

Implementing Meta-cognitive Learning Strategies to Improve Intertextual Arabic Comprehension Competences: An Intervention Study Among Arabic-speaking Tenth Graders

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Abstract—Intertextual understanding is a complex cognitive process that involves linguistic and cognitive skills together with the application of appropriate learning strategies, in order to understand the implicit meaning of the text. To foster intertextual skills among the learner as a habit of thinking, the present study made use of meta-cognitive learning strategies, due to their pedagogical benefits demonstrated in previous studies. Based on experimental research, the aim of the study was to examine to what extent the use of meta-cognitive learning strategies (as opposed to traditional methods) will lead to improved intertextual skills among tenth graders, and how it affects the understanding of intertextual texts. An intervention group (n=27) and a control group (n=27) from the same school were instructed during twelve weeks: the intervention group was taught using meta-cognitive strategies, while the control group was taught using classic ones. The findings indicated a significant improvement in the general score of reading comprehension in the intervention group, that involved three of four intertextual skills. The study recommends the usage of meta-cognitive instruction strategies in reading comprehension lessons.

Index Terms—meta-cognitive learning strategies, intertextual competences, thinking development, teacher training

I. INTRODUCTION

Intertextual understanding involves the use of linguistic and cognitive skills, as well as the implementation of appropriate learning strategies for deciphering the meaning of old texts incorporated in a new one. Learning strategies are a sequence of cognitive processes that affect the information processing process to provide the student with the tools on how to learn, and solve problems (Tsuman & Abed-Elhak, 2016). Zohar & Peled (2008) pointed out that, these learning strategies are important activities that make the learning process more successful, efficient and enhances students' sense of ability and independence. Of all the learning strategies, meta-cognitive strategies are seen as one of the methods that serve the aforementioned purposes. Zohar and Barzilai (2013) refer to meta-cognitive learning strategies as activities and skills that the learner uses to plan, monitor and evaluate his learning process. It seems to be that, through the practice and implementation of meta-cognitive learning strategies, high school students will be able to cope with all the difficulties in understanding texts of all kinds, including intertextual texts. In Israel's Arabic-speaking high schools, intertextuality is an integral part of the new curriculum of Arabic language and literature (Ministry of education, 2013). This curriculum attributes great significance to students' ability of conducting a methodical and multi-dimensional comparison between two texts and identifying literary intertextual phenomena, like parody or allusion¹. However, the common teaching methodology of intertextuality in high schools is based on demonstration of the phenomena without developing the learners' ability to find linkages between texts. As a consequence, the students find it difficult to identify and analyze intertextuality on their own, and this issue continues to haunt them into their college studies, a difficulty that is reflected in their relatively low achievements in Arabic matriculation exams (Alecc-L ehman, 2006). Therefore, the goal of the current study was to examine the impact of an intervention program (which is based on meta-cognitive learning strategies) on the intertextual competences among 10th graders, and how it affected the understanding of intertextual texts.

¹ Parody: a literary work or music that copies the style of a serious genre in a way that is intentionally humorous. Allusion: is a brief and indirect reference to a person, place and thing. It is just a passing comment and the writer expects the reader to possess enough knowledge to spot the allusion and grasp its importance in a text (Naham, 2004).

II. THEORETICAL BASES

A. *Meta-cognitive Strategies, and Their Positive Impact on Teaching-learning Processes*

Meta-cognitive strategies are one of the major components of meta-cognition. According to Flavell (1979), meta-cognition, or “thinking about thinking”, refers to a human's awareness of his thinking process, its regulation and control. In education, meta-cognition is defined as how students monitor and control their learning processes (Jiang et al., 2016). Scholars identify three components of meta-cognition: meta-cognitive knowledge, meta-cognitive strategies (skills), and meta-cognitive experiences (Flavell et al., 2002; Zohar & Barzilai, 2013). Meta-cognitive knowledge refers to individual's knowledge about cognitive resources (e.g., competences, processes, and thinking strategies) in the context of executing a specific cognitive task, and different ways of solving thinking problems (Flavell, 1979). Meta-cognitive strategies (skills) are targeted actions taken by the learner to plan, guide and assess his thinking and learning process (Zohar & Barzilai, 2013)². Meta-cognitive experiences refer to feelings and judgements of the learner during the execution of his cognitive assignment (Flavell, et al., 2002). Literature pointed out the positive impact of meta-cognitive strategies in the teaching of all subjects, particularly through:

i) **Fostering meaningful learning.** Using of meta-cognitive learning strategies leads to an in-depth understanding by allowing learners to actively use the knowledge they had acquired during their learning in a new context (i.e., transference, Zohar, 2016) and support independent learning (Lihua, 2013).

ii) **Improving academic achievements.** Studies that focused on the relationship between meta-cognitive learning strategies and academic achievements consistently suggested that the later improve when more meta-cognitive strategies are involved in the learning process, and that learners with higher achievements (compared to lower-achieving learners) implement more meta-cognitive thinking strategies (Keselman, 2003; Lihua, 2013). It was further found that integrating meta-cognitive teaching strategies with co-teaching improves academic achievements among lower-achieving learners (Susantini et al., 2018).

iii) **Developing higher-order thinking skills.** Scholars agree that using of meta-cognitive learning strategies can contribute to the improvement of high-order thinking skills and promoting learning processes. Several studies have highlighted the positive impact of meta-cognitive strategies on improving high-order thinking skills in different disciplines, like science teaching (Susantini et al., 2018; Zohar & Peled, 2008), maths (Desoete & Roeyers, 2006), and reading comprehension (Leutner et al., 2007; Veenman & Beishuizen, 2004). Some studies focused more specifically on language. Lihua (2013) for instance found a positive relationship between the frequency of using meta-cognitive learning strategies and the improvement of English language skills in the three fields of language: reading comprehension, written expression and listening comprehension. Other researchers found that implementing meta-cognitive learning strategies while analyzing and studying texts in Arabic language, improves high-order thinking skills including identifying elements and linkages, deduction, comparison and evaluation (Mustafa, 2004; Tsuman & Abed-Elhak, 2016).

B. *Application of Meta-cognitive Instruction in a Visible and Explicit Way*

Zohar and Barzilai (2013) suggested a number of recommendations for the incorporation of meta-cognitive strategies during teaching in order to enable students play an active role in their learning and in constructing their knowledge. These strategies include:

i) **Using meta-cognitive incentives.** The use of symbols, questions or reminders encourage students to use meta-cognitive knowledge or skills when engaging in learning activities.

ii) **Meta-cognitive discussions.** Group discussions moderated by the teacher are thought to encourage the students to share their thinking processes with their peers and to make these processes a visible and central topic of discourse while engaging in various cognitive activities.

iii) **Reflective writing in a thought log.** This tool allows learners to describe, analyze and evaluate – in detail – the activities, thoughts, and deliberations in the context of a task. Through the thought log, teachers can follow their students' thinking processes for long periods and receive a great deal of information in an authentic learning context. Thought logs are effective both in improving learning processes and in developing student's meta-cognitive learning strategies such as control, self-assessment, transference, planning and goal setting, as well as problem-solving (Segev-Miller, 2004).

iv) **Modeling of think- aloud.** In this strategy, teachers demonstrate to their students how to apply meta-cognitive knowledge and skills in the context of task execution. In the modeling process, the teacher verbalizes his or her thinking process while performing a task or during problem solving, and then the students are asked to practice the same method (Leighton, 2017).

C. *Defining Intertextuality According to Different Approaches*

² Learning process guided by meta-cognitive strategies starts with a planning phase. It includes goal setting, choosing learning strategies and appropriate thinking competences, setting the order of strategies, identifying the expected difficulties, and raising possible solutions. The monitoring phase refers to individuals' awareness and examination of their thinking processes during the execution of the cognitive assignment. The evaluation is conducted post-learning and includes learners' reflection about their learning and thinking processes, as well as their insights (Zohar & Barzilai, 2013).

Intertextuality is a challenging concept to define, since it is perceived differently by scholars from different disciplines (history, literature, communication) (Allen, 2000). Literature suggests three main approaches to intertextuality. The first approach views intertextuality in the wider cultural context, looking at texts of all genres (written, painted or otherwise performed) as representing culture and as interrelated. According to this approach, the readers implement their previous experience when encountering new texts, connecting the new texts to old ones, and reading them from an intertextual perspective. Among the advocates of this approach are the Russian scholar Bakhtin (1989), the semiotic linguistic Kristeva (1980) and the literature researcher Barthes (1977). The second approach views intertextuality as a literary phenomenon, which exists between different literary texts. Intertextuality in literature is created through measures like parody or allusions. The main representatives of this approach are the semiotician Sebeok (1985) and the literature researchers Ben-Porat (1985) and Genette (1997). The third approach, more recently developed by Sarig (2002), overlooks the genre of texts and instead focuses on the different relationships between texts through a systematic model that includes four different types of relationships between old and new texts. The first type examines the relationship in terms of identifying the origin or genre of the old text in the new text. The second type focuses on identifying the presence (explicit or implicit) of the old text in the new text. The third type explores the relationship in terms of conversion (change), deducing the quality and type of processing of the old text in form and content as part of the transference to the new text. The processing can be light, medium or comprehensive, to the point of a complete change of form and content. The fourth type refers to the inter-text relationship in the thematic and idea level, deducing the implicit meaning behind the integration of the old text in the new text by comparing similar or different themes in both texts.

In the current study we relied on Sarig's (2002) model for two major reasons: First, because the model refers to texts of all genres (literary as well as other forms of art works). In the context of the study, the intervention group was asked to analyze intertextual texts and compare them with different types of art work, such as pantomime³, caricature⁴, and collage⁵, in order to deduce the common themes between them. Second, because the model defines four key skills of intertextuality, which were all incorporated into the present intervention program and were examined in the tests before and after intervention. These are high order thinking skills that teaching sought to strengthen among the intervention group during intertextual text analysis using meta-cognitive learning strategies, the latter known in the professional literature for their positive effects in cultivating high-order thinking skills.

In light of the major pedagogical benefits of meta-cognitive learning strategies, which have been demonstrated in previous literature, it was necessary to implement these strategies among high school students while analyzing intertextual texts in order to: (a) foster the learners' ability of linking and connecting text as a general tendency and a habit; (b) enable students to form intertextual connections and construct their meaning; and (c) encourage learners to present knowledge and share it with peers.

D. Research Question and Hypothesis

The study research question was: To what extent does the use of meta-cognitive learning strategies (as opposed to traditional methods) fosters intertextual competence among tenth graders? Based on previous literature, it was predicted that the intervention program would lead to improvement in the four key intertextual competences, defined here as follows: i) Identifying the source of the previous text incorporated in the new text; ii) Identifying the extent of presence of the old text in the new text; iii) Deducing the type of variation made in the transition from the old text to the new text; and iv) Deducing the implicit meaning behind incorporating the old text into the new text. Operatively speaking, improvement in these skills will thus lead to an improvement after intervention of the overall grade in reading comprehension that will be expressed in terms of higher scores in the intervention relative to the control group.

III. METHODOLOGY

A. Participants

Two 10th grade classes (16 years old) with a total of 54 Arabic-speaking students were recruited (as convenience sample) from two classes from the same high school in the Western Galilee region in Israel. Both classes belonged to the technological science reserve track. The first class (N=27) served as an intervention group while the second class (N=27) served as a control group.

B. Research Tools

Both groups were tested before and after the intervention with the aim of assessing the impact of the intervention program on their intertextual competences. Prior to the intervention, all participants filled a number of questionnaires related to individual background information, exam anxiety and attitudes toward Arabic language. Also, their academic

³Pantomime: a play or entertainment in which the performers express themselves mutely by gestures, often to the accompaniment of music (Naham, 2004).

⁴Caricature: a drawing or written or spoken description of someone that usually makes them look silly, in order to be funny and sometimes even to provoke criticism (Naham, 2004).

⁵ Collage: a picture in which various materials, for example paper, cloth, or photographs, are stuck onto a larger surface. Similar to painting, the artistic expression is expressed through color, shape, composition, etc (Naham, 2004).

achievements in Arabic language were collected from school reports. Additionally, all students underwent a pre-intervention intertextuality test to assure comparability between the groups. Following the intervention, both groups performed a second intertextuality test to assess the program's impact on the students' competences.

1. Socio-demographic questionnaire: In this questionnaire, the participants were asked to provide information about their gender, religion, parents' education (i.e., the educational level of both parents), parents' occupation and parents' income. For example, "Parents' income: was rated as lower than average (1), average (2) and higher than average (3) (see details in Appendix A).

2. Test anxiety questionnaire: Test-anxiety was assessed using a questionnaire based on Spielberger (1980). The questionnaire was translated into Arabic using a reverse translation methodology from the Hebrew version developed by Zeidner and Nevo (1993). The questionnaire included 20 statements that refer to anxiety before or during an exam, such as for example: "I get anxious before tests, even when I am well prepared". The participants were asked to indicate their agreement with each statement on a 5-point Likert scale (1 = never; 5 = always). The variable "test anxiety" was calculated as the average score based on the participants' responses to all statements, with a higher value representing a higher level of anxiety score. The alpha Cronbach reliability of the questionnaire was of 0.85 (see details in Appendix B).

3. Attitude towards the Arabic language questionnaire: The questionnaire was based on a similar questionnaire of attitudes toward the Hebrew language as a foreign language by Alian and Abu-Husein (2015). The questionnaire was translated into Arabic using the reverse translation method by expert translators who are fluent in both languages, and in collaboration with an Arabic language education professional. All professionals agreed that the questionnaire was perfectly suited for its original purposes. The questionnaire was adapted to the purpose of the present study and examined attitudes toward the Arabic language using 18 statements such as for example: "I love studying Arabic", or "Knowing Arabic will make me a more educated person". Again here, the participants were asked to indicate their agreement with each statement on with a 5-point Likert scale (1 = totally opposed; 5 = totally agree). The variable "attitudes toward Arabic" was computed as the average score of the participants' responses to all statements, with a higher value representing more positive attitudes. The alpha Cronbach reliability of the questionnaire was of 0.803, (see details in Appendix C).

4. Academic achievements: Data about the participants' academic achievements were handed by the school and were used as base-point data, making sure the groups were comparable. These data included the average grade for the Arabic language at the end of their ninth grade (i.e., just prior to their enrollment in the study).

5. The intertextuality tests: Since the objective of the study was to assess the effects of intervention program on intertextuality competences, two versions of intertextuality tests were developed and validated, in order to avoid a situation where students would remember the answers in the post-test. The pre-intervention test consisted of reading and analyzing an argumentative text (of about 2305 words). The measures of the participants' intertextual competences constituted a base point for both groups. The post-intervention test consisted of reading and analyzing a narrative-symbolic text (of about 2146 words) aiming at assessing the participants' intertextual competences following the intervention.

Each of the tests included 26 closed-ended comprehension questions. Four were phrased based on the first level of reading comprehension, focusing on the identification of details (questions no. 1, 2, 3, 19), while the rest of the 22 questions were designed to examine the four intertextual competences: i) Identification of the origin of the old text in the new text (4 items: no. 7, 9, 12, 18); ii) Identifying the extent of presence of the old text in the new text (2 items: no. 5, 16); iii) Deducing the type of processing in transference from the old text to the new text (2 items: no. 11, 22); and iv) Deducing the implicit meaning behind the integration of the old text in the new text (14 items: no. 4, 6, 8, 10, 13, 14, 15, 17, 20, 21, 23, 24, 25, 26). (see details in Appendix D).

To ensure the validity of both tests (pre and post), the researcher consulted four Arabic language experts and made sure that all four intertextual skills were incorporated in both tests. The reliability of both tests was examined prior to the study in another pilot group (of about 33 participants from the 10th grade) for the purpose of the study, and tested in two different ways: first with a Cronbach alpha test of the two versions separately. It was found that the reliability value of the pre-test was equal to 0.76 while the reliability value of the post-test was 0.74. Both of these values indicated a medium reliability, with no recommendation to omit questions because this did not yield a higher reliability value. The second reliability test was conducted by creating two different versions from the general tests (pre and post) separately, each one with 13 questions. A Pearson correlation was calculated between the participants results in the two versions of the pre-test, and was found to be statistically significant ($r = 0.391$, $p < 0.05$), while Pearson's value of the post-test was found to be statistically significant ($r = 0.317$, $p < 0.05$), suggesting that both versions were comparable, and the reliability was reasonable-medium for both tests (pre and post).

6. The intervention program

Program's objectives	1-Improving intertextual skills among the intervention group through the application of research-based meta-cognitive learning strategies (Zohar and Barzilai, 2013). 2- Fostering students' awareness of their learning processes while applying meta-cognitive skills, such as planning, monitoring and regulating, when analyzing intertextual texts.
Who implemented the program?	The researcher herself implemented the intervention program in two 10 th grade classes. The first class served as an intervention group while the second was a control group.
Time frame	Two weekly hours for a period of 12 weeks, during reading comprehension lessons (a total of 24 lessons for each group).
Contents of the intervention	<p>1-The intervention content was adapted according to the curriculum of reading comprehension for both classes. After consulting with the Arabic language teachers of both classes, four texts of reading comprehension were selected from the curriculum that included the topic of intertextuality, in order to integrate and analyze them in the intervention program. Four lessons were devoted to each text.</p> <p>2-The literary genre of the texts: Two of the texts were argumentative, and the other two were narrative symbolic texts.</p> <p>3-Learning strategies for the intervention group: Students were asked to implement meta-cognitive learning strategies during the analysis of the four intertextual texts, according to the following stages: planning, monitoring, and evaluation. The planning stage included: 1- Using the thought log, students were asked to describe, analyze and evaluate - in detail- the activities, thoughts, and deliberations in the context of a task (deducing from the previous texts incorporated in the new text). Through the thought log, the researcher followed their students' thinking process over a long period and received a great deal of information in an authentic learning context.</p> <p>2- Meta-cognitive discussions (in pairs): The students were required to verbalize their thought processes to their peers, and to make them a visible and central topic of discourse while engaging in the cognitive activities. 3- Modeling of think-aloud: First, the researcher loudly verbalized her thinking processes while performing the task or problem solving, and then the students were asked to demonstrate their thinking processes to their peers.</p> <p>The monitoring stage included Meta-cognitive incentives. The students were assisted by questions, reminders and symbols when asked to engage in online tasks (an e-learning unit in groups) in the context of acquiring the four main intertextual skills when analyzing the texts. Students were also asked to compare the intertextual texts with other forms of art works, such as a collage, pantomime, and a folk song, in order to conclude the common themes.</p> <p>The Evaluation Stage included Meta-Cognitive Discussions (in group). Students were asked to reflect on their cognitive activities during the intervention program and discuss the following points: Their success in achieving the goals, their assessment of the use of meta-cognitive learning strategies, suggestions for improving cognitive activities, and the insights behind it.</p> <p>Learning Strategies for the Control Group: Different forms of frontal instruction were used when analyzing the four intertextual texts as follows: 1-Lectures: Based on presentations, the researcher explained the topic of intertextuality, including explanation and reference to the four main skills of intertextuality as well as and reference to another type of intertextuality from other forms of artworks, such as pantomime, collage, or folk song. 2- Discussion and dialogue during learning. 3- Providing tasks and questions individually to students for the four intertextual skills and comparing the intertextual texts with other forms of artworks. 4-An individual reflection on the intervention program using a questionnaire.</p>
Program structure for both groups	The program included the following stages: 1- Providing a general explanation of the program. 2- Completing various background questionnaires and performing the pre-intervention to measure the four intertextual skills. 3- Implementation of the intervention program by the researcher (2 hrs.) For three months. 4- Performing the post-intervention to examine the extent of the effect of the intervention plan on improving the intertextual skills.
The validity of the plan	The intervention program was reviewed by three Arabic language experts and one expert in thought development. The experts made some technical notes and agreed that the program was indeed adapted to all participants and suitable for the proposed objectives.

7. Data collection and analysis

After having obtained the approval from the Chief Scientist, the Mofet Institute's Ethics Committee, the school principal and the students' parents, the students in both groups were given a general explanation about the study. The research was conducted in the school according to a five stages schema. (i) Collecting general information by the researcher, through demographic questionnaire, test anxiety questionnaire, academic achievements in Arabic and the pre-intervention test in intertextuality (The students themselves filled out the paper questionnaires, for two lessons in the class). (ii) Analysis of background information and pre-intervention intertextuality test results. (iii) Implementation of the intervention program during 12 weeks. (iv) Post-intervention test. (5) Analysis of post-intervention tests and final data analysis.

The collected data were analyzed using SPSS software. The baseline measurements were compared between the two groups using *t*-tests for independent samples. The students' performances in the competency tests (pre and post) were analyzed using a 2×2 analysis of variance with group (intervention vs. control) as a between subjects factor and time (pre- vs. post intervention) as a within-subject factor.

IV. RESULTS

A. Background Data

Table 1 presents the descriptive statistics (means and standard deviations) for each of the background variables for the control and intervention groups. These include the variables: parents' education, socio-economic status, attitudes toward Arabic, exam's anxiety, academic achievements in Arabic. To examine the difference between the means of the two groups in the background data, *t*-tests for two independent samples were conducted on each measure. As shown in Table 1, no significant difference was observed between the two groups in any of the background measures (see *t*-values on the right).

TABLE 1
BACKGROUND DATA: COMPARISON BETWEEN GROUPS

	Control		Intervention		<i>t</i>
	M	SD	M	SD	
Parents' level of education	3.94	1.17	4.35	.81	-1.49
Parents' income	2.22	0.42	2.30	.47	-0.61
Attitudes toward Arabic	3.56	0.71	3.47	.77	-0.456
Exam's anxiety Questionnaire	2.36	0.68	2.25	.59	-0.642
Achievement in Arabic	89.78	6.23	90.33	5.32	0.352

B. The Performance Data in the Competency Pre-test

Table 2 presents the descriptive statistics (means and standard deviations) for each of the performance of the two groups (control and intervention) in the competency pre- test. These include four intertextual competences. To examine the difference between the means of the two groups in the performance in the competency pre-test, *t*-tests were performed for two independent samples in all dimensions. As shown in Table 2, the findings indicated no significant difference between the two groups in the performance in the competency pre-test (see *t*-values on the right).

TABLE 2
PERFORMANCE DATA IN THE COMPETENCY PRE- TEST: COMPARISON BETWEEN GROUPS

	Control		Intervention		<i>t</i>
	M	SD	M	SD	
Identifying source	2.59	0.89	2.22	0.75	-1.645
Identifying presence	0.89	0.85	0.67	0.62	-1.100
Deducing processing	0.89	0.75	1.11	0.89	0.991
Deducing meaning	7.67	1.49	8.26	1.56	1.426
Competency general score	15.56	2.26	15.89	2.01	0.573

C. Intertextual Performance

Table 3 presents the students' performance in the competency tests (pre- and post-intervention) first in terms of general score and then for each of the four intertextual skills. The 2×2 analysis of variance (with group: intervention vs control as a between subjects' factor, and time: pre- vs. post-intervention as a within-subject factor) conducted first on the general score showed highly significant main effect of group ($F(1, 52)=16.92, p = .00014, \eta^2 = .256$). This was due to the fact that in the average, the intervention group performed higher ($M = 18.56, SE = 0.42$) than the control group ($M = 16.09, SE = 0.42$). A significant time effect ($F(1, 52)=182.58, p = 0.0000, \eta^2 = .778$) was also found, due to an average higher score in the post-intervention ($M = 18.93, SE = 0.29$) than in the pre-intervention test ($M = 15.72, SE = 0.35$). As expected, a highly significant interaction ($F(1, 52)=80.68, p = .00000, \eta^2 = .608$) was observed between the two factors. As we can see in Table 2, and confirmed by the Bonferroni post-hoc tests, this effect was due to a much higher change in score of the intervention ($p = .00000$, average change =5.33) than in the control group ($p = .014$, average change =1.07).

TABLE 3
INTERTEXTUAL PERFORMANCES: COMPARISON BETWEEN GROUPS

	Control		Intervention		Interaction
	Pre	Post	Pre	Post	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
General score	15.56 (2.26)	16.63 (3.12)	15.89 (2.01)	21.22 (1.89)	$F=80.68, p=.00001$
Identifying source	2.59 (0.89)	2.44 (0.97)	2.22 (0.75)	3.19 (0.74)	$F=10.27, p=.002$
Identifying presence	0.89 (0.85)	1.11 (0.64)	0.67 (0.62)	1.78 (0.51)	$F=14.86, p=.0003$
Deducing processing	0.89 (0.75)	1.19 (0.68)	1.11 (0.89)	1.67 (0.48)	$F=1.02, p=.32$
Deducing meaning	7.67 (1.49)	9.07 (1.90)	8.26 (1.56)	11.63 (1.39)	$F=22.03, p=.00002$

The ANOVA conducted on each one of the four skills showed significant interactions between the factors in all but one of the four intertextual skills (see *F* and *P* values in Table 2, right), due to a differing score improvement between the intervention and the control group. The decomposition of all significant interactions using Bonferroni post-hoc tests showed that score change between pre- and post-intervention testing was significant in the intervention (and not in the control) group in "Identifying source skill" ($p = .0015$) and in "Identifying presence skill" ($p = .0015$). In "Deducing meaning skill", a significant improvement was found in both intervention ($p = .00000$) and control ($p = .0001$) groups, although with a much larger effect size in intervention ($\eta^2 = .894$) than in the control group ($\eta^2 = .382$).

V. DISCUSSION AND CONCLUSION

The aim of the current study was to examine to extent to which a teaching intervention based on meta-cognitive learning strategies would, relative to a classical teaching strategy, lead to improvement in intertextual competences among 10th graders as manifested in the understanding of intertextual texts. For this purpose, an intervention and a control group of students were recruited from the same school and tested before and after the intervention to assess the impact of the program on the intertextual skills indices.

At the baseline, the finding indicated no significant difference between the two groups in terms of background data, as well as in the overall intertextual competence and specific skills. The significance of this result is that the two groups were similar and started from the same level. The statistical comparison of the scores of the two groups in the pre- and post-intervention tests revealed a significant improvement in the general score, attributed mainly to the intervention group as attested by the interaction between groups and testing time. The increased performance in the intervention group was found in all intertextual skills, although with a smaller (non-significant) effect in the "deducing processing" skill domain. A possible explanation for this very small/weak effect might be related to the complexity and difficulty of acquiring competence in this skill compared to others (Naham, 2004). In order to improve this skill, the students in the intervention group were asked to deduce the quality and type of change which is made in the form and the content in the transition from the previous text to the new text. Apparently, the students are not used to performing such complex learning activities, hence they experienced some difficulties in this task. Another alternative explanation for this weak effect might be related to the fact that this skill (although not the only one) was examined through two items only. Increasing the number of items for assessing this and other skills would probably create more variance and thus make the derived measure more sensitive. Nevertheless, the present finding has shown that meta-cognitive learning strategies could indeed be effective in improving this intertextual competence.

The findings reported here are consistent with findings reported in previous studies (e.g., Lihua, 2013; Mustafa, 2004; Tsuman & Abed-Elhak, 2016) where implementation of meta-cognitive learning strategies during reading comprehension texts (in English or in Arabic) analysis improved high-order thinking skills such as identification of elements and connections, deduction, comparison and assessment.

Furthermore, these findings are of significant importance because they highlights the characteristics of the meaningful learning process experienced by the intervention group (Ausubel's , 1978). During learning, the students were instructed to use meta-cognitive strategies; they formed the intertextual linkages themselves, constructed their meaning and adopted the rational that helped them connect new concepts to familiar ones, already in their consciousness and they are used to share it with their friends as a tendency and a thinking habit. It should be noted that students' experience of the learning process collaboratively with meta-cognitive learning strategies increased their motivation for learning and improved their general grade in the post-intervention test. This finding is also in agreement with observations by Susantini et al. (2018) who suggested that the combination of meta-cognitive learning strategies with collaborative teaching promotes students' achievements.

Conclusion

Altogether, the findings described here confirmed the study research hypothesis related to all four intertextual skills, supporting thus the argument that intervention programs based on meta-cognitive teaching strategies improve intertextual competences. In light of these findings, it can be concluded that the use of meta-cognitive teaching strategies can contribute to educational practices. This observation should stimulate educators' efforts to increase awareness to the positive implications of implementing meta-cognitive teaching and learning strategies in regular classes and to encourage students to use these methods. The more students use meta-cognitive learning strategies, the more their autonomous learning capabilities will improve, as well as their reading comprehension and academic achievement in language classes. Furthermore, the exposure of Arabic language teachers to the positive implications of meta-cognitive teaching can promote their professional development. The findings presented here can also contribute to the development of teaching curricula that incorporate meta-cognitive teaching strategies in all aspects of teaching Arabic in particular and other languages in general. The present study exposes to a number of important limitations. Because the questionnaires data are based on self-report for demographic variables, test-anxiety and attitude toward Arabic, the related results might have been affected by biases such as social desirability. Since any bias of this kind is supposed to be a constant in both groups, it is unlikely that its effects explain the results differences between the groups. Also, but most importantly, only one convenience sample from the same school participated in this study. This choice might have affected the results due to the school climate, the students' personality and their chosen major. Hence, in order to better generalize these findings, future studies seeking to assess the effects of the implementation of meta-

cognitive learning strategies on intertextual reading comprehension should randomly select classes with different major disciplines and from different schools.

APPENDICES A. SOCIO-DEMOGRAPHIC QUESTIONNAIRE

This questionnaire refers to personal background data. The details are discreet and will be revealed only to the researcher.

Please answer the following questions:

Personal data (mark your answer):

1. **Gender:** (a) male (b) female
2. **Religion:** (a) Muslim (b) Christian (c) Druze
3. **Parents' education:**
 - a. **Father's education:** Elementary school (1); Middle school (2); High school (3); Diploma (4); BA (5); MA (6) and Higher degrees (7)
 - b. **Mother's education:** Elementary school (1); Middle school (2); High school (3); Diploma (4); BA (5); MA (6) and Higher degrees (7)
4. Parents' occupation: (a) Father: _____ (b) Mother: _____
5. Parents' marital status: (a) married (b) separated (c) divorced
6. Parents' income: Lower than average (1); Average (2) and Higher than average

APPENDIX B. TEST ANXIETY QUESTIONNAIRE

This questionnaire is used to assess exam anxiety. Here are some sentences that people sometimes use to describe themselves. Carefully read each sentence, and mark the option that usually describes you. There are no "correct" or "incorrect" answers. Choose an answer that usually describes how you feel before or during the test.

	<i>Sentences</i>	<i>Never</i>	<i>Rarely</i>	<i>Often</i>	<i>Sometimes</i>	<i>Always</i>
1	I feel relaxed and confident during a test.	1	2	3	4	5
2	When I am in a test, I feel restless and anxious.	1	2	3	4	5
3	I think about my grade throughout the test.	1	2	3	4	5
4	During tests, I find myself wondering if I will ever be able to complete my studies.	1	2	3	4	5
5	The harder I work during a test; I find it harder to organize the materials.	1	2	3	4	5
6	Thoughts about my failure disrupt my ability to focus on the questions.	1	2	3	4	5
7	I feel restless during important tests.	1	2	3	4	5
8	I get anxious before tests, even when I am well prepared.	1	2	3	4	5
9	I start feeling restless right before I get the test results.	1	2	3	4	5
10	I am very tense during tests.	1	2	3	4	5
11	I would like to be less bothered by tests.	1	2	3	4	5
12	I am so stressed during tests; I get stomach aches.	1	2	3	4	5
13	I feel like I fail myself during important tests.	1	2	3	4	5
14	I worry before important tests.	1	2	3	4	5
15	During tests, I find myself thinking about the possible implications of failing the test.	1	2	3	4	5
16	When I take an important test, I feel my heart pounding.	1	2	3	4	5
17	During tests, I find myself wondering if I am capable of studying.	1	2	3	4	5
18	The fear of failure disrupts my focus during tests.	1	2	3	4	5
19	I am very nervous during important tests.	1	2	3	4	5
20	During tests, I often think about my future professional prospects if I fail.	1	2	3	4	5

APPENDIX C. ATTITUDES TOWARD ARABIC LANGUAGE

In this questionnaire you will be asked about your attitude towards the Arabic language.

Carefully read each sentence, and mark the option that usually describes you. There are no "correct" or "incorrect" answers. Choose an answer that usually describes your attitude toward the Arabic language.

Sentences	Totally disagree	Disagree	Agree to some extent	Agree	Totally agree
1. I love studying Arabic	1	2	3	4	5
2. Arabic is an easy language	1	2	3	4	5
3. I love my Arabic teacher	1	2	3	4	5
4. It is fun to study Arabic	1	2	3	4	5
5. Arabic lessons are boring	1	2	3	4	5
6. Arabic sounds are nice	1	2	3	4	5
7. I study Arabic because it will help me get a good job	1	2	3	4	5
8. Arabic studies will help me in my academic studies	1	2	3	4	5
9. It is important to learn Arabic in Israel	1	2	3	4	5
10. There is no need to study Arabic, because it is useless in Israel	1	2	3	4	5
11. If I had an option, I would rather not to study Arabic	1	2	3	4	5
12. Arabic is an annoying language	1	2	3	4	5
13. I like hearing Arabic on the radio or on TV	1	2	3	4	5
14. Knowing Arabic will make me a more educated person	1	2	3	4	5
15. I would like to study Arabic in a higher degree	1	2	3	4	5
16. I enjoy Arabic lessons	1	2	3	4	5
17. Arabic is a difficult language	1	2	3	4	5
18. It is important for me to know Arabic	1	2	3	4	5

APPENDIX D. THE INTERTEXTUALITY TESTS

(attached are eight examples of the questions, four from each test (pre and post), which address the four intertextual skills as follows i) Identifying source (question no 1); ii) Identifying presence (question no 2; iii) Deducing processing (question no 3); iv) Deducing meaning (question no 4).

Reading Comprehension (pre -test): "Developing the Culture of Online Social Networks: Advantages and disadvantages".

This part consists of 26 questions. For Each question, choose the most appropriate answer based on the text. 3.8 points per question.

1) The literary genre of the text "Sinbad" is:

- a) a realistic folk tale
- b) a folk parable
- c) a folk fairy tale
- d) a popular song

2) The goal of putting the proverb/saying "if a beautician can treat the age defects of an old woman" in quotation marks (line 53) is to:

- a) present the colloquial source of the text
- b) present the implied meaning of the new text
- c) draw the reader's attention to the previous text
- d) show the explicit way of employing the previous text

3) It can be concluded that the type of processing (change) made in the phrase "if the beautician can treat the age defects of an old woman" (line 39) compared to the original text is at:

- a) The meaning level
- b) The linguistic level
- c) The syntactic level
- d) The grammatical level

4) The implicit meaning of employing a part of the Qur'anic verse "hide immoralities - what is apparent of them and what is concealed" (line 34) is:

- a) The eagerness of Internet users to post the good and bright moments
- b) The desire of Internet users not to post defects, both apparent or hidden
- c) The interest of Internet users to post both good and bad situations
- d) The eagerness of Internet users to hide defects and not publish them on social media

Reading Comprehension (post-test): "The forgotten cherries"

This part consists of 26 questions. For Each question, choose the most appropriate answer based on the text. 3.8 points per question.

1) It can be concluded that the following expression:" Let us all unite and not be divided" (lines 17-18) links the text to its:

- a) religious origin represented by Qur'anic verse that reads:" And hold firmly to the rope of Allah all together and do not become divided" (Aal-Imrann: 103).
- b) religious origin represented by Qur'anic verse that reads: "And whoever holds firmly to Allah has [indeed] been guided to a straight path"((Aal-Imrann: 101).
- c) literary origin represented by the poetic line : " He who is patient in the face of difficulties, the rope in his hands is not broken".
- d) religious origin represented by Hadith (speech) of the Prophet Muhammad: " And hold firmly to the rope of Allah all together and do not become divided".

2) The purpose of attaching some footnotes to the following expression:" Plant and do not eat, but plant in humiliation so that he will eat" line(53) is:

- a) to reveal the author's knowledge
- b) to clarify the implied meaning of the new text
- c) to show the explicit way of employing previous text
- d) to draw the reader's attention to the expression itself

3) It can be concluded that the type of processing (change) made in the phrase:" Apply the old man's advice, 'It's a wise decision" (line 25) compared to the original text is:

- a) The meaning level
- b) The linguistic level
- c) The syntactic level
- d) The grammatical level

4) The implicit meaning behind using of the following phrase:" Whoever causes injustice to others will receive the same" line (64) is:

- a) warning against the wicked, and showing that they will be rewarded in the same way
- b) warning against injustice and depriving people their rights
- c) warning against harming others and depriving them their rights
- d) encouraging people to help others because it will eventually pay off

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