**The Extent to Which Arabic Language Teachers Employ the Strategy of Concept Maps in Teaching Grammar to Middle School Students in Arab Schools in Israel**

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***Abstract***: This study investigated the extent to which Arabic language teachers employ concept maps in teaching grammar to middle school students in Israel, and examined differences in use according to gender, academic qualification, years of experience, and training courses. To achieve this aim, a questionnaire was designed with two parts: the first collected demographic information, and the second measured teachers’ use of concept maps through 35 items across five domains. The instrument’s validity and reliability were verified, and the sample comprised 100 male and female teachers selected randomly. Data were analyzed using a descriptive–analytical quantitative approach, calculating means and standard deviations. Independent Samples T-Tests were employed to examine differences by gender and academic qualification, while One-Way ANOVA was used to assess differences by years of experience and number of training courses.

The findings indicated that teachers’ overall use of concept maps was high, with a mean score of 3.59. Statistically significant differences were found in favor of female teachers, teachers with postgraduate degrees, those with more than 11 years of experience, and those who had attended more training courses. Based on these results, the study recommends further theoretical and applied research on concept maps in teaching Arabic grammar, the development of specialized training programs to enhance teachers’ skills in designing and applying concept maps effectively, with particular attention to male teachers and less experienced educators, and the creation of a practical guide for Arabic language teachers featuring applied models of concept maps for diverse grammatical topics.

***Index Terms***—Arabic language teachers, concept maps, grammar instruction, middle school, Arab schools in Israel.

1. **Introduction**

The Arabic language is the vessel of thought and culture, the window through which human beings view the achievements of civilization and its sciences, and the primary medium of thinking, expression, communication, and understanding among people. Indeed, nations are often classified and distinguished by their languages (Bousahla & Farahawi, 2020). Arabic also serves as a fundamental means for studying and comprehending other subjects, and it occupies a special place in students’ lives, as it constitutes the channel through which knowledge and experiences are conveyed to them. The language further branches into several core components and skills, most notably listening, reading, speaking, writing, and linguistic knowledge, which itself encompasses phonology and its written representation, morphology, grammar, semantics, spelling, handwriting, and punctuation. Mastery of these components enables students to acquire sound communicative competence in listening, speaking, reading, and writing. However, this competence cannot be fully realized without a solid grasp of grammatical rules.

For this reason, the study of grammar is an integral part of mastering the Arabic language. Grammar plays a crucial role in identifying the syntactic properties of words and the grammatical rules they acquire from their position in the sentence, such as case endings, inflection, and construction. It also serves to refine students’ speech and protect them from errors in both spoken and written expression. Any mistake in parsing or grammatical accuracy affects the intended meaning communicated to the recipient (Al-Dulaimi & Al-Dulaimi, 2004). Moreover, grammar guarantees linguistic correctness in performance, comprehension, and interpretation, in accordance with the grammatical rules that words acquire from their position, movement, or syntactic function (Abdu, 2020). It also ensures stylistic soundness, enabling students to express their needs, feelings, thoughts, and desires in accordance with the linguistic principles established by Arab grammarians (Abdel Hamid, 2020).

Despite the importance of grammar, students at various educational stages—including middle school—continue to show weakness in acquiring grammatical skills. Evidence of this appears in the results of Israel’s national evaluation exams (Meitzav) for the years 2015 and 2016, which indicated low achievement among Arab eighth graders in language education, including grammar (RAMA, 2016).[[1]](#footnote-1) Numerous studies have also highlighted persistent difficulties in grammar, most notably the scarcity of solved syntactic exercises and the lack of sufficient illustrative examples in grammar textbooks (Al-Dulaimi & Al-Dulaimi, 2004; Majadleh & Marzouq, 2019; Yousef, 2019). These difficulties are also evident among Arab students in Israel (Jubran, 2009; RAMA, 2016).

Researchers attribute this difficulty to several factors, foremost among them the rigidity of grammar teaching methods and the lack of variety in their application. Bousahla and Farahawi (2020) affirmed that, regardless of the number of approaches available, the teaching of Arabic grammar generally relies only on two methods: the inductive method[[2]](#footnote-2) and the deductive method.[[3]](#footnote-3) In a study conducted by Al-Jubouri (2004), it was found that the inductive approach is the most widely used in grammar instruction, and he recommended the adoption of more diverse strategies as well as introducing Arabic language teachers to modern instructional methods whose effectiveness in grammar teaching has been demonstrated by research. Similarly, the “Arabic Language Curriculum Committee: Language, Comprehension, and Expression for Middle and Secondary Levels” (2013) emphasized the importance of employing innovative and varied teaching methods in all areas of Arabic, including grammar, in order to foster students’ critical thinking, encourage creativity, and promote active participation in the learning process. In addition, Hamadat and Ayasrah (2011) noted the lack of appropriate pedagogical practices for presenting grammatical content in a way that aligns with the learner’s cognitive structure. This finding is consistent with the argument of Al-Zaghloul and Al-Bustangi (2007) that the method of presenting the subject matter requires careful attention to clarifying its organizational structure and logical sequence in order to enable learners to integrate it into their own knowledge frameworks, while also maintaining their engagement and attention during instruction.

Accordingly, many studies (Kashkosh, 2024; Majadleh, 2019; Yousef, 2019; Kashkosh & Khateb, 2021) have called for the adoption of teaching methods that engage students in learning and align with the current era and its rapidly developing pedagogical innovations. Among the most effective strategies that fulfill this purpose is the concept map strategy, which derives its theoretical framework from Ausubel’s theory of meaningful learning. This strategy organizes concepts and terms hierarchically, helping students to comprehend the material being taught and to integrate it into their cognitive structures by linking prior knowledge with new information (Ausubel et al., 1978).

The present study therefore aimed to examine the extent to which Arabic language teachers employ the strategy of concept maps when teaching grammatical topics to middle school students. To this end, it sought to answer the central research question: To what extent do Arabic language teachers employ concept maps when teaching grammar to middle school students?

The significance of this study lies in shedding light on the aspects that teachers need in order to teach grammar effectively through the use of concept maps when working with middle school students. This approach helps teachers to rethink their perceptions of the strategy and enhances their instructional performance by shifting from traditional teacher-centered learning to understanding-based learning that fosters students’ thinking skills. Furthermore, the study contributes to improving students’ academic achievement by encouraging them to apply concept maps in learning Arabic language domains in general and grammar in particular, and by enabling them to transfer this knowledge to practical life situations.

In addition, the findings of this study are expected to provide the Ministry of Education with a scientific basis for launching training programs for teachers in light of the results. The study also opens new avenues for other researchers to conduct further investigations that may assist teachers in improving their instructional practices, thereby increasing students’ motivation to learn grammar.

1. **Theoretical Background and Previous Studies**

The concept map strategy is regarded as one of the most important tools developed to uncover the learner’s cognitive structure, to identify what knowledge and prior information the learner already possesses, and to organize this knowledge within different learning and instructional contexts. This knowledge is arranged within the individual’s cognitive structure in the form of a map of concepts and ideas organized hierarchically, with general and main ideas at the top and branching into subordinate ideas. The purpose of this structure is to reduce cognitive overload and to enhance the learning process (Baig et al., 2016).

**Scientific Basis of the Theory**

The concept map strategy derives its theoretical framework from the theory of meaningful learning proposed by the American psychologist David Ausubel in the 1960s. It was further developed by Joseph Novak in 1972 during his research at Cornell University on cognitive development. Novak argued that Ausubel’s theory rests on the basic principle that meaningful learning occurs when the learner understands the subject matter by linking new information and concepts to prior knowledge already acquired and stored in memory (Novak & Cañas, 2008).

**Concept Mapping as a Teaching and Assessment Tool**

Concept maps have been widely employed as an instructional tool across education, science, languages, and other fields. As a contemporary teaching strategy, a concept map functions as a plan the teacher uses to present and clarify course content by means of graphic or schematic devices. The text to be learned is reorganized into a hierarchical display in which the most general, inclusive ideas appear at the apex and progressively specific concepts descend toward the base. Concepts are enclosed in frames or geometric shapes and connected by arrows or lines labeled with linking words that state the relationship (Bousahla & Farahawi, 2020; Saʿadeh, 2018; Elashhab, 2019).

Concept maps can also serve as a tool for assessing student learning. In the late twentieth century, assessment underwent a notable shift toward authentic, performance-based approaches. Educators began to employ diverse tools—such as the student portfolio, observation supported by a standardized checklist, and rubric-guided performance evaluation—alongside concept maps and other measures (Ali, 2017). Used diagnostically or summatively, concept maps allow flexible differentiation: a highly proficient learner can be asked to analyze a text by constructing a full map that employs all core components (hierarchy, propositions, cross-links, examples); an intermediate learner can receive a partially completed map pre-loaded with key concepts to guide analysis; and a novice can be supported with a partial map plus a word bank to scaffold vocabulary and relations. Individual differences in learning style (visual, auditory, kinesthetic) can be addressed by building the map with digital tools (e.g., Mindomo) and embedding selective audio–visual cues. In all cases, the chosen texts should be calibrated to students’ grade level and linguistic readiness to ensure the targeted learning outcomes (Kashkosh, 2024).

Regarding the components of concept maps, prior scholarship identifies several elements that together make the representation meaningful and assessable. Drawing on cognitive-mapping principles (Tolman, 1948) and the classic scheme of Novak, later adapted in regional studies (Abualhommos & Abdel Razeq, 2019; Novak, 2010), a robust concept map typically includes: a clearly stated focus question or central problem; key concepts (nodes) arranged hierarchically from general to specific; propositions—pairs of concepts connected by labeled linking words that form readable statements; cross-links that connect different map segments to reveal integrative understanding; and concrete examples or instances attached to the lowest-level concepts. Directional arrows and precise linking phrases make relations explicit, while a generally top-down layout supports quick reading and scoring. These components not only guide instruction but also enable transparent, criterion-referenced evaluation of knowledge structure and change over time (Abualhommos & Abdel Razeq, 2019; Novak, 2010; Tolman, 1948).

Taken together, this approach treats concept mapping as both pedagogy and assessment: a way to teach for meaning by reorganizing knowledge into propositions, and a way to evaluate learning by making students’ cognitive structures visible, comparable, and improvable (Bousahla & Farhawi, 2020; Saʿadeh, 2018; Elashhab, 2019; Ali, 2017; Kashkosh, 2024).

As for the components of concept maps as identified by Abualhommos and Abdel Razeq (2019), Novak (2010), and Tolman (1948):

1. **The Scientific Concept**

These are the main and subsidiary concepts or ideas that should be placed in similar geometric shapes—rectangles, squares, or circles—distributed across the concept map so as to reflect their equivalence in level and importance within the hierarchy.

1. **Linear connectors**

These are horizontal or vertical lines used to link the different parts of the concept map.

1. **Linking phrases**

Words or short phrases written on the arrowed connectors to specify the type of relationship between any two concepts or ideas, and to reveal the learner’s grasp of those relations—for example: “is divided into,” “includes,” “consists of,” “in the form of,” “affects,” “relates to,” etc. These phrases are not placed inside frames.

1. **Examples**

Objects, persons, or dates placed on the map to clarify the intended meaning. Examples are not put inside frames or shapes; they are attached only by simple line connectors. Effectiveness of the concept-map strategy in certain Arabic-language education courses.

**The Effectiveness of the Concept Map Strategy on Some Educational Variables Related to Arabic Language.**

A number of studies have demonstrated the effectiveness of the concept-map strategy in selected Arabic-language variables —across domains, skills, genres, and linguistic knowledge—as follows:

**Improving academic achievement**

Bousahla and Farhawi (2020) conducted a study to examine the impact of using concept maps and their effectiveness for first-grade pupils in linguistic knowledge. The sample consisted of 56 pupils selected purposively and divided into two groups: an experimental group that received lessons using the concept-map strategy, and a control group that was taught by the conventional method. To achieve the study’s aim, the experimental design was employed. The results showed that using the concept-map strategy was effective in improving achievement in Arabic, in favor of the experimental group, which outperformed the control group at a statistically significant level.

**Acquiring and Improving Cognitive Skills in Arabic**

Certan studies have demonstrated the effectiveness of concept maps in improving cognitive skills related to Arabic writing. Al-Muhanna (2012) found that using the concept-mapping strategy contributed substantially to third-grade pupils’ mastery and retention of writing the medial *hamza*. Fandi and Ali (2011) likewise reported that concept maps facilitate the acquisition, internalization, discrimination, and better application of rhetorical concepts among primary-school pupils; employing this strategy also encouraged students to ask questions, express opinions, participate actively, and build self-confidence.

**Enhancing and Developing Creative and Critical Thinking Skills**

In a field study conducted by al-Dardour (2001) on sixth-grade pupils, it was concluded that the concept-mapping strategy clearly contributes to improving and developing students’ critical-thinking skills. Khudair (2011) likewise confirmed the effectiveness of concept maps in improving creative-thinking skills among fourth-grade girls in the Arabic language subject.

In the domain of Arabic grammar specifically, several studies have sought to investigate the effectiveness of the concept-map strategy for academic achievement in grammar and for improving grammatical skills compared with the conventional method. Among these is the study by Beydogan & Bayindir (2010), which aimed to determine the effectiveness of using concept maps on fourth-grade pupils’ achievement in Arabic grammar in the city of Kirsehir, Turkey. The results showed higher levels of achievement among the experimental group taught with concept maps than among the control group. This finding is consistent with numerous previous studies that have pointed to the effectiveness of concept mapping in raising achievement in grammar and improving grammatical skills (Muqabala & al-Falahat, 2010; Yusuf, 2019; Salem & Musleh, 2020).

In light of the foregoing, the effectiveness and impact of the concept-map strategy becomes evident in certain educational courses in the Arabic-language field in general—such as increasing academic achievement, improving cognitive skills in Arabic, and developing creative and critical thinking—and in grammar in particular, by increasing students’ achievement in grammar and enhancing their grammatical skills. It is therefore recommended to train students in grammatical skills and to simplify those skills by means of this strategy while activating their role in learning grammar topics. Concept maps help clarify grammatical topics in a simplified manner, arranged from the general to the specific, which assists students in understanding grammatical concepts, terms, and rules smoothly and easily, and enables them to integrate them into their cognitive structure so that they become a stable approach and habit.

**Previous Studies**

There are numerous studies that have addressed the concept-mapping strategy. Among them is ʿAbd al-Jawād (2022), which aimed to identify the degree of effectiveness of concept maps in developing physics concepts among upper-basic students in Nablus. The descriptive–analytical method was used with a sample of 16 male and 19 female teachers, who responded to a researcher-designed questionnaire of 17 items. The results showed no statistically significant differences in the perceived effectiveness of concept maps for developing physics concepts between male and female teachers. However, there were statistically significant differences by academic qualification (in favor of master’s degree holders) and by years of experience (in favor of the more experienced teachers).

Ṣalāḥāt (2021) sought to determine the degree of teachers’ awareness in Jordan of electronic concept maps and to identify statistically significant differences attributable to academic qualification. Using the descriptive method with a sample of 407 teachers, the study found that teachers’ awareness of electronic concept maps was moderate, and it reported statistically significant differences in favor of teachers holding postgraduate degrees.

Al-Ṣuʿūb and al-Ṣarāyrah (2021) aimed to determine the degree to which English-language teachers use the concept-mapping strategy with basic-stage students in Karak, Jordan, and to test for statistically significant differences by gender, experience, and academic qualification. Adopting a descriptive–analytical approach, the study sampled 100 English teachers selected by simple random sampling. The results indicated that the degree of teachers’ use of concept maps was moderate across all levels. The study also revealed apparent differences in means and standard deviations by academic qualification in favor of diploma holders, while no statistically significant differences appeared by gender or years of experience.

Abi ʿArar et al. (2021) investigated the extent to which concept maps are used in the elementary schools of ʿArʿarah al-Naqab as a teaching and assessment tool from teachers’ perspectives. Employing the descriptive method with a purposive sample of 22 elementary teachers, the study found that teachers’ use of concept maps as a teaching tool was very low, and their use as an assessment tool was low. It also found no statistically significant differences in teachers’ use of concept maps as a teaching tool attributable to gender or years of experience, while indicating generally positive attitudes toward using concept maps for both teaching and assessment.

As for the study by Danbaʿ and Bani Khalid (2020), it sought to identify the extent to which resource-room teachers[[4]](#footnote-4) use the concept-mapping strategy in teaching students with learning difficulties, to explore their views on its effectiveness, and to detect any statistically significant differences in the degree of use attributable to gender, experience, or academic qualification. The study employed the descriptive survey method; the sample was selected by simple random sampling and consisted of 96 male and female teachers working in resource rooms, whose views on use of the strategy were canvassed. The results showed that 68.8% of the sample had previously used concept maps in teaching students with learning difficulties, while 31.3% had not. The findings also indicated that teachers expressed agreement with employing the strategy, and that there were no statistically significant differences in the degree of teachers’ use attributable to gender, academic qualification, or years of experience.

By contrast, ʿAbd al-ʿAzīz and Abā Ḥusayn (2019) aimed to determine the degree to which teachers of students with learning difficulties use electronic concept maps. The sample comprised 101 basic-stage teachers, and the descriptive survey method was used. The results showed that the degree of use was moderate, and they further revealed statistically significant differences attributable to experience and to training courses with respect to the degree of teachers’ use of concept maps.

Al-Saʿdānī and colleagues (2018) conducted a study to ascertain the extent to which computer-studies teachers employ the concept-mapping strategy with first-year secondary students in the Asīr region of Saudi Arabia, and to identify differences in the degree of use according to teaching experience. Using the descriptive method, the study sampled 35 teachers of computer studies in government schools. The findings indicated that the degree of use of concept maps among computer-studies teachers was very low, and that there were no statistically significant differences in mean scores for use attributable to years of experience—suggesting homogeneity in use regardless of experience level. The results also showed that teachers who had received training courses used concept maps to a greater extent than those who had not.

Al-Lahāwiyah’s study (2014) investigated the extent to which upper–basic-stage science teachers in the town of al-Qaṣr (Jordan) apply the concept-mapping strategy, and examined differences in the degree of application by gender, teaching experience, and academic qualification. Using a descriptive–analytical method, the sample comprised 60 teachers (male and female). The study found that teachers’ mastery and application of concept maps were at a moderate level. It also showed no statistically significant differences in application attributable to gender, whereas there were significant differences attributable to teaching experience (in favor of the more experienced) and to academic qualification (in favor of postgraduate degree holders).

By contrast, al-Masālimah (2011) sought to determine the extent to which lower–basic-stage science teachers in Bethlehem employ the concept-mapping strategy, and to test for differences in the degree of use by gender, academic qualification, and years of experience. Adopting a descriptive–analytical approach, the study sampled 68 teachers selected at random from public and private schools and used both a questionnaire and interviews. The results indicated that the degree of employing concept maps in teaching—across planning, implementation, and assessment—was high, and that there were no statistically significant differences in the degree of use attributable to gender, academic qualification, or years of experience.

Shetat (2007) conducted a study aimed at identifying the extent of science teachers’ awareness of using concept maps, the obstacles to their use from the teachers’ perspective, and differences in the degree of use according to gender, specialization, and academic qualification. The study employed the descriptive survey method and covered all male and female teachers who taught general science from first through tenth grade in public, private, and government-affiliated schools in the towns of Ramallah and al-Bīreh. The final sample consisted of 133 male teachers and 204 female teachers selected by simple random sampling. The results revealed a high level of awareness among basic-stage science teachers regarding the use of concept maps, and no statistically significant differences in the use of concept maps attributable to gender, specialization, or years of experience.

After reviewing previous studies on the use of the concept-map strategy in educational contexts, it becomes clear that, although they varied in research aims and academic specializations, they showed notable similarity in methodological and procedural aspects. All of the studies adopted the descriptive–analytical approach, which aligns with the methodology of the present study and supports the choice of this research orientation. Most studies also relied on the questionnaire as the primary data-collection tool, which likewise matches the instrument employed here, indicating a general methodological convergence in this field of research.

The prior literature also converged in addressing standard variables that affect the degree to which teachers employ the concept-map strategy. All of them examined statistical differences in levels of use according to key demographic and professional variables such as gender, years of experience, and academic qualification.

The researcher benefited from this review in constructing an instrument suited to measuring the degree to which Arabic-language teachers employ concept maps in teaching grammatical topics to lower-secondary (intermediate) students, drawing in particular on the methodological framework and tools used in Masālimah (2011), Shetat (2007), and Abī ʿArar et al. (2021), with modifications and adaptations to fit the specific educational and disciplinary context of the present study.

Nevertheless, the critical review of prior studies revealed substantive research gaps that call for focused scholarly attention—chief among them the complete absence of studies addressing the use of concept maps in teaching Arabic in general and grammar in particular. Earlier work concentrated on diverse specializations—English, science, computer studies, and special education—while overlooking this vital, central domain in Arab education. The review also showed a shortage of studies targeting the intermediate stage specifically, with the exception of Shetat (2007), ʿAbd al-Jawād (2022), and al-Lahāwiyah (2014)—a transitional stage that is crucial for the formation of complex grammatical concepts in students.

**Research Questions**

**Central Question 1:** What is the degree to which Arabic-language teachers employ knowledge/concept maps in teaching grammatical topics to students at the intermediate (lower-secondary) stage?

**Question 2:** Does the degree to which Arabic-language teachers employ the concept-map strategy in teaching grammatical topics at the intermediate stage differ according to (a) gender, (b) academic qualification, (c) years of teaching experience, and (d) the number of in-service training courses in modern teaching strategies in which the teachers have participated?

**Study Hypotheses**

**H1.** There are statistically significant differences in the mean level of Arabic language teachers’ use of the concept-mapping strategy in teaching grammatical topics, attributable to the gender variable.

**H2.** There are statistically significant differences in the mean scores for Arabic-language teachers’ use of the concept-mapping strategy in teaching grammatical topics to lower-secondary students attributable to academic qualification: teachers with postgraduate degrees employ the strategy to a higher degree than teachers holding only a bachelor’s degree.

**H3.** There are statistically significant differences in the mean scores for Arabic-language teachers’ use of the concept-mapping strategy in teaching grammatical rules to lower-secondary students attributable to the years-of-experience variable; teachers with more experience employ the strategy to a higher degree than those with fewer years of experience.

**H4.** There are statistically significant differences in the mean level of Arabic-language teachers’ use of the concept-mapping strategy in teaching grammatical topics to lower-secondary students, attributable to the number of in-service professional development courses the teachers have completed in modern instructional strategies.

1. **Study Methodology**

**Research Design**

The study adopted a quantitative descriptive–analytical design, given its suitability to the nature and aims of this research.

**Study Sample**

The sample consisted of 100 Arabic-language teachers who teach at the intermediate (lower-secondary) stage in northern and southern regions of Israel. The sample was selected by simple random sampling.

**Procedures**
The study was carried out through the following interrelated methodological steps:

1. The researcher reviewed the relevant educational literature and previous studies related to the topic, then obtained the necessary approvals to conduct the study.
2. The study population—Arabic-language teachers at the intermediate stage—was enumerated and the final sample identified.
3. The research instrument was prepared, and its validity and reliability were established.
4. After confirming the instrument’s suitability, it was piloted with 20 teachers at a northern intermediate school outside the original sample to verify validity and reliability.
5. The finalized instrument was then administered to the target sample of intermediate-stage Arabic teachers in the northern and southern regions.
6. Finally, the data were collected, coded, tabulated on dedicated sheets, entered into the computer, and statistically analyzed using the Statistical Package for the Social Sciences (SPSS).

**Study Instrument**

**Questionnaire:** Drawing on the educational literature and prior studies related to this topic—especially Masālimah (2011), Shetat (2007), and Abī ʿArar et al. (2021)—the researcher formulated the questionnaire items, which comprised two parts:

**Part I (Demographics):** Items on participants’ basic characteristics: gender (male, female); academic qualification (first degree, postgraduate); years of teaching experience (fewer than 5 years; 5–10 years; more than 10 years); and in-service training courses completed in modern teaching strategies (0 courses; 1–3 courses; 4–6 courses; 7 or more).

**Part II (Scale):** A 35-item scale designed to determine the degree to which Arabic-language teachers employ the concept-map strategy in teaching grammatical topics. The questionnaire covered five categories as follows:

1. Teachers’ planning and preparation for teaching grammar using concept maps (items 1, 2, 3, 10, 20).
2. How teachers present and organize grammatical content using concept maps (items 4, 8, 12, 15, 16, 17).
3. Developing students’ thinking skills in general—and grammatical skills in particular—using concept maps (items 6, 9, 18, 11, 13, 26, 34).
4. Teachers’ monitoring of the learning process and improving students’ performance (items 5, 7, 14, 23, 19, 27, 33).
5. Diagnosing and assessing students’ grammatical skills using concept maps (items 21, 22, 24, 25, 32, 28, 29, 30, 31, 35).

A five-point Likert scale was adopted, with responses ranging from “1” (very low) to “5” (very high).

**Instrument Validity (Face Validity)**

To establish face validity, the preliminary version of the questionnaire was presented to five specialists with expertise in measurement and evaluation, curricula, and teaching methods. They reviewed the instrument in light of their experience and provided feedback on the clarity of items and the precision of the wording, as well as recommendations for modification, deletion, or addition to ensure content validity. Based on their comments, several items were rephrased and necessary adjustments were made. The questionnaire was then deemed suitable for administration and, in its final form, comprised 35 items.

**Instrument Reliability**

To verify reliability, the researcher piloted the instrument with an exploratory sample of 20 Arabic-language teachers who teach at the intermediate stage in the northern region and who were not part of the main study sample. The overall Cronbach’s alpha was α = 0.90, which is considered acceptable for scientific research purposes.

**Data Processing and Analysis**

The Statistical Package for the Social Sciences (SPSS) was used to process and analyze the data. To examine the mean levels of Arabic-language teachers’ use of the concept-map strategy in teaching grammatical topics, means and standard deviations were computed and ranked in descending order by mean for participants’ responses. An independent-samples *t*-test was employed to test differences in mean scores for the degree of use according to gender and academic qualification. A one-way ANOVA was used to test differences in mean scores according to years of teaching experience and the number of in-service professional development courses completed by the teachers.

**4. Results**

**Table 1. Demographic Characteristics (N = 100)**

| **Variable** | **Category** | **Count** | **Percentage** |
| --- | --- | --- | --- |
| Gender | Male teacher | 30 | 30% |
|  | Female teacher | 70 | 70% |
| Academic qualification | Bachelor’s degree | 29 | 29% |
|  | Postgraduate studies | 71 | 71% |
| Years of experience | < 5 years | 4 | 4% |
|  | 5–10 years | 15 | 15% |
|  | 11 years and above | 81 | 81% |
| Number of in-service PD courses | 1–3 | 40 | 40% |
|  | 4–6 | 37 | 37% |
|  | 7+ | 23 | 23% |

From Table 1, 70% of participants are female teachers (n = 70) and 30% are male teachers (n = 30). Regarding academic qualification, 71% hold a postgraduate degree (n = 71) versus 29% with a first degree only (n = 29). Most participants (81%) have more than 10 years of teaching experience (n = 81); 15% have 5–10 years (n = 15), and 4% have fewer than 5 years (n = 4). Concerning professional development in modern teaching strategies, 40% completed 1–3 courses (n = 40), 37% completed 4–6 (n = 37), and 23% completed seven or more (n = 23).

**Table 2. Descriptive statistics for the overall research variable**

| **Variable** | **Mean** | **SD** | **Observed range** | **Cronbach’s α** |
| --- | --- | --- | --- | --- |
| Overall questionnaire | — | — | — | 0.92 |
| Use of concept-map strategies in teaching grammatical topics | 3.59 | 0.56 | 2.03–5.00 | 0.90 |

To verify instrument reliability, the researcher administered the questionnaire to a pilot sample of 20 Arabic-language teachers at the intermediate stage. As shown in Table 2, the overall Cronbach’s alpha was 0.90, indicating high internal consistency.

**Results for Research Question 1:** “What is the degree to which Arabic-language teachers employ knowledge/concept maps while teaching grammatical topics to intermediate-stage students?”

To answer this question, means and standard deviations were computed for teachers’ use of concept maps in teaching grammar, and responses were ranked in descending order by mean. The detailed item- and subscale-level results are presented in the next table.

**Table 3. Descriptive statistics for items measuring teachers’ use of the concept-map strategy in teaching grammar to intermediate students**

| **N** | **Item (English rendering)** | **Mean** | **SD** | **Degree** |
| --- | --- | --- | --- | --- |
| 1 | Summarizing grammatical topics and skills logically and in an organized way while learning grammar topics | 3.81 | 0.67 | High |
| 2 | Presenting grammatical topics comprehensively and coherently | 3.78 | 0.65 | High |
| 3 | Guiding students to focus on the main grammatical concepts and rules while learning grammar topics | 3.78 | 0.75 | High |
| 4 | Training students to connect grammatical concepts to one another | 3.73 | 0.69 | High |
| 5 | Helping students simplify the knowledge associated with grammar topics | 3.72 | 0.82 | High |
| 6 | Organizing students’ grammatical knowledge structure while learning grammar topics | 3.69 | 0.72 | High |
| 7 | Developing thinking in general and grammatical skills in particular | 3.68 | 0.78 | High |
| 8 | Assessing higher-order thinking (application, analysis, synthesis, evaluation) while learning grammar topics | 3.68 | 0.77 | High |
| 9 | Reviewing grammatical concepts in course units using the concept-map strategy | 3.67 | 0.68 | High |
| 10 | Detecting students’ conceptual errors while learning grammar topics | 3.66 | 0.88 | High |
| 11 | Enriching students’ information when learning grammar topics | 3.65 | 0.69 | High |
| 12 | Sequencing the presentation of grammar topics according to students’ level | 3.65 | 0.71 | High |
| 13 | Sequencing the presentation of grammar topics according to students’ level | 3.65 | 0.81 | High |
| 14 | Checking students’ retention of grammatical information and rules | 3.64 | 0.76 | High |
| 15 | Motivating students to search for relationships among grammatical concepts | 3.63 | 0.81 | High |
| 16 | Designing activities and exercises using concept maps to teach grammar topics | 3.62 | 0.76 | High |
| 17 | Identifying students’ prior grammatical knowledge structure | 3.61 | 0.77 | High |
| 18 | Developing positive attitudes toward learning grammar topics | 3.60 | 0.74 | High |
| 19 | Measuring the extent of students’ mastery of acquired grammatical concepts and their application in varied contexts | 3.60 | 0.65 | High |
| 20 | Motivating students to generate grammatical knowledge when studying grammar topics | 3.60 | 0.73 | High |
| 21 | Improving students’ grammatical abilities and increasing achievement in grammar | 3.58 | 0.74 | High |
| 22 | Measuring students’ ability to classify grammatical concepts while learning grammar topics | 3.58 | 0.72 | High |
| 23 | Introducing/previewing grammar topics in new lessons | 3.57 | 0.85 | High |
| 24 | Checking students’ understanding of grammar topics in lessons (as a **summative** assessment tool) | 3.57 | 0.67 | High |
| 25 | Planning the time needed to present grammar topics | 3.56 | 0.73 | High |
| 26 | Monitoring students’ **conceptual growth** in grammar while learning grammar topics | 3.55 | 0.74 | High |
| 27 | Checking students’ understanding of grammar topics (as a **diagnostic** assessment tool) | 3.53 | 0.71 | High |
| 28 | Detecting individual differences in achievement while learning grammar topics | 3.53 | 0.71 | High |
| 29 | Checking students’ understanding of grammar topics in lessons (as a **formative** assessment tool) | 3.50 | 0.79 | High |
| 30 | Motivating students to research and inquire while learning grammar topics | 3.46 | 0.76 | High |
| 31 | Selecting activities suitable for teaching grammar topics during lessons | 3.44 | 0.78 | High |
| 32 | Guiding students to use concept maps for **self-review** of grammar topics | 3.44 | 0.73 | High |
| 33 | Preparing achievement tests using concept maps when learning grammar topics | 3.38 | 0.73 | Moderate |
| 34 | Improving the grammatical abilities of **slow-learning** students | 3.34 | 0.75 | Moderate |
|  |
| 35 | Training students in **self-assessment** using concept maps to identify strengths and weaknesses in understanding grammar rules | 3.29 | 0.80 | Moderate |

**Overall mean = 3.59, SD = 0.56 → Level: High.**

Table 3 shows an overall mean of 3.59 (SD = 0.56), indicating a high level of teachers’ use of the concept-map strategy in teaching grammar to intermediate students. Item means range from 3.29 to 3.81, i.e., moderate to high.

The highest mean appears for Item 1 (3.81)—summarizing grammatical topics and skills logically and in an organized way—followed, in descending order, by comprehensive and coherent presentation of grammar topics (3.78), directing students to focus on core grammatical concepts and rules (3.78), training students to connect grammatical concepts (3.73), and helping students simplify knowledge linked to grammar topics (3.72). By contrast, the lowest mean is for Item 35 (3.29)—training students in self-assessment using concept maps to identify strengths and weaknesses in understanding grammar rules.

**Study Hypothesis Results**

**First Hypothesis:**

"There are statistically significant differences in the mean level of Arabic language teachers’ use of the concept-mapping strategy in teaching grammatical topics, attributable to the gender variable."

To test this hypothesis, an independent samples *t*-test was conducted, where the independent variable was gender, and the dependent variable was the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics. The results are presented in **Table 4**.

**Table 4: Differences in Arabic Language Teachers’ Use of the Concept Map Strategy in Teaching Grammar Topics According to Gender**

| **Variable** | **Male Teachers (N=30)** | **Female Teachers (N=70)** |  **T (98)** |
| --- | --- | --- | --- |
| Degree of using the concept map strategy in teaching grammar topics | 3.39 (.62) | 3.67 (.52) | -2.35\* |

\* *p* < .05

Table 4 indicates statistically significant gender differences in the mean degree to which Arabic-language teachers employ the concept-mapping strategy when teaching grammatical topics at the lower-secondary level. Female teachers reported higher use (M = 3.67, SD = 0.52) than male teachers (M = 3.39, SD = 0.62), t(98) = −2.35, p < .05. The mean difference of 0.28 (95% CI [0.024, 0.536]) corresponds to a medium effect (Cohen’s d ≈ 0.51). Accordingly, Hypothesis 1 is accepted, confirming that the degree of use is higher among female teachers.

**Second Hypothesis:**

"There are statistically significant differences in the mean scores of Arabic language teachers’ use of the concept map strategy in teaching grammar topics at the preparatory stage, attributable to the academic qualification variable, with teachers holding graduate degrees employing the strategy to a higher extent than those holding only a bachelor’s degree."

To test this hypothesis, an independent samples *t*-test was conducted, where the independent variable was academic qualification, and the dependent variable was the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics. The results are presented in **Table 5**.

**Table 5: Differences in the Use of the Concept Map Strategy in Teaching Grammar Topics According to Academic Qualification**

| **Variable** | **Bachelor’s Degree (N=29)** | **Graduate Studies (N=71)** | **T (98)**  |
| --- | --- | --- | --- |
| Degree of using the concept map strategy in teaching grammar topics | 3.40 (.50) | 3.66 (.57)  |  -2.14\*   |

\* *p* < .05

It is evident from **Table 5** that there are statistically significant differences in the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics according to the academic qualification variable. Teachers holding graduate degrees (M = 3.66, SD = .57) reported higher levels of use compared to those with only a bachelor’s degree (M = 3.40, SD = .50), with a significant difference (*t* = -2.14, *p* < .05). Based on these findings, the research hypothesis is accepted, indicating that teachers with graduate studies employ this strategy to a greater extent in their teaching practices than those with a bachelor’s degree.

**Third Hypothesis:**

"There are statistically significant differences in the mean level of Arabic-language teachers’ use of the concept-mapping strategy to teach grammatical rules to lower-secondary students, attributable to years of experience; more-experienced teachers employ the strategy to a higher degree than less-experienced teachers."

To test this hypothesis, a one-way ANOVA was conducted, where the independent variable was years of teaching experience and the dependent variable was the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics. The results are shown in **Table 6**.

**Table 6: Differences in the Use of the Concept Map Strategy in Teaching Grammar Topics According to Years of Teaching Experience**

| **Variable** | **Less than 5 years (N=4)** | **5–10 years (N=15)** | **11 years and above (N=81)** | **F (2,97)** |
| --- | --- | --- | --- | --- |
|  Degree of using the concept map strategy in teaching grammar topics | 2.71 (.45) | 3.62 (.63) | 3.63 (.52) | 5.48\*\* |

\*\* *p* < .01

The results presented in **Table 6** indicate that there are statistically significant differences in the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics according to years of teaching experience. Teachers with 11 years or more of experience (M = 3.63, SD = .52) reported higher levels of use, followed closely by teachers with 5–10 years of experience (M = 3.62, SD = .63), compared to novice teachers with less than 5 years of experience (M = 2.71, SD = .45). This difference was statistically significant (*F* = 5.48, *p* < .01).

Based on these results, it can be concluded that years of teaching experience have a significant impact on the extent to which teachers adopt the concept map strategy in teaching grammar topics.

**Fourth Hypothesis:**

"There are statistically significant differences in the mean level of Arabic-language teachers’ use of the concept-mapping strategy in teaching grammatical topics to lower-secondary students, attributable to the number of in-service training courses in modern teaching strategies the teachers have completed."

To test this hypothesis, a one-way ANOVA was conducted, where the independent variable was the number of professional development courses completed, and the dependent variable was the degree of Arabic language teachers’ use of the concept map strategy in teaching grammar topics. The results are presented in **Table 7**.

**Table 7: Differences in the Use of the Concept Map Strategy in Teaching Grammar Topics According to Number of Professional Development Courses**

| **Variable** | **1–3 Courses (N=40)** | **4–6 Courses (N=37)** | **7 or More Courses (N=23)** | **F (2,97)** |
| --- | --- | --- | --- | --- |
| Degree of using the concept map strategy in teaching grammar topics | 3.51 (.60) | 3.49 (.46) | 3.88 (.56) | 4.18\* |

\* *p* < .05

Based on the results in **Table 7**, statistically significant differences were found in the degree to which Arabic language teachers employed the concept map strategy in teaching grammar topics according to the number of professional development courses attended. Teachers who had completed seven or more courses (M = 3.88, SD = .56) reported higher levels of use compared both to those who had attended 4–6 courses (M = 3.49, SD = .46) and those with 1–3 courses (M = 3.51, SD = .60). This difference was statistically significant (*F* = 4.18, *p* < .05).

Accordingly, the hypothesis is accepted, indicating that the number of professional development courses teachers have attended has a significant effect on the extent to which they employ the concept map strategy in their teaching practices.

Excellent — this is already a very rich and detailed Discussion section in Arabic. Let me now render it into academic English, with careful attention to clarity, coherence, and smooth scholarly tone. I’ll preserve the structure (central question, four hypotheses) while polishing the style to meet journal/dissertation standards.

**5. Discussion of Findings**

**Discussion of the First Central Research Question**

The findings related to the first central research question — *“To what extent do Arabic language teachers employ concept maps while teaching grammar topics to preparatory stage students?”* — revealed a high level of use, with an overall mean score of 3.59 and a standard deviation of 0.56.

This result can be interpreted as indicating that Arabic language teachers rely substantially on this strategy when teaching grammar, as it helps simplify grammatical concepts through gradual and sequential presentation. It also enhances students’ comprehension of these concepts, enables them to apply them in their learning, and positions the student as the central agent in the educational process.

The current study is consistent with that of al-Masalmeh (2011), which found a high degree of concept map use across planning, implementation, and assessment domains, and also with Shatat (2007), who reported similarly high levels of concept map use among science teachers.

**Discussion of the First Hypothesis (Gender)**

The results of the first hypothesis indicated that there were statistically significant differences in the degree of teachers’ use of concept maps in teaching grammar topics according to gender, with female teachers reporting higher use than their male counterparts.

This finding can be explained in light of the characteristics of concept maps as a teaching strategy. Concept mapping requires hierarchical organization, systematic planning, and detailed elaboration — features that may align with teaching traits often associated with female teachers in educational settings (Ali, 2017). In addition, concept maps depend on attention to visual and aesthetic detail, and female teachers may display a greater inclination toward strategies based on structured organization and visual presentation of complex grammatical information (al-Tanawi, 2018).

Furthermore, concept maps require teachers to integrate visual and verbal communication skills simultaneously during instruction; female teachers may demonstrate greater facility in combining these modes effectively. Finally, because concept maps are designed to build gradual knowledge bridges linking grammatical concepts, female teachers may be more inclined to adopt methods that emphasize coherence and logical sequencing in the presentation of content (Samara, 2016; Sari & Faridi, 2020).

**Discussion of the Second Hypothesis (Academic Qualification)**

The results of the second hypothesis showed statistically significant differences in teachers’ use of concept maps according to academic qualification. Teachers holding **graduate degrees** reported higher levels of use compared to those holding only a bachelor’s degree.

This result may be attributed to the broader exposure of graduate-level teachers to a wide range of research on effective learning and contemporary instructional strategies, particularly concept mapping. Their familiarity with studies highlighting the impact and effectiveness of concept maps across various fields of Arabic language instruction — including enhancing academic achievement, improving cognitive skills, and fostering creative and critical thinking — enables them to master and apply the strategy more effectively (Khudair, 2011; al-Dardour, 2001; Bousahla & Farahawi, 2020; Fandi & Ali, 2011). In grammar specifically, concept maps have been shown to improve student achievement and grammatical skills (Muqabila & al-Falahat, 2010; Youssef, 2019; Beydogan & Bayindir, 2010).

This finding is consistent with prior research confirming significant differences in teachers’ use of concept maps according to academic qualification, favoring those with graduate-level education (Salahat, 2021; Abdul Jawad, 2022; al-Lahawiya, 2014).

**Discussion of the Third Hypothesis (Teaching Experience)**

The third hypothesis revealed statistically significant differences in teachers’ use of concept maps according to years of teaching experience. Teachers with 11 years or more of experience reported higher levels of use than those with fewer years of service.

This result can be explained by the advanced teaching skills and professional expertise developed through extended classroom practice. Effective implementation of concept maps requires the ability to analyze grammatical content, break it down into its core components, and reorganize it hierarchically and relationally using geometric forms and linking arrows. Such skills develop through long-term experience.

Experienced teachers are also better equipped to anticipate students’ difficulties with complex grammatical rules, making them more aware of the importance of using visual and organizational tools like concept maps. Moreover, concept mapping requires flexibility in addressing individual learner differences and adjusting the map during lessons — a capacity that grows with years of teaching practice. For instance, teachers often tailor maps to visual, auditory, and kinesthetic learners, enrich them with multimedia features, and adapt texts according to students’ proficiency levels, thereby ensuring learning objectives are met (Kashkosh, 2024).

This result is consistent with studies by Abdul Jawad (2022), Abdul Aziz & Aba Husayn (2019), and al-Lahawiya (2014).

**Discussion of the Fourth Hypothesis (Professional Development Courses)**

The results of the fourth hypothesis showed statistically significant differences in teachers’ use of concept maps according to the number of professional development courses attended. Teachers who had completed **seven or more courses** reported higher levels of use compared to those who had attended fewer courses.

The researcher attributes this result to the characteristics and advantages of the concept map strategy, which requires a deep understanding of the principles of instructional design and cognitive organization. Implementing this strategy effectively demands mastery of specific technical skills such as identifying main and subordinate concepts, creating logical links among them, selecting appropriate colors and symbols, and becoming proficient in specialized digital applications designed for concept mapping. These applications are used to present maps in engaging and interactive ways for students, particularly through platforms such as **Mindomo**,[[5]](#footnote-5) which provides structured digital mapping features, and **Napkin AI**,[[6]](#footnote-6) which offers AI-driven tools for generating and refining concept maps. Such specialized skills are usually acquired through multiple and varied professional training courses.

Moreover, concept mapping requires a thorough understanding of visual learning and active learning theories, which are often emphasized in continuous professional development programs. Teachers who participate in a greater number of training courses are generally more familiar with the diverse practical applications of concept mapping across various areas of Arabic language teaching, including grammar. This broader exposure increases their confidence and motivation to experiment with and adapt the strategy to suit the teaching of complex grammatical rules, which often demand innovative and advanced pedagogical methods to make them clearer and more comprehensible for students (Kashkosh, 2024). The present finding aligns with Abdul Aziz & Aba Husayn (2019).

**6. Conclusion**

The findings of this study revealed the reality of Arabic language teachers’ use of the concept map strategy in teaching grammar to preparatory stage students in Arab schools in Israel. The results showed that the overall level of use was high, with a mean score of 3.59, indicating that teachers are aware of the importance of this modern instructional strategy and are actively seeking to apply it in their teaching practices in the field of grammar.

The study also revealed statistically significant differences in teachers’ use of concept maps according to several demographic and professional variables: gender (in favor of female teachers), academic qualification (in favor of teachers with graduate degrees), years of teaching experience (in favor of more experienced teachers), and number of professional development courses (in favor of those who had completed more courses).

Based on these results, the study emphasizes the urgent need to develop specialized and targeted training programs, particularly for male teachers and those with less experience. It also highlights the importance of creating a practical instructional guide to help teachers maximize the benefits of concept mapping in their grammar instruction. Furthermore, the findings point to the necessity of investing in continuous professional development through specialized training courses to ensure the enhancement of grammar teaching quality in Arabic.

Finally, the study recommends conducting future research to explore the impact of concept map strategies on students’ achievement and their understanding of grammatical rules, thereby contributing to the enrichment of educational literature in the field of teaching Arabic grammar.

**7. Recommendations**

In light of the findings of this study, several recommendations are proposed to enhance the effective use of concept map strategies in teaching Arabic grammar at the preparatory stage:

1. **Professional Training Programs**
	* Develop specialized training workshops on concept map design and implementation, targeting especially male teachers and novice teachers with fewer years of experience.
	* Integrate hands-on practice using digital tools (e.g., *Mindomo, Napkin AI*) to familiarize teachers with technology-supported concept mapping.
2. **Practical Instructional Guide**
	* Create a comprehensive teaching manual that provides step-by-step guidance on how to design, present, and adapt concept maps for grammar instruction.
	* Include sample concept maps tailored to different grammar topics, alongside suggested classroom activities and evaluation rubrics.
3. **Continuous Professional Development**
	* Encourage teachers to regularly attend professional development courses, emphasizing the value of repeated and varied exposure to advanced teaching strategies.
	* Provide incentives for teachers to engage in lifelong learning, such as recognition certificates, promotions, or salary bonuses tied to professional training.
4. **Curriculum Integration**
	* Embed concept map strategies explicitly within national Arabic grammar curricula, ensuring consistency in their application across schools.
	* Promote the use of student-centered approaches, encouraging learners to construct their own maps as a tool for active learning and self-assessment.
5. **Research and Evaluation**
	* Conduct future studies examining the direct impact of concept mapping on students’ grammar achievement, comprehension, and long-term retention.
	* Explore the effectiveness of concept maps in other areas of Arabic language instruction (e.g., reading comprehension, writing, literature) to extend their pedagogical value.
	* Assess the comparative effectiveness of manual versus digital concept maps, especially in technology-enhanced learning environments.
6. **Collaboration and Knowledge Sharing**
	* Establish teacher communities of practice where educators can share best practices, exchange sample maps, and reflect on their experiences in applying the strategy.
	* Encourage collaboration between universities, teacher colleges, and schools to sustain ongoing innovation in grammar pedagogy.

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1. . RAMA = The National Authority for Measurement and Evaluation in Education, Israel. [↑](#footnote-ref-1)
2. . This is a teaching approach that begins with the study of specific cases or particular examples in order to arrive at a general rule or overarching concept. It relies on reasoning and inference by providing learners with a sufficient number of examples, with the goal of enabling them to derive and generalize grammatical rules and principles (Yousef, 2019). [↑](#footnote-ref-2)
3. . This is an instructional approach based on moving from the general to the specific, and from the whole to the part. According to this method, the teacher presents the general rule to the students, followed by examples, evidences, and specific applications (Yousef, 2019). [↑](#footnote-ref-3)
4. . **Resource-room teachers** are specialist educators who work in dedicated instructional settings designed to provide educational and pedagogical support for students with learning difficulties. These settings—known as **resource rooms**—are learning environments equipped with specialized materials and teaching tools intended to assist students who face learning challenges, with the aim of developing their academic skills and helping them overcome the difficulties they encounter. Resource-room teachers receive specialized training in special education and learning difficulties, which equips them to employ innovative, varied instructional strategies—such as concept mapping—to meet the individual educational needs of students with learning difficulties and to enhance their comprehension and grasp of material (Danbaʿ & Bani Khalid, 2020). [↑](#footnote-ref-4)
5. . https://www.mindomo.com/ [↑](#footnote-ref-5)
6. . https://www.napkin.ai/ [↑](#footnote-ref-6)