addressing the following steps:

- Determining the purpose of the test: measuring the achievement of learners in the three sections (national identity, nature and environment, health and sports);
- Analyzing the content of the units for each of the third, fourth and fifth sections in the Arabic language curriculum (textbook);
- Identifying behavioral goals (analyzing the content of the clips, and linking them to the Bloom classifier);
- Writing a specification table (mating: vertically extracted behavioral goals with BLOOM cognitive levels);
- (Extract the number of questions for all cognitive levels, and extract the dot of questions);

- Writing test questions: filling in the blank, completion questions, mating questions;
- Applying the test: 1/ A neutral sample: in order to correct the errors contained in its paragraphs;
- Coming out with a final educational test to study.

13 Results of the Study – Presentation and discussion of the results of the study

The first hypothesis: Conceptual maps are effective in raising the academic achievement of third-year primary students in the Arabic language subject.

13.1 Pre-test Results

It is clear from the table that the average of the experimental group is 9.94 with a bural deviation of 2.92, an arithmetic average of the control group 10.18 and a standard deviation of 2.69, and the value of 't' was estimated at 0.34- and the degree of freedom was 0.70. Therefore, there are no differences between the two groups in the tribal test of both the experimental and the control group, that is, they are homogeneous and similar in the level of the Arabic language.

Table 1 Pre-test results

The two groups	Sample	Arithmetic average	Standard deviation	Calculated value 't'	Degree of freedom
The experimental group	39	9 .94	2.92	-0.34	0.25
The control group	33	10.18	2.69		

13.2 Post-Test Results

It is clear from the table that the arithmetic average of the experimental group was estimated at "12.74 with a benometic deviation of 3.88, an arithmetic average for the control group of 10.63, a standard deviation of 2.69, and the value of 't' was estimated at 2.70 and the degree of freedom 01. 0 Thus, there are differences in the averages of academic achievement between the students of the experimental group (taught using the concept map strategy) and their peers in the control group (they were taught in the normal way) in the Arabic language subject in favor of the experimental group, that is, there is a positive impact on teaching according to the concept map strategy.

What has been reached is in line with the results of many studies, such as the study of "Samira bin Musa" and "Abdul Majid Issani" in 2018, where their study focused on clarifying the method of teaching Arabic grammar to primary school students using the strategy of conceptual maps. As well as the study of "Hanan Boushala" and "Kamal Ferhaoui" in 2020, where it focused on researching the impact of the use of conceptual maps on academic achievement among primary first-year students in two experimental and control groups, and it was found that the use of conceptual maps is effective in academic achievement in the Arabic language subject (for the benefit of the experimental group).

Table 2 Post-test results

The two groups	Sample	Arithmetic average	Standard deviation	Calculated value 't'	degree of freedom
The experimental group	39	12.74	3.88	2.70	0.01
The control group	33	10.63	2.69		

14 Discussion

The results indicate that the use of concept maps in Arabic language education has had a noticeable positive impact on students' academic achievement compared to traditional teaching methods. In the pre-test, there were no statistically significant differences between the two groups, demonstrating their homogeneity in terms of Arabic language proficiency before the experiment began. However, in the post-test, the experimental group that utilized concept maps showed a significant improvement in average academic achievement scores compared to the control group, which received traditional instruction.

These findings are consistent with previous studies that have demonstrated similar benefits of using concept maps in various educational contexts. For example, the study by Safayeni (2007) confirmed that concept maps contribute to enhancing students' dynamic and critical thinking skills. Similarly, the K and Whitehill study (2014) found that concept maps improve personal learning progress, which is also supported by the improved academic performance observed in your study. Furthermore, the H and Lin study (2015) indicated an improvement in students' understanding of fundamental science concepts, reinforcing the notion that concept maps can be valuable across different fields of study.

The results of your study align directly with the findings of Hanan and Ferhaoui (2020), which reported that the use of concept maps

significantly improved academic achievement in Arabic for primary level students. This increasing support for the use of concept maps highlights their effectiveness as an educational tool. While the study by Polancos (2021) compared the effects of Vee Diagrams and concept maps and found that Vee Diagrams were more effective in certain cases, this does not diminish the value of concept maps, which have proven effective in various educational contexts.

Through the current study, the importance of employing active learning strategies in the educational process, especially the concept map strategy, is evident. Concept maps enhance the organization of knowledge among learners, which is crucial for teaching a subject as foundational as Arabic, reflecting national identity. Investing in the education of future generations is essential. The results of your study are consistent with other research, such as Buran (2015), which demonstrated that concept maps assist learners in problem-solving, exchanging creative ideas, remembering new vocabulary, taking notes, enhancing reading skills, organizing tasks, and preparing presentations. Additionally, Safar et al. (2014) highlighted that concept maps are suitable, valuable, and useful facilitation and promotional tools in education. Keleş also confirmed that using concept maps helps primary school teachers improve their teaching, lesson planning, and evaluation, making lectures more engaging. Moreover, Orlova (2017) noted that the continuous use of concept maps enhances the efficiency of the educational process and has positive effects.

In conclusion, these findings suggest that concept maps can play a significant role in improving academic achievement and fostering a deep understanding of concepts across diverse study subjects, underscoring the importance of integrating this strategy into educational curricula for optimal outcomes.

15 Recommendations

- The necessity of training educators in active learning strategies, including concept maps, to enhance cognitive structures, especially in the Arabic language;
- The use of concept maps in primary education by integrating them into the Arabic language curriculum at the elementary level, through the enhancement of auditory and visual memory by employing various senses in the educational process;
- The necessity to develop and encourage the use of digital tools by employing concept maps to create an interactive and engaging classroom environment;

- The necessity to promote collaborative learning through the use of concept maps in group activities to foster teamwork and deepen understanding.

16 Conclusion

Based on the findings of this study, it is evident that the implementation of conceptual maps significantly enhances the academic achievement and language proficiency of third-year primary students. At this developmental stage, where students are in the process of acquiring foundational language skills, it is crucial to build a robust knowledge base through effective teaching strategies. Conceptual maps, with their structured hierarchical layout and visually engaging elements, serve as a powerful tool in this regard.

Research in the domain of active learning supports the efficacy of conceptual maps as a facilitative and supportive strategy for organizing and consolidating learning. Their ability to visually represent complex information in a clear and structured manner makes them particularly valuable in educational settings. By integrating conceptual maps into the curriculum, educators can create a more interactive and effective learning environment, thereby enhancing students' cognitive and linguistic development.

Therefore, incorporating conceptual maps into teaching practices is not only beneficial but essential for optimizing educational outcomes and fostering a deeper understanding of the subject matter among primary students.

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