The effect of integrated instructions on reading comprehension, motivation, and cognitive variables

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This quasi-experimental study examined the contribution of concept-oriented reading instruction (CORI) on fifth grade students' reading comprehension, motivation and metacognition. Participants were sixty-six fifth grade female Jordanian students who matched in gender, socioeconomic status, number of years learning English, and school attended. Students completed measures of reading comprehension test, motivation, and metacognition twice (before and after the intervention reading program). Results of pre- and post-test analyses of female students' responses to the reading test and the metacognition and motivation questionnaires showed that reading comprehension, motivation, and metacognition increased only in the CORI group. This study has revealed the feasibility of implementing CORI in EFL reading contexts.

Introduction

Given its substantial importance to school students' learning and development, research on reading comprehension has investigated influences upon the growth of this skill (Guthrie & Wigfield, 2000; Guthrie & Klauda, 2014; Klauda & Guthrie, 2015). Generally, it has been noticed that second language (L2) learners may struggle to develop reading skills, especially students who are economically disadvantaged and exposed to a teacher-centred approach. While these struggling learners might score low in academic achievement, simply because of their low motivation, their disengagement in the form of effort, for example, might affect their reading comprehension and, therefore, they may not acquire comprehension skills effectively (Klauda & Guthrie, 2015). In response to these problems, researchers and educators have been interested in how to help these struggling students to develop reading comprehension. One of the efforts that have been done to help these struggling readers to develop reading comprehension is the use of reading intervention programs (Guthrie, Wigfield & VonSecker, 2000; Guthrie, 2004).

Studies conducted in English speaking countries have shown that cognitive and motivation variables influence school students' reading comprehension (Guthrie et al., 2000; Guthrie & Taboada, 2004; Pressley & Harris, 2006). Unlike first language (L1) contexts, studies in non-speaking English countries, to date, are very rare, especially with respect to understanding how motivation and metacognitive variables can contribute together to the growth of reading comprehension among students in both schools and tertiary education. Additionally, studies on reading comprehension in L2 contexts have either examined the relationship between cognitive variables and reading comprehension or, alternatively, the relationship between motivation variables and reading comprehension. Another line of research in L2 contexts has focused on the effects of

intervention programs on only reading comprehension (refer to Chen, Shih-Jay & Chu, 2014). It is important to mention that research on developing reading comprehension in Jordan and other Arab countries has treated reading as an isolated skill and, accordingly, has not given adequate attention to the effects of other constructs, such as metacognition or/and motivation (refer to Al-Qatawneh, 2007). Furthermore, in EFL contexts in Arab countries the use of intervention programs for developing reading comprehension lacks coherence of important constructs that can contribute to the growth of reading comprehension, such as the promotion of strategy use and development of motivation. In short, very few studies in Arab countries have used reading intervention programs to examine the effect of strategy use and motivation on reading comprehension.

Thus, the main purpose of this study is to examine to what extent reading comprehension, motivation and metacognitive variables increase under the effect of *concept-oriented reading instruction* (CORI), which is an integrated reading intervention program that has not been adequately employed in L2 and EFL contexts. In our study, CORI was implemented in Jordan, an EFL context, in order to investigate its effects on students' reading comprehension, motivation, and metacognition. Surveying previous studies in which CORI was used appear to reveal that the L1 context is the focus of CORI implementation (Swan, 2003). Therefore, CORI implementation in Jordan, to the best knowledge of the researchers, is the first study to be carried out in L2 contexts.

Literature review

Several studies on literacy development have been carried out to understand the development of reading comprehension of students in schools. Researchers who have focused on motivation have debated how the functions of cognitive and motivation variables interact and how each variable influences students' learning achievement (Guthrie et al., 2000; Guthrie, 2004; Guthrie & Wigfield, 2000). Specifically, such research has so far focused on how motivation offers energising and activating ways for initiating and developing cognitive processes, which can improve students' achievement (Guthrie & Wigfield, 2000). Some of these studies have examined intrinsic motivation as a predictor of achievement in several areas, such as reading, sports, and mathematics (Wigfield, Eccles, Schiefele, Roeser & Davis Kean, 2006). Regarding this issue, Guthrie et al. (2000) have noted that intrinsic motivation is a strong predictor of elementary school students' reading comprehension.

Educators are likely concerned about how to make readers, especially those at early stages of education, engaged in reading activities. A good learning environment that contributes to the growth of mastering reading skills is an efficient exposure to engagement processes, which involves engaged reading among school students (Guthrie & Wigfield, 2000). This is because engaged readers have the capability and awareness of using and regulating strategies to develop their acquisition of knowledge through reading. Using integrated instructions in reading classrooms, the use of strategies among students has demonstrated an increase in text comprehension (Pressley, 2000; Guthrie et al. 2007), extending the predictive power of this variable on comprehension (Pressley & Harris, 2006), and strong

association with learning performance (Zhao & Zheng, 2014). In such a way, activating background knowledge, for example, plays a significant role in comprehension of traditional printed texts (McNeil, 2011).

Research on the use of metacognition awareness of reading strategies (MARS) showed that L2 readers have high usage of reading strategies (Cubukcu, 2008; Mokhtari & Reichard, 2004). So, does knowing logically mean using reading strategies effectively? In this regard, in 2012 the results of the Program for International Student Assessment (PISA) indicated low academic achievements in Arab countries in reading, mathematics, and science (see the following section for more details). Additionally, results from international tests have revealed recently that Arab learners as well as L2 learners had achieved low scores (refer to International English Language Testing System, undated). Driven from the above notions, large-scale assessments such as PISA have revealed contrary results to Mokhtari and Reichard (2004) who reported that students in L2 contexts are proficient in using reading strategies. Beyond examining what readers know about reading strategies, our study took a further step through examining the growth of reading strategies under CORI intervention and training students on using MARS.

Metacognition, which is a state of higher order thinking, comprises an awareness of and ability to control cognitive processes when learners are engaged in learning (Flavell, 1979). Evaluating, questioning, and planning are examples of cognitive processes that are employed by proficient readers. Self-questioning, as one of these processes used by motivated readers, is strongly linked to reading comprehension (Taboada, Tonks, Wigfield & Guthrie, 2009). Regarding this issue, Guthrie et al. (1998) pointed out that motivated readers are engaged in a process of reading strategies that operate dynamically and increase over time. Motivated readers also use and regulate strategies of searching, extracting, and critically looking up for details to develop their acquisition of information found in reading texts (Guthrie et al., 1998). To use these strategies, readers have to be strongly motivated because strategy use is highly linked to motivational attributes of desire, attention, and effort (Deci & Ryan, 1985). Bruce and Robinson (2000) experimented with a metacognitive approach to enhance reading skills and word identification in upper primary poor readers. The results of their experiment were compatible with their expectations in which greater gains were detected in experimental subjects. Perhaps the need for teachers to focus on strategies for how students can become more efficient learners is important more than ever in countries like Jordan, in order to develop self-regulatory learning in students (Harrison & Prain, 2009).

The context of at-risk readers

Results of International Student Assessment programs in 2006-2012 show a decreasing trend in Jordanian students' achievement in L1 reading and mathematics, as shown in Figure 1 below. The functional mechanism of motivation and metacognition in supporting desired growth in effective learning in reading and mathematics can be a major factor in students' poor performance. In a recent review of English language education in Jordan, Alhabahba, Pandian, and Mahfoodh (2016) have touched upon the poor performance of English language learners in Arab countries and have argued that it can be

attributed to factors related to learners such as motivation and inefficient use of metacognitive awareness of reading strategies. They have also claimed that the poor performance of English language learners in Arab countries can be a result of teacher-centred approaches in which teachers focus on decoding, word for word translation, and grammar translation method as ways for delivering information. Above that, the authoritarian power practised by parents impacts in a negative way upon students' learning, resulting in poorer development of critical thinking skills (Alhabahba et al., 2016).
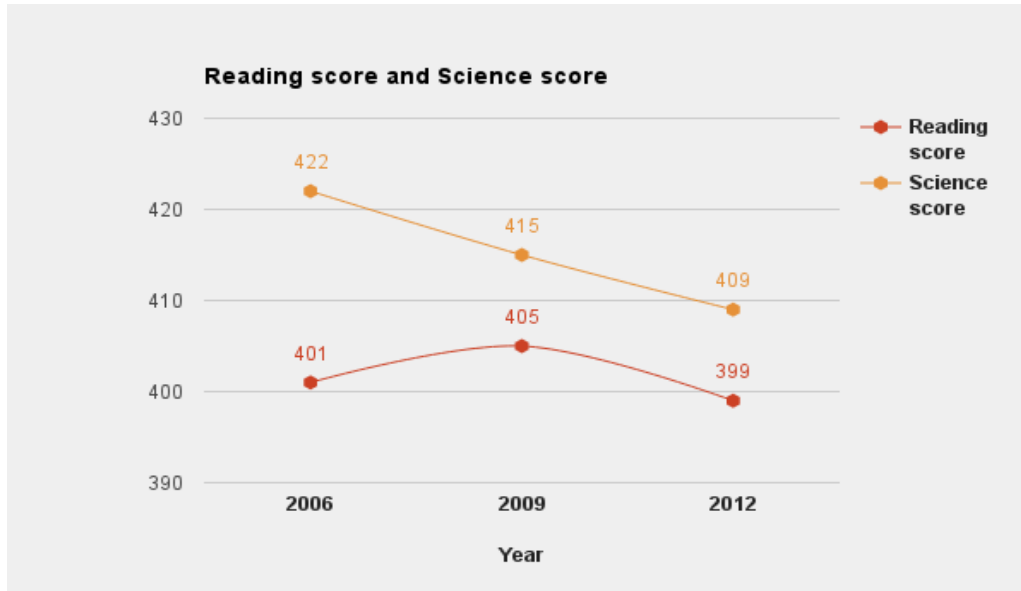

Figure 1: PISA results of Jordanian students' achievements in reading and mathematics for the years 2006-2012 (interactive plot produced by RPubs, available at http://rpubs.com/mohd82ma/Students_Achievements).

School-exist results in the Arab world

Recent trends for school students in economically disadvantaged countries have shown low performance in academic achievements (PISA, 2012). For example, media headlines and researchers' points of view in Jordan have examined the adequacy of teaching and learning practices in the Jordanian classrooms (Alzubaidi, Aldridge & Khine, 2014; Malkawi, 2014; Jordanian Teachers Syndicate, 2015). These researchers have also noted the recent unsatisfactory results of high school students in Jordan, which was clear when 29.6% of the students in academic stream passed exams in 2014 compared to 57% in 2010 (*Jordan Times*, 2015). Additionally, Alzubaidi et al. (2014) have recently pointed out that the general environment of teaching and learning in L2 contexts, and especially in Jordan, is that students are exposed to only mere explanations of English language structures and meanings of words without proper and effective instruction. Such a claim is not surprising, for example the United States Agency for International Development (USAID)

(2008) projected a technological initiative in schools named *Discovery Schools* to promote and develop the learning and teaching environment in Jordanian schools. In this project, e-content in mathematics, English, and other subjects was taught using technology, and the result that seems to be interesting is that "the general nature of practice is still teacher-centred in the Discovery Schools project" (p. 25).

It should be noted that the teaching of reading using different texts (historical, scientific and other types of texts) is demanding and it requires teachers to be acquainted with comprehensive instructional practices coupled with creativity to deliver meaningful learning (Kirschner, Sweller & Clark, 2006). Taking these problems into concern, our research was carried out to examine the effectiveness of CORI on reading comprehension, motivation, and metacognition awareness.

The study

This study addresses the following research questions:

1. What is the effect of concept-oriented reading instruction on EFL fifth grade students' reading comprehension in Jordanian schools?
2. What is the effect of concept-oriented reading instruction on EFL fifth grade students' reading motivation?
3. What is the effect of concept-oriented reading instruction on EFL fifth grade students' metacognition awareness of reading strategies?

Concept-oriented reading instruction

Developed by John Guthrie and Lois Bennett in 1993 (Guthrie et al., 2004), CORI is a comprehensive framework that comprises a set of instructional practices that aims to stimulate students' interests and motivation to read. CORI is also known as an instructional reading intervention program that combines science instruction, strategy instruction, a set of motivational practises developed to advance school students' comprehension, motivation (i.e. intrinsic), and strategy learning and use (Guthrie, 2004).

There are four stages in CORI. In the first stage, the main theme is promoted and engagement is driven within the topic discussed. This is followed by the second stage in which multiple sources are used to gather necessary information corresponding to the theme promoted. In the third stage, instructions are delivered, and encouragement to use them among students is performed. In the fourth one, tasks and assignments are requested to assess learning outcomes. Strategy instructions are offered to inherit the inputs gained from reading texts with support and interaction of comprehension strategies that are beyond strategy training (e.g. extensive reading, vocabulary acquisitions, and development). In the development of CORI stages, learners should be engaged in activities and content discussions that require purposeful use of strategies. Such strategies can include activating background knowledge, synthesising information, and graphical representation(s) of information acquired. Explicit instruction is delivered to develop

these strategies where students are engaged in learning about new topics or ideas from texts. Teachers are required to support students learning processes through modelling, scaffolding, and extensive practices (refer to Guthrie et al., 2007).

An important characteristic of CORI is curricular coherence which is operationalised by the continuous supply of content materials that support students' engagement by encouraging them to establish links across texts and other subjects (Guthrie et al., 2000). Motivation in CORI is also addressed because CORI specifies five motivational constructs that signify goals and aims for the instructional intervention. These five motivational constructs which are mastery goals, self-efficacy, perceived autonomy, collaboration, and intrinsic motivation were drawn from social cognitive theory (Schunk, 2003), self-determination (Ryan & Deci, 2000), and goal-theory (Pintrich, 2000) (more details can be found in Guthrie et al., 2007). Relevance, choice, and collaboration, for example, as instructional practices driven from earlier motivational constructs are used to infuse students engagement and motivation.

Method

The design of the study is quasi-experimental using control and experimental groups to estimate the effect of CORI on the three variables: reading comprehension, motivation, and metacognition. This design was found to be appropriate for this study because it has been recommended that in a setting where students cannot be randomly assigned, it is better to employ a quasi-experimental design which can serve as an alternative choice to randomly assigned groups designs (Fife-Schaw, 2006). Although full control in a quasi-experimental design is difficult, this design can help researchers to reach reasonable conclusions (Ary, Jacobs, Sorensen & Walker, 2013). In this study, the experimental group received teaching of reading using CORI and in the control group the traditional teaching method was used.

Participants and the context

The participants were sixty-six fifth-grade female students from six classrooms in one southern district area in Jordan, called Alshoubak. To employ CORI, only female students were selected for two reasons. First, we wanted to eliminate the issue of the gender differences in learning because it has been pointed out that girls may possess more linguistic skills than boys (Eriksson et al., 2012). Second, in the schools chosen for this study, female students outnumbered male students. It is important to mention that all students came from the same cultural background, number of years learning English (since first grade), almost the same age (around 11 years old), and under the same conditions of classrooms (traditional reading teaching practices). Further, the girls were from same socio-economic status. The girls' mothers are housewives and their fathers' occupations are primarily governmental ones with salaries that range between 350 and 420 Jordanian Dinars.

Another issue that should be justified in this study is the selection of the fifth grade stage to be the target for employing CORI. The fifth grade stage was selected for several

reasons. First, research on the intervention programs conducted on early stages of schooling revealed high returns (i.e. early childhood) compared to primary or secondary stages (Heckman et al., 2004). Second, the fifth grade stage is an early stage in Jordanian schools, and it has been argued that students in early stages in schools show effective achievements in some important domains, such as the cognitive domain (Yoshikawa et al., 2013). Third, the students in our sample (the fifth grade students) were at appropriate ages to be exposed to CORI. Fourth, the students in our sample had similar number of years studying English as a foreign language. Fifth, the students in earlier stages, such as the fifth grade in this study, rely on textbooks without supplementary reading texts. For these reasons we chose the fifth grade stage for the employment of CORI.

Regarding the selection of Alshoubak, a district in Jordan, to be the region to employ CORI, there are some reasons. First, the students in this district have limited access to sufficient learning materials. Second, the teachers in this region have limited access to professional development programs that are essential for the development of teachers' skills. Third, the education department in this district welcomes educational research and encourages researchers who are interested in research that aims to develop learning and instruction in the region.

The six schools that agreed to take part in the study were sent invitations enclosed with a short description of the reading intervention program. Three schools were nominated as experimental schools by the director of the supervision department because of their interest in and support for improving students' learning and teachers' professional development. Teachers who participated in CORI implementation had similar years of teaching experience. Furthermore, all teachers had bachelor's degrees in English Language Teaching (ELT) and were from the same geographical site where this research was conducted.

All teachers in the experimental schools received invitations to participate in a mini CORI training sessions for 4 weeks, and all of them agreed to participate (Guthrie et al., 2007). In addition, the teachers sat for training workshops using CORI as their teaching framework. All the teachers participated in the experiment had approximately the same teaching experience. We built mutual trust with the teachers and had their agreement regarding the adoption of CORI as the only reference framework for teaching. We also agreed with the teachers to make regular visits (not in the classrooms) to discuss CORI implementation. To ensure that teaching style was not an independent variable, the teachers were trained on the use of CORI and were helped to prepare lesson plans.

Regarding the context of the study, it is important to highlight what constitutes traditional reading method in Jordan, compared with other regions of the world. In most cases, schools in Jordan receive limited funding from the government and, therefore, conducting up-to-date professional development is unlikely to occur (Alhabahba et al., 2016). Thus, teachers are left by their own to figure out and choose teaching styles that they think suitable for their students. Thus, with the authoritarian power that exists in the context, teachers focus on rote learning and memorisation that do not support student-centred and task-based learning approaches.

Data collection

To collect data, some measures were used before and after the implementation of CORI. These measures are *Reading Comprehension Test* (RCT), *Metacognition Awareness of Reading Strategies* (MARS) with three levels, and *intrinsic motivation* with three levels. A panel of five PhD holders reviewed these measures and assessed their translated versions in order to check their appropriateness for school female students. Issues like format (including pictures to visually represent few questions) and time needed to answer the tools items were raised by the panel. Subsequently, the researchers made some modifications (e.g., time needed to answer RCT items) in response to these issues raised by the panel.

The first measure, RCT, was developed by the researchers and contained 26 questions which were divided equally into inferential, literal, and evaluative items. To construct RCT, the researchers followed the recommendations of Alderson, Clapham and Wall (1995) and Wray and Janan (2013). One of these recommendations is that texts used in RCT should consider word difficulty and familiarity levels and appropriateness of the text to the test takers and their cultural background. The researchers employed developed RCT to examine students' reading comprehension growth during the implementation of CORI. The students completed RCT before CORI and after the completion of CORI training.

MARS is the second measure, adopted from Mokhtari and Reichard (2004). When this measure was tested and used in L2 contexts, including Arab contexts, it achieved good reliability and validity. The translation method used for this tool was back-translation method as recommended by Brislin (1986). MARS consisted of three levels/sub-scales: support strategies with six items, cognitive strategies with nine items, and metacognitive with twelve items. We used this model to measure students' responses using a Likert scale ranging from 1 (I never or almost never use this strategy) to 5 (I always or almost always use this strategy).

The third measure was an intrinsic motivation scale with three levels (Vallerand et al., 1992): stimulation, accomplishment, and knowledge, each with three items. Similar to MARS, modification and translation of this measure was carried out to fit the purpose of our study. For example, the items 'to show myself that I am a good citizen because I can speak a second language' was modified to 'to show myself that I am a good student because I can read'. Students responded on Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Students completed answers to this instrument before and at the conclusion of the project.

The three measures used in this study were examined for reliability and validity. The construct validity of RCT was examined by item-analysis difficulty (Lord, 1952). The values ranged from 0.60-0.80 suggesting a good difficulty level. For MARS, Cronbach's alpha for support achieved .92, metacognitive .93 and cognitive strategies .89. Intrinsic motivation knowledge, accomplishment, and stimulation achieved Cronbach's alpha .82, .80 and .79 respectively.

Implementation of CORI

The 50-minute daily reading intervention program, implemented in the beginning of the second semester 2014 (from February to the end of May), was the main reading program for the total of 16 weeks. Specifically, five instructional phases were implemented in CORI classrooms. The overall study of the effectiveness of the CORI intervention program for developing comprehension, intrinsic motivation levels, and MASR levels was a pre-post control group design. The following measures were given before and immediately after the 16-week intervention to school female students in the CORI and control groups. Before and after the course of CORI, tools were pre- and post-tested.

In the first phase, emphasis was placed on content in the conceptual theme for reading instruction, to offer female school students an involving and meaningful learning environment. This included learning about animals and their living conditions in their context. For example, when the teachers taught students about the donkey, they taught about feeding, communication, and adaption to habitat. Second, the teachers provided hands-on activities to motivate female students' situational interest, which included field observation of living animals and plants, and experiments on seed planting (refer to Appendix). The third phase included using information sources and interesting texts in relation to the conceptual theme (e.g., defined conceptual theme in relation to the topic taught by teachers). For example, donkey was given as an example of a living animal, while *Grandma and the brave donkey* was the text. Fourth, the teachers provided some interesting texts and exercises to the students. The fifth phase included teaching a set of strategies that are considered effective in developing reading comprehension. Such strategies included activating background knowledge, self-questioning, looking up information, and forming graphically (refer to Guthrie & Wigfield, 2000; Guthrie, 2004; Guthrie & Taboada, 2004; Guthrie et al., 2007). It is noteworthy to mention that supplementary texts were provided and ranged from easy to difficult. These reading texts were selected based on some criteria, which included, amongst all, suitability of the texts to the cultural and learning values in relation to the context. The teacher participants and the director of supervision Department of Education in the context of the study were also consulted during the selection of the reading texts. The Appendix presents examples of supplementary texts, individual's set, peers' set, and group's set.

Data analysis

The overall aim of using a quantitative approach in this study is to gather accessible data in an easy manner because this is the first time for projecting CORI in this L2 context. In addition to this, understanding the functionality of CORI in L2 context would be easier through using quantitative approach. Students' responses were keyed in SPSS v20 and the variables were created for the purpose of understanding the effect of using CORI on reading comprehension, intrinsic motivation levels separately (i.e. knowledge, stimulation, and accomplishment), and metacognition levels (i.e. support, metacognitive, and cognitive strategies). To analyse the data, a series of multiple analysis of covariance (ANCOVA) were run. ANCOVA helps in understanding the potential influence of covariates on the dependent variable and allows for reducing within-error group variance, which in turns

allows for more accurate assessment of the influence of the independent variable (Field, 2009). The following sub-sections present the analysis of the three measures used in this study, RCT, intrinsic motivation and MARS.

Reading comprehension
Scores from RCT of the fifth grade female students were created from both the pre-RCT and post-RCT assessment. As mentioned earlier, the students' responses to the RCT items were scored on a four point scale, as recommended for early reading assessment (Rathvon, 2004). The standardised scale from this test was further carried out for further analysis.

MARS questionnaire scores
Scores from each subscale were created. For the items of each level of MARS (support, metacognitive and cognitive strategies), the sum of scores was used in the statistical analysis. The rationale behind carrying out this method is to understand the effect size on each dimension of MARS after CORI completion, while controlling pre-tests.

Intrinsic motivation questionnaire scores
Scores from each subscale were created. That is, the sum of scores for each subscale in the intrinsic motivation tool was treated and created separately for the exact rationale explained above in the analysis of MARS.

Results

CORI and reading comprehension

The first question of the study focuses on the relationship between CORI and reading comprehension. To address this question, ANCOVA analysis technique was carried out. Before conducting this step, exclusion of the effect of pre-RCT results on post-RCT of the two groups with one covariate was conducted in order to check for homogeneity of slopes assumption through ANCOVA. The interaction effect of treatment by covariate in the post-RCT was non-significant at $F(1, 64) = 3.935$, $p = .52$. This result indicates that the relationship between the pre-RCT and the post-RCT did not differ significantly as a function of CORI. Therefore, this result indicates that pre-RCT is feasible to be used as a covariate.

A significant effect of CORI after controlling for pre-RCT scores was found among the groups at ($F = 42.454$, $df = 1,63$, $p = .000$, $\eta^2 = .403$), and the pre-RCT was not significantly related to post-RCT at ($F = .062$, $df = 1,63$, $p = .804$). Thus, after adjustment by covariate, post-RCT students differed significantly by CORI. As shown in Table 1, the students who participated in CORI classes ($M = 82.22$) outperformed the students in the control group ($M = 47.18$), with ($F = 42.454$, $df = 1,63$, $p = .000$, $\eta^2 = .403$). In order to determine the effect size, *Cohen's d* formula was used. The result of this formula used to determine the effect of CORI on the treatment group's reading comprehension was *Cohen's d* $= 1.65$, which indicated that the treatment group scored 1.65 standard deviation which is higher than the standard deviation of their counterparts in the control group.

This indicated that there was a significant and large effect of the treatment (i.e., CORI), with *Cohen's d* = 1.65. Based on these findings, it can be concluded that there was a significant difference between the experimental group (CORI female students) and the control group (traditional teaching method).

Table 1: Mean and standard deviation of post-RCT

Dependent variable: Post reading test			
Group	Mean	Std. dev.	N
Control	47.18	23.85	34
Experimental	82.22	18.12	32
Total	64.17	27.51	66

CORI and intrinsic motivation

To address the second research question, which focuses on examining the effect of CORI on intrinsic motivation, a series of ANCOVA analyses were employed to understand the effect of CORI on each level of intrinsic motivation variable (i.e., knowledge, accomplishment and stimulation). The interaction effect of treatment by covariates in post-intrinsic motivation knowledge, accomplishment, and stimulation was non-significant at $F(1, 64) = 3.935$, $p = .52$, $F(1, 64) = 1.053$, $p = .309$, and $F(1, 64) = 0.634$, $p = .429$ respectively. These results indicate that the relationship between the pre-intrinsic motivation levels and the post-intrinsic motivation levels did not differ significantly in response to the CORI treatment. Therefore, these results indicate that pre-intrinsic motivation levels are feasible to be used and as covariates in further analysis.

The first ANCOVA analysis is concerned with the effect of CORI on knowledge which is the first level of intrinsic motivation. The results of ANCOVA showed a statistically significant effect of CORI on intrinsic motivation knowledge after controlling the covariate. The students in CORI classes ($M = 4.180$) outperformed the students in the control group ($M = 3.655$), as shown in Table 2 with ($F = 4.180$, $df = 1, 63$, $p = .045$, $\eta^2 = 0.062$). Further, pre-intrinsic motivation knowledge was not significantly related to post-intrinsic motivation knowledge at ($F = .129$, $df = 1, 63$, $p = .720$, $\eta^2 = 0.002$). The result of *Cohen's d* = 0.51 indicated that the treatment group scored 0.51 standard deviation which is higher than their counterparts in the control group. This further indicated that there was a significant moderate to large effect of the treatment.

Table 2: Mean and standard deviation of post-intrinsic motivation knowledge

Dependent variable: Post intrinsic motivation knowledge			
Group	Mean	Std. dev.	N
Control	3.66	1.06	34
Experimental	4.18	0.98	32
Total	3.91	1.05	66

The second ANCOVA analysis is concerned with the second level of intrinsic motivation, accomplishment. As shown in Table 3, it was found that students who participated in CORI classes (M = 4.203) outperformed those in the control group (M = 3.619) with (F = 8.551, df = 1,63, p = .005, η^2 = 0.120). Pre-intrinsic motivation accomplishment was significantly related to post-intrinsic motivation accomplishment at (F = 9.191, df = 1,63, p > 0.05, η^2 = 0.127). *Cohen's d* = 0.58, which indicated that the treatment group scored 0.576 standard deviation higher than their counterparts in the control group. This indicates that there was a significant moderate to large effect of the treatment.

Table 3: Mean and standard deviation of post intrinsic motivation accomplishment

Dependent variable: Post intrinsic motivation accomplishment			
Group	Mean	Std. dev.	N
Control	3.80	0.89	34
Experimental	4.40	0.70	32
Total	4.10	0.85	66

The last ANCOVA analysis in this section is concerned with the third level of intrinsic motivation, stimulation. Table 4 shows that the students in CORI classes (M = 4.203) outperformed the students in the control group (M = 3.619) with (F = 8.551, df = 1,63, p = .005, η^2 = 0.120. Pre-intrinsic motivation stimulation was not significantly related to post- intrinsic motivation stimulation at (F = .198, df = 1,63, p= .658, η^2 = 0.003). *Cohen's d* = 1.25 indicated that the treatment group scored 1.25 standard deviation higher than their counterparts in the control group. Further, this indicate that there was a significant large effect of the treatment.

Table 4: Mean and standard deviation of post-intrinsic motivation stimulation

Dependent variable: Post intrinsic motivation stimulation			
Group	Mean	Std. dev.	N
Control	3.62	1.02	34
Experimental	4.20	1.00	32
Total	3.90	1.04	66

CORI and MARS

To address this question, which focuses on the effect of CORI on each level of MARS, a series of ANCOVA analyses were carried out. The interaction effect of treatment by covariates in the post-support, cognitive and metacognitive strategies was non-significant at $F(1,64)$ = 0.078, p = .178, $F(1,64)$ = 1.855, p = .782, and $F(1,64)$ = 0.102, p = .751 respectively. These results indicate that the relationship between the pre-MARS levels and the post-MARS levels did not differ significantly as a function of the CORI treatment. Therefore, these results indicate that pre-MARS levels are feasible to be used as covariates

in further analysis. The ANCOVA analysis presented here is for each level of MARS: support strategies, cognitive strategies, and metacognitive strategies respectively.

The first ANCOVA analysis was run to understand the effect of CORI on students' support strategies in the experimental group. As shown in Table 5, students in the CORI group (M = 3.355) outperformed the students in the control group (M = 3.098) (F = 10.516, df = 1,63, p = .002, η^2 = 0.143). Additionally, pre-support strategies was significantly related to post-support strategies (F = .423, df = 1,63, p = .043, η^2 = 0.064). The effect size was *Cohen's d* = 0.72, which indicated that the treatment group scored 0.719 standard deviation which is higher than their counterparts in the control group. This indicate that there was a significant and medium to large effect of the treatment.

Table 5: Mean and standard deviation of post-support strategies

Dependent variable: Post support strategies			
Group	Mean	Std. dev.	N
Control	3.10	0.34	34
Experimental	3.35	0.37	32
Total	3.22	0.38	66

The second ANCOVA is concerned with the second level of MARS, cognitive strategies. As reflected in Table 6, CORI students (M = 4.07) outperformed their peers in the control group (M = 2.73) (F = 74.116, df = 1,63, p = .000, η^2 = 0.541). Additionally, pre-cognitive strategies was not significantly related to post-support strategies (F = .423, df = 1,63, p = .518, η^2 = 0.007). The effect size was *Cohen's d* = 2.17, which indicated that the treatment group scored 2.17 standard deviation higher than their counterparts in the control group. This indicated that there was a significant and large effect of the treatment.

Table 6: Mean and standard deviation of post-cognitive strategies

Dependent variable: Post-cognitive strategies			
Group	Mean	Std. dev.	N
Control	2.73	0.70	34
Experimental	4.08	0.52	32
Total	3.39	0.91	66

The third ANCOVA is concerned with the third level of MARS, metacognitive strategies. As shown in Table 7, CORI students (M = 3.80) outperformed the students in the control group (M = 3.10) (F = 21.107, df = 1,63, p = .000, η^2 = 0.251). Further, pre-metacognitive strategies was not significantly related to post-metacognitive strategies (F = .423, df = 1,63, p = .891, η^2 = 0.000). The effect size was *Cohen's d* = 1.02, which indicated that the treatment group scored 1.02 standard deviation higher than their counterparts in the control group. This indicated that there was a significant and large effect of the treatment.

Table 7: Mean and standard deviation of post-metacognitive strategies

Dependent variable: Post-metacognitive strategies			
Group	Mean	Std. dev.	N
Control	3.10	0.54	34
Experimental	3.81	0.67	32
Total	3.44	0.70	66

Discussion

In this study, CORI, which is an instructional intervention reading program, was employed to investigate its effects on reading comprehension, metacognition of reading strategies, and motivation among Jordanian fifth grade female students. A quasi-experimental design was carried out in this study because classes are readily formed by the school administration in Jordan. The contribution of our study emerges from the scant work on motivational and cognitive variables and reading comprehension under one instructional intervention program. Further, to the best knowledge of the researchers, this is the first CORI experiment in L2 contexts aimed at examining Arab Jordanian female fifth grade students' reading comprehension, intrinsic motivation, and metacognition strategies.

The results of this study have revealed that after the implementation of CORI there was a considerable increase in students' reading comprehension, intrinsic motivation (i.e. knowledge, accomplishment and stimulation), and metacognition awareness of reading strategies (i.e. support, cognitive and metacognitive). During CORI implementation, female students showed interest in the 'new teaching style proposed by their teacher'. This generated interest sprung from 'we love the stories we had in our class', for example. It is concluded from the former notions that EFL students felt the significant shift from the traditional teaching approach currently practised to more communicative, yet comprehensive instructional practices. Shifting from the traditional reading teaching approaches to CORI has touched deeply the interrelations between students, teachers, and parents through the set of instructional practices that required them to 'communicate with others', for example, when they were requested to talk, write, or discuss something they liked and wanted to learn more about (Guthrie, 2004).

Similar to the findings of Guthrie (2004) and Guthrie et al. (2007), our study has clearly indicated that CORI influences female students' reading, intrinsic motivation, and metacognition awareness of reading strategies. These findings can be of importance to educators in Jordan because they show that the often-seen decline in school students' motivation, strategy use, and reading comprehension can be reversed with effective reading intervention programs that are designed to develop students learning. The findings of this study have confirmed that intrinsic motivation is a significant variable in the development of reading (Wigfield et al., 2004). Thus, EFL contexts in respect to curricula and classroom instructions may wish to consider some more emphasis on intrinsic motivation as an indicator for better school students' achievement and comprehension.

On the basis of the theoretical principles of CORI, support for intrinsic motivation was presented in the form of instructional practices that aimed to develop, practically, the constructs examined among the school students. Although the experience we had during training teachers on CORI was 'interestingly uneasy', the practicality of CORI instructional practices made abstract concepts, such as metacognition, feasible to be taught to EFL students. In this sense, in-service teachers were exposed to much theoretical learning during post-secondary education which would not help much in tackling practical reading classroom problems. The irony found in EFL classrooms generally and specifically, reading classrooms, is that teachers are required to teach subject matters in a communicative approach which connects students to real life situations and individuals around them (e.g., parents or peers) employing knowledge acquired (i.e. their theoretical knowledge of subject matter). Thus, without proper education that tackles classrooms problems, i.e. the practical side, and onsite professional development workshops, educational objectives and desired outcomes are hard to achieve. This claim is evident in a USAID project in Jordan (USAID, 2008) in which teachers discern a change of teaching and learning paradigm developing in their schools.

Conclusions

The important findings of this study add to the body of literature of L2 contexts at large and to the Arab world in particular because the findings have clearly shown the feasibility of the implementation of CORI in EFL contexts. In the current study, CORI female teachers sensed the feasibility of connecting their students to motivation and strategy use to promote reading comprehension through an engagement process, such as hands-on activities that are linked to interesting texts (Wigfield et al., 2004) which made metacognition a concept, to them, possible to be taught. Although the collective instructional practices used in CORI made predicting which instructional practice contributed more to the growth of comprehension, intrinsic motivation, or metacognition unclear, it seems that isolating these instructional practices may not present a clearer picture of their significance. Yet, the attempt made here, in the context of the current study, was to carry out CORI as a whole which led us to believe that dealing with one problematic issue (e.g., motivation) in isolation is not recommended, if not linked to other variables (e.g., strategy use and motivation). This viewpoint concurs with Wigfield et al. (2004) who have shown that classrooms are complex in nature and requires a 'variety of instructional supports' that helps school learners' motivation growth.

This study has some limitations originating from the relatively small sample size, the geographical site, and the design of the study. As the focus of this research was on examining the effects of CORI on motivation, metacognition awareness of reading strategies, and reading comprehension, future studies may employ CORI to address its effect on other variables such as students' self-efficacy. As this study employed CORI using a quasi-experimental research design, future research can examine the effects of CORI using longitudinal research designs. Conducting longitudinal research can enable a clearer picture of causality relationships in understanding the growth of reading comprehension in relation to motivation, metacognition, and other variables. Considering

larger sample size, different geographical sites, and other variables such as parental involvement and teachers evaluation could also help in understanding the effects of CORI on students' motivation and strategy use.

Appendix: Supplementary texts examples

Haifa Zahra (2014). *Grandma Nawara Series*. Dar Al-Manhal Publishers. https://www.abjjad.com/book/2191328191/grandma-nawara-series

Examples of individual's set	*Grandma and the computer* *Grandma and the bike*
Examples of peers' set	*Grandma's brave donkey* *Grandma visits Petra*
Examples of group's set	*Grandma and the spring gifts* *Grandma doesn't know swimming*

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