Research Paper

Effect of Scaffolded Differentiation Strategies on Inferential Reading Comprehension and Receptive Vocabulary Improvement of Intermediate Students

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Abstract

This study tried to examine the effect of using scaffolded differentiation strategies on reading comprehension and vocabulary improvement of intermediate students. The effect of using scaffolded differentiation strategies on the reading strategy use of the intermediate students was also checked. The researcher selected 40 EFL learners with intermediate levels. They were mixed learners from the institutes in Tehran. Nelson proficiency test, screening test, diagnostic test, progress monitoring test, outcome test, and a close-ended questionnaire were used in the study. For the quantitative part, the selected students were randomly divided into four groups. Two were experimental groups and the rest were control ones. Each group consisted of 10 students. There were 15 sessions for the treatment. In the Experimental group the instructor used scaffolded differentiating strategies for improving the reading comprehension of the students and in the control group the teachers used ordinary methods. A test that subdivides the broad area into specific skills, in this case, inferential comprehension and receptive vocabulary was administered before and after the intervention. The questions were constructed in the related course of study. The result of the post-test showed that 'Inferential reading' and 'Receptive vocabulary' of the experimental group were noticeably greater than those of the control one. Data for the qualitative part was collected through the reading strategy inventory of MARSI (Mokhtari & Reichard, 2002). The reading strategy inventory was administered to 20 participants before the instruction and the instruction started, and after the instruction it was administered again. It consisted of 30 items that measured three factors: Global Reading Strategies (13 items), Problem-Solving Strategies (8 items), and Support Reading Strategies (9 items). The result of the posttest showed that the mean scores for the two subscales of 'Global' and 'Supportive' in the experimental group were noticeably greater than the mean scores in the control group but not for the other subscales of 'Problem-solving'.

Keywords: Scaffolding; Differentiated instruction; Inferential Reading Comprehension; Receptive vocabulary

INTRODUCTION

Reading is an integral skill for educational success (Levine, Ferenz, & Reves, 2000). It is

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a required skill for almost all graduate programs, but unfortunately, most of the students suffer from deficiencies in reading (Farhadi & Sajadi, 1999). and it is not exaggerating to say that good language learning necessitates good

comprehension (Hammadou, 1991). It is even a crucial skill for daily life because people are forced to read and to get information about specific topics (Farhady, 2005).

However, traditional teachers have many problems for teaching a heterogeneous group of learners (C. A. Tomlinson, 2009). Today, in many countries students learn English as a foreign language (EFL), in these countries, English is neither broadly used for communication, nor used as the medium of instruction. So, the students learn English at educational settings such as public or private schools, universities, and private language institutes. Reading comprehension plays an important role in students` gaining knowledge in EFL countries because it helps them to read newspapers, books, journals, magazines, and the like. Thus, instructing appropriate techniques and procedures in teaching reading in EFL situations is helpful for promoting their knowledge (Gregory & Chapman, 2002). But unfortunately, many teachers are not educated enough to help the students to choose appropriate strategies during the reading process. This study tries to examine the following points:

- Examining the effect of using scaffolded differentiation strategies on reading comprehension improvement of the intermediate students.
- Examining the effect of using scaffolded differentiation strategies on vocabulary improvement of the intermediate students.
- Examining the effect of using scaffolded differentiation strategies on reading strategy use of the intermediate students.

Based on the topic and statement of the problem the following questions are proposed:

Q1. What is the effect of using scaffolded differentiation strategies over students` use of reading strategies?

Q2. Does scaffolded differentiation strategies have any effect on the inferential reading comprehension of intermediate students?

Q3. Does scaffolded differentiation strategies have any effect on receptive vocabulary improvement of intermediate students?

According to the aforementioned quantitative questions, the following null hypotheses are formed:

Ho1. Scaffolded differentiation strategies do not have any effect on the inferential reading comprehension of intermediate students.

Ho2. Scaffolded differentiation strategies do not have any effect on receptive vocabulary improvement of intermediate students.

LITERATURE REVIEW

Teachers should differentiate instruction to ensure that struggling, advanced, and in-between learners and also students with varied cultural heritages and background experiences all grow as much as possible. They have to provide specific alternatives for individuals to learn as deeply as possible without assuming that students` road map for learning is identical to each other (C. A. Tomlinson & Moon, 2014).

Scaffolding Students' Comprehension

The term scaffolding means the gradual release of responsibility from the teacher to the students. Students need some opportunities to do what the teacher has modeled and the teacher's role diminishes as students become more capable (Alvermann & Phelps, 1998). In the beginning of a scaffolded approach, most of the task will be done by the teacher and then he/she uses scaffolding activities improving student abilities and independence at the task over time.

The plan is much more important than making the students proficient at specific tasks such as answering questions about a text or filling in charts, here the teachers intend for the required abilities about mental habits that lead to automatic reading of any type of text in the future. With sufficient scaffolding, the students can be prepared for any comprehension challenge that might arise (Robb, 2003).

Cognitive and metacognitive strategies

The distinction between cognitive and meta-cognitive strategies is deeply rooted in the results of the research on meta-cognition. Meta-cognitive strategies are the sets of strategies that are carefully planned and used by the readers to monitor and manage the reading

processes such as defining the purpose of reading, reviewing the text in terms of length and structure, and making use of tables and charts in the text. But cognitive strategies are aimed at solving comprehension problems regarding the text such as guessing the meaning of unknown vocabulary from the context and re-reading the text for clarification (Anderson, 1999).

Scaffolding vs. Differentiation

In general scaffolding and differentiating share many similarities. Both of them aim to move the students from where they are to where they need to be. However, the two approaches are distinct in several ways. In scaffolded instruction, the teachers usually break a lesson into discrete parts and then give students the assistance they need to learn each part. For example, teachers may give students an excerpt of a longer text and engage them in a discussion of that part to improve their understanding of its purpose. Also, teachers teach the related vocabulary for the comprehension of the text before assigning the full reading. But in differentiated instruction, the teachers might give some students an entirely different reading (to better match their reading level and ability), let the students the choice from several texts (so each student can pick the one that interests them most), or make several options available for completing a related assignment. For example, the students might write a traditional essay, draw an illustrated essay in comic-style form, create a slideshow "essay" with text and images, or deliver an oral presentation (Walqui, 2006).

METHOD
Participants
The researcher selected 60 EFL learners with intermediate levels. They were mixed learners from the institutes in Tehran. Nelson proficiency test was administered for the homogeneity of the 60 participants to choose 40 of them. The age of the selected students was from 13 to 18.

Design
The convergent parallel mixed method design was used in this study. This approach is the most familiar type of mixed methods strategy. In this approach, both quantitative and qualitative data are analyzed separately and then checked to see if the findings confirm each other or not. It is believed that both qualitative and quantitative data provide different types of information—often detailed views of participants qualitatively and scores on instruments quantitatively—and both yield results that should be the same. It arises from the ideas of (Campbell & Fiske, 1959). They believed that gathering different forms of data is fruitful for understanding a psychological trait.

Instruments
The following instruments were used in this study:

1. The Nelson proficiency test was administered to ensure the homogeneity of the 60 participants to choose 40 of them.

2. Screening test which provides little information about instructional needs in reading comprehension. A test from Active Skills for Reading by Anderson was selected.

3. Diagnostic test which subdivides the broad area into specific skills. The test consisted of four parts including literal reading comprehension, inferential reading comprehension, referential reading comprehension, and receptive vocabulary. The questions were constructed in the related course of study. The test was prepared by the researcher under the supervision of the dissertation advisor. It was piloted and its reliability and validity were also checked.

4. There were 15 sessions for the treatment. In the Experimental group, the instructor used scaffolded differentiating strategies to improve the reading comprehension of the students, and in the control group, the teacher used ordinary methods.

5. Progress monitoring tests as periodic measures to determine the response to the treatment.

6. Outcome test which provides an index of growth across the students. In this part, the diagnostic test was administered again.

7. Close ended questionnaire for students` meta-cognitive awareness of reading strategy use. Self-reported reading strategy inventories are one of the methods for assessing strategy

use. They are regarded as prospective meta-cognitive reports which refer to measurements that are neither concurrent (i.e., think aloud) nor retrospective (Cromley & Azevedo, 2006; Veenman & Spaans, 2005). A prospective report is a convenient way to assess readers' awareness of strategies. For assessing the type and frequency of reading strategies that students perceive they use during the reading, the *Meta-cognitive Awareness Reading Strategy Inventory* (Mokhtari & Reichard, 2002*)* was developed. It contains 30 items that measure three factors: Global Reading Strategies (13 items), Problem-Solving Strategies (8 items), and Support Reading Strategies (9 items).

Procedure
Procedures for collecting Data on Research Question 1
This question investigates the effects of using scaffolded differentiation strategies over students' skill to their use of reading strategies. The model proposed by Anthra (2010) is used in this study which contains the following phases:
-**Initial knowledge building** through observation and explanation
-**Demonstration** by an experienced colleague or mentor
-**Initial practice**—closely guided by the experienced colleague or mentor
-**Guided practice** with gradual reduction of direct guidance as skill increases
-**Independent practice** with direct guidance
-**Assessment** of performance and related knowledge

At the beginning of the study a Nelson proficiency test was administered to ensure the homogeneity of the 60 participants, to choose 40 of them. For this part 20 intermediate students (out of the main 40 students) studying at Tehran English institutes during the academic year of 2021-2022 participated in the study. 10 of the participants were males and the rest were females and their age ranged from 13 to 18. Data for the study was collected through reading strategy inventory of MARSI (Mokhtari & Reichard, 2002).

Effective teaching is highly based on understanding the nature of learning. So, understanding the components included in an effective reading process and the performance of skillful readers during this process plays an important role for teaching reading in a foreign language. Reading not only requires efficient use of many processes such as attention, perception, and comprehension, but also it covers both cognitive and meta-cognitive processes (C. C. Block & Pressley, 2007; W. P. Grabe & Stoller, 2013; Kern, 1989). Grabe (2008) states that reading is a rapid, efficient, interactive, strategic, flexible, purposeful, evaluative, and linguistic process. The reader should employ strategies that would help not only decode the knowledge in the text but also relate his/her background knowledge to the text and interpret the text. In general, strategy means a plan or a conscious action that addresses a specific goal (Oxford, Ehrman, & Lavine, 1990). According to (Carrell, Gajdusek, & Wise, 1998) reading strategies are actions that readers select and control to achieve desired goals or objectives. There are some classifications of reading strategies in literature, but two major categories are notable. One is the holistic/global (top-down strategies, text-level strategies) versus local strategies (bottom-up strategies, word-level strategies) and the other is the cognitive versus meta-cognitive strategies (Koda, 2007). Holistic/global strategies are those that are applied to understand and monitor comprehension during reading including predicting the content and noticing the structure of the text, integrating and questioning the knowledge, and using background knowledge. On the other hand, local strategies are those to figure out a specific linguistic unit such as questioning the meaning of a lexical item and clearing the unknown vocabulary (E. Block, 1986). The distinction between cognitive and meta-cognitive strategies is that meta-cognitive strategies are used by the readers to monitor and manage the reading process such as defining the purpose of reading, reviewing the text in terms of length and structure, and making use of tables and charts in the text. Cognitive strategies are used to solve comprehension problems regarding the text such as guessing the meaning of unknown vocabulary from the context and re-reading the text for clarification (Anderson, 1999; Sheorey & Mokhtari, 2001; Uhl Chamot & El Dinary,

1999). Data for the study was collected through a reading strategy inventory (MARSI) developed by Mokhtari & Reichard, 2002 before and after the instruction. At the beginning of the research, the reading strategy inventory was administered to the selected 20 participants and next the instruction started. The instructor taught different reading strategies including summarization, using background knowledge, making inferences, making predictions, generating and answering questions, understanding and remembering word meanings, and monitoring one`s own comprehension based on the Anthra model for fifteen sessions and at the end the reading strategy inventory was administered again.

Procedures for Collecting Data on Research Questions 2 and 3

At the beginning of the study, a Nelson proficiency test was administered to ensure the homogeneity of the 60 participants, choosing 40 of them. They were intermediate students studying at Tehran English institutes during the academic year of 2021-2022. At the beginning, the selected students were randomly divided into four groups. Two were experimental groups and the rest were control ones. Each group consisted of 10 students. The purpose of the research was to examine the effect of scaffolded differentiation strategies, so in the experimental groups the teacher used scaffolded differentiated strategies and in the control group, the teacher used ordinary methods.

There are different models for differentiated reading instruction including Tomlinson's model, Pinnells`s model, and …. In this study, the model proposed by Walpole & Mckenna was used.

This model consists of three tiers including intensive intervention, differentiated small-group instruction, and high-quality whole-group instruction.

According to Walpole & Mckenna`s model, assessment was a required part of differentiation instruction so four types of assessment were run as follows:

1. Screening assessment to determine the students that need additional instruction in a given area.
2. Diagnostic assessment to determine specific instructional needs in the related area.
3. Progress assessment to determine the periodic progress of the students.
4. Outcome assessment to determine the effectiveness of additional instruction across students.

According to the model, the practical phase started as follows:

As it was mentioned above the process started with a screening test to tell us whether a significant problem may exist in the area. For this purpose, a test from Active Skills for reading was selected. Since the screening test provided little information about the instructional needs in reading comprehension and was not detailed enough to help the teachers plan the instruction, a diagnostic test was run. In this test, the broad area of reading comprehension was divided into related competencies for the intermediate level students namely literal reading comprehension, inferential reading comprehension, referential reading comprehension, and receptive vocabulary. After the tests, the above-mentioned phases started:

Phase one

The model started with whole group instruction. Since in this study scaffolding instruction was supposed to be combined with differentiated instruction, cognitive and metacognitive strategies were used in this phase. Strategy instruction started with strategies that students often used and moved towards those that were rarely employed by students. The instructor taught different reading strategies including summarization, using background knowledge, making inferences, making predictions, generating and answering questions, understanding and remembering word meanings, and monitoring one`s own comprehension based on Anthra model for fifteen sessions. Each strategy consists of different activities and in each session, one of the activities was practiced as the below table.

Table 1

Procedure	Strategy	Related activities
First weak	Summarization	**Finding the main idea** **Mat r I C e S**
Second weak	Activating Background Knowledge	- a N t I C I p at I O N G U I D e S (+ W h Y) - K - W - L - t h I N K - p a I r - S h a r e
Third weak	Making Predictions	- p r e D I C t I O N C h a r t - p r e D I C t I O N S I G N a L S
Fourth weak	Making Inferences	- t + B = I I N F e r e N C e M a C h I N e S - S t I C K Y S Y M B O L S a N D D r a W I N G S
Fifth weak	Generating and Answering Questions	- B I G Q U e S t I O N S - I t S a Y S , I S a Y, a N D S O
Sixth weak	Understanding and Remembering Word Meanings	- C O N N e C t t h e W O r D S - F I G F I G S (F I G U r I N G O U t F I G U r at I V e L a N G U a G e)
Seventh weak	Monitoring One's Own Comprehension	- G e N r e t r a N S F O r M at I O N - r e a D - a L O U D t h I N K - a L O U D (r ata)

There are two models for strategy training including Bottom-Up Self-Regulation and Top-Down Self-Regulation.

Bottom-Up Self-Regulation: in this method, self-regulation is triggered by cues from the environment. There is no goal at the beginning of the work and feedback from the task and classroom reward structures help to establish work orientations. According to Boekaerts' model students are influenced by environmental cues but all the signals are not well and sometimes the resources have to be redirected.

Top-Down Self-Regulation: in this method students' adopted learning goals guide the process. According to Winne (1995) learners set goals for extending knowledge and sustaining motivation. They are aware of what they know and what they believe.

In this study, the latter method was used. For implementing the instruction the model proposed by Anthra (2010) was used which contains the following phases:

- Initial knowledge building through observation and explanation

- Demonstration by an experienced colleague or mentor

- Initial practice closely guided by the experienced colleague or mentor

-Guided practice with gradual reduction of direct guidance as skill increases

- Independent practice with direct guidance

- Assessment of performance and related knowledge

Phase two

Tier two consists of a shorter portion of instruction. This phase benefits all the students whether struggling students or top students. In each session, after the scaffolding strategies, the differentiated instruction started. The teacher formed and reformed the students in small groups and worked directly with each group while other groups were engaged in meaningful practices. According to Walpole & Mckenna` model, the isolated areas of reading comprehension include phonemic awareness, phonics, fluency, vocabulary, and comprehension. Since the target of the study was the intermediate students, the major obstacles were vocabulary and comprehension, so on the basis of the diagnostic test results the groups were formed and reformed for the needs in vocabulary and comprehension. After the recognition of the students` strengths and weaknesses in the above areas, the teacher formed small groups according to the needs. Consequently, there were some groups for working on comprehension and some groups for vocabulary. In the vocabulary groups the teacher tried to improve the vocabulary level of the students by using different strategies such as semantic feature analysis, concept sorting, definition provision, and …. In the

comprehension groups again, the teacher used different strategies such as question clusters, text structure instruction, direct explanation, and … to improve the comprehension ability of the students. As it was mentioned above, during the study the instructor used scaffolded differentiated strategies in the experimental groups and traditional methods in control ones. On the basis of the model, the related strategies, and the related literature the instructor had the following roles in those groups.

Table 2
Learning Activities for Experimental Group

Phase	Teacher's Activities
Introduction	Teacher explains why this strategy is important
	Teacher explains when to use the strategy in actual reading
	Teacher gives the prompts to help students doing think-aloud
Modeling think aloud strategy to comprehend the text (Teacher does, Students watch)	Teacher verbalizes her prediction when reading the title of the text
	Teacher verbalizes her thought when visualizing the text
	Teacher model how to connect the text with prior knowledge by verbalizing her comparison
Guided-Practice (Teacher does, students help)	Teacher continues reading the text. She stops in some lines and asks students what they think
	Teacher writes students` comment on the board
	Teacher reviews every strategy used together with the students
Pair-Practice (Students do, teacher helps)	With different text, teacher asks students to practice in pair and record their think-aloud.
	Teacher helps students if necessary
	Teacher reviews the text and asks what they are thinking during their read
Independent Practice (Students do, teacher watches)	Teacher asks students to do think-aloud independently and check their use of reading strategies
Evaluation	Teacher asks questions related to the text

Table 3
Learning activities for control group

Phase	Focus	Teachers` Activities
Pre-Activities	Introducing learning objectives and activating Students `background knowledge	Introducing learning objectives
		Activating students` background knowledge by asking questions related to narrative text e.g do you like story, etc
		Introducing the topic
		Asking questions related to the topic
Whilst-Activities	Assigning students to read aloud and answer the questions based on the text.	Reading the text aloud and asking student to listen and locate the difficult words as the teacher reads the text.
		Designating some students to read the text.
		Clarifying the meaning of difficult words.
		Assigning students to answer the questions
		Check the students" answer
Post activities	Assigning students to sit in a group to read the second text and answer questions	Introducing the second text
		Asking questions related to the topic
		Assigning students to read and answer the questions in the second text in the group
		Check the students" answer

The teachers must periodically check to see the extent of the instruction appropriateness and for this purpose progress monitoring tests were used. By this act the teachers could keep track of the student's overtime so they had a portfolio for each student.

Phase three
And finally for the children that tier 1 and 2 do not suffice, tier 3 was used. It was of systematic and explicit instruction type; the aim was to prevent children from needing special educational services.

At the end there was the outcome test to provide the index of growth across all the students, in this phase, the diagnostic test was administered again to check the improvement of the students in the areas of comprehension and vocabulary. 8 texts were selected for the diagnostic test and 20 questions were written by course aims (as it was mentioned before 4 areas including receptive vocabulary, literal, inferential, and referential comprehension were the target of this part and consequently 5 questions were dedicated for each one and all the questions were in multiple-choice format). The intervention lasted 7 weeks, four hours a week at the preparatory program.

Data Analysis
The quantitative data were analyzed by SPSS software. The collected data on students` meta-cognitive awareness of reading strategy use were tabulated to get the percentage of students marking each statement.

RESULTS
The main goal of this study was to probe the impact of implementing Scaffolded differentiation strategies in EFL reading comprehension classes. As presented in chapter one of this study, the following research questions were raised to achieve the objective of the study:

RQ1. Does using scaffolded differentiation strategies have any effect on the inferential reading comprehension of intermediate students?

RQ2. Does using scaffolded differentiation strategies have any effect on receptive vocabulary improvement of intermediate students?

RQ3. What is the effect of using scaffolded differentiation strategies on students' use of reading strategies?

The following null hypotheses were laid out based on the above-mentioned research questions:

H01. Using scaffolded differentiation strategies does not have any effect on the inferential reading comprehension of intermediate students.

H02. Using scaffolded differentiation strategies does not have any effect on receptive vocabulary improvement of intermediate students.

Reliability Statistics
As stated in chapter three of the current study, four instruments were used in this study: English Nelson proficiency test, Screening reading test, Diagnostic reading test, and Metacognitive awareness of reading strategies inventory. Table 1 indicates that the reliability value for the English Nelson proficiency test was measured at .90 through the KR-21 method. In addition, as represented in Table 4.1, the reliability value for the screening reading test and diagnostic reading test was estimated at .80 and .81 respectively. As Bryman and Cramer (2009) hold, the internal reliability of the questionnaire is estimated using Cronbach's alpha. Therefore, the internal reliability index of metacognitive awareness of reading strategies inventory was estimated via Cronbach's alpha. As seen in Table 4, the results showed that the Cronbach's alpha reliability for metacognitive awareness of reading strategies inventory including 30 items turned out to be .86.

Table 4

Reliability Statistics for the Instruments of the Study

Instrument	Number of items	Reliability Method	Reliability Index
English Nelson proficiency test	50	KR-21	.901
Screening reading test	8	KR-21	.804
Diagnostic reading test	20	KR-21	.810
Metacognitive awareness of reading strategies inventory	30	Cronbach's Alpha	.864

Homogeneity Results through the Nelson test

To select homogeneity intermediate participants, the researcher gave the Nelson test to 75 EFL learners. The results gained on the Nelson test are outlined in Table 5. According to Table 5, the mean, median, and mode of the Nelson test scores before homogenizing were 27.39, 28, and 26 respectively. These central parameters are close to one another denoting that the Nelson test scores are normally distributed around the mean. Moreover, according to Table 5, the ratios of skewness (-.655) and kurtosis (-.974) over their respective standard errors are not beyond the ranges of +/- 1.96 showing that the Nelson test scores are normally distributed. (See Appendix C for the Nelson test raw scores before homogenizing).

Table 5

Descriptive Statistics for Nelson Test before Homogenizing (Scores out of 50)

N	Mean	Median	Mode	SD	Skewness Ratio	Kurtosis Ratio
59	27.39	28.00	26	5.93	-.655	-.974

Figure 1 below displays the distribution of the homogeneity test scores before homogenizing on a normal curve. As can be seen in the Histogram, most of the Nelson test scores are located around the mean in the center of the curve, and there are few minimum and maximum scores on the two sides of the curve forming a bell shape. That indicates the normal distribution of the scores.
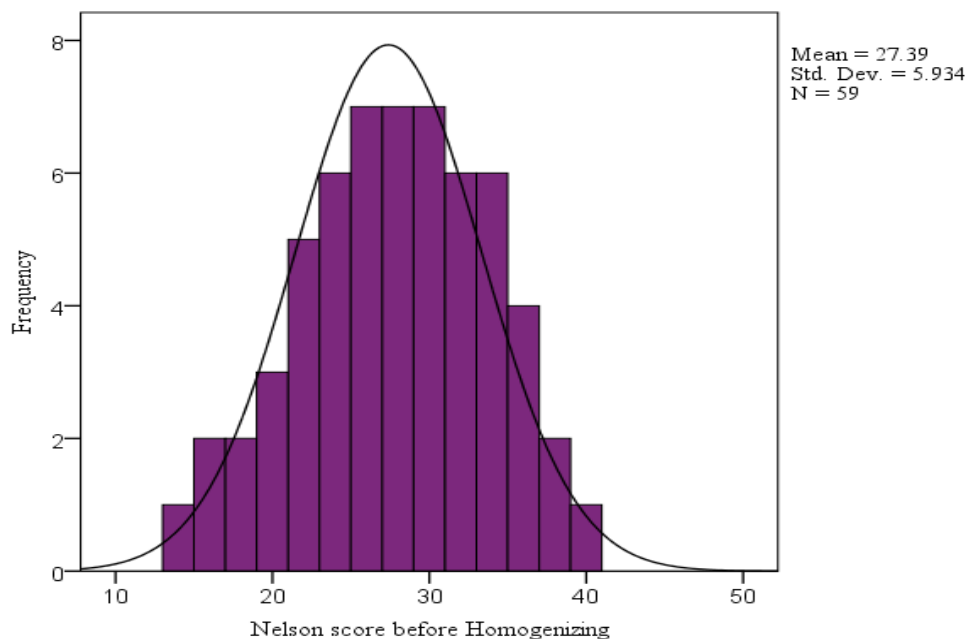

Mean = 27.39
Std. Dev. = 5.934
N = 59

Figure 1

Histogram of normal distribution of Nelson test scores before homogenizing

Table 6 below represents the descriptive statistics for the Nelson test score after homogenizing. Based on the results of the Nelson test, those 40 learners who scored one standard deviation (SD = 5.93) plus and minus the mean (M = 27.39) (scores between 21 and 33) were chosen as homogeneous intermediate participants for the main study. Besides, Table 3 indicates that the mean, median, and mode of the Nelson test scores after homogenizing were 27.26, 27, and 26 respectively. In addition, as evident from Table 6, the ratios of skewness (-.169) and kurtosis (-1.41) over their respective standard errors are within the ranges of +/- 1.96 denoting the normal distribution of the Nelson test scores. (See Appendix D for the Nelson test raw scores after homogenizing).

Table 6
Descriptive Statistics for Nelson Test Score after Homogenizing (Scores out of 50)

N	Mean	Median	Mode	SD	Skewness Ratio	Kurtosis Ratio
40	27.26	27.00	26	3.42	-.169	-1.411

The distribution of the Nelson test scores before homogenizing was drawn on a normal curve (Figure 2). Like the previous Histogram, the Histogram below indicates that most of the Nelson test scores are recorded around the mean in the center of the curve, and the there are few minimum and maximum scores on the two sides of the curve forming a bell shape. It reveals the normally distributed of the scores.
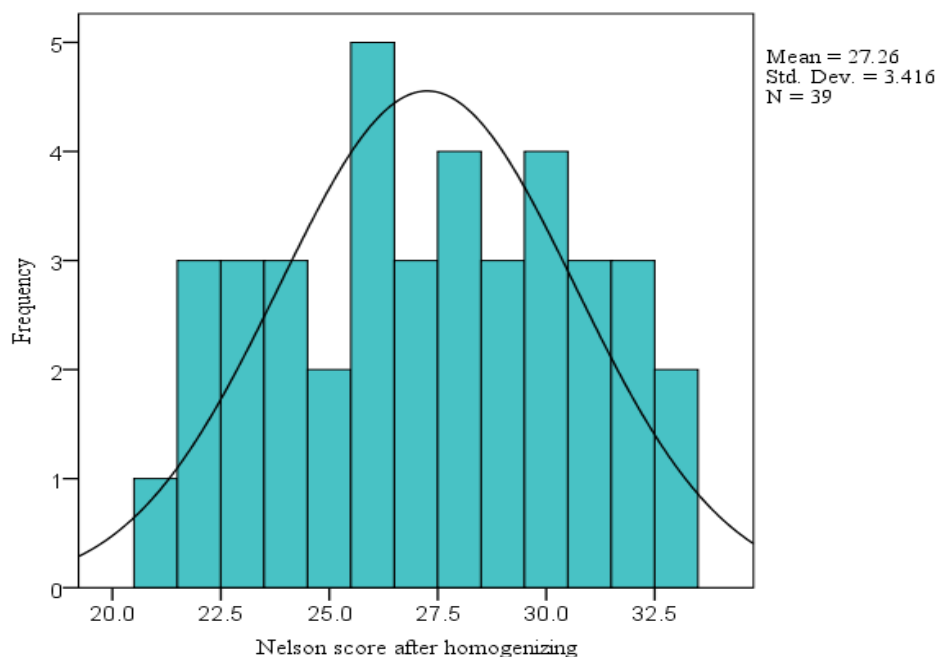

Figure 2
Histogram of Nelson test scores after homogenizing

Addressing Research Question 1

The first and second research questions of this study inquired if using scaffolded differentiation strategies has any effect on inferential reading comprehension and receptive vocabulary of intermediate students respectively. To investigate these two research questions of this study, the multivariate ANCOVA (MANCOVA) was utilized. ⌧ Maintains maintains that multivariate analysis of covariance (MANCOVA) is a statistical technique that is the extension of the analysis of covariance (ANCOVA). It is the multivariate analysis of variance (MANOVA) with a covariate(s). In MANCOVA, we measure for statistical differences on multiple continuous dependent variables (posttest scores gained on elements of reading comprehension i.e. inferential reading and receptive vocabulary) by an

independent grouping variable (using scaffolded differentiation strategies), while controlling for a third variable called the covariate (pretest scores acquired on inferential reading and receptive vocabulary). Covariates are added to reduce error terms and so that the analysis eliminates the covariates' effect on the relationship between the independent grouping variable and the continuous dependent variables.

The descriptive statistics for the pretest of four elements of reading comprehension in the experimental and control groups were calculated before presenting the results of MANOVA (Table 7). As demonstrated in Table 4 and Figure 3, the means for the four elements of learners' reading comprehension in the experimental and control groups seem to be close to each other on the pretest.

Table 7

Descriptive Statistics for Scores Gained on Four Elements of Reading Comprehension by Group (Pretest)

Variable	Group	N	Mean	SD	SEM
Inferential reading	Experimental	20	2.40	1.142	.255
	Control	20	2.35	1.137	.254
Receptive vocabulary	Experimental	20	2.25	1.020	.228
	Control	20	2.20	1.152	.258

Additionally, Table 8 below includes the descriptive statistics for the posttest scores obtained on four elements of reading comprehension in the experimental and control groups. (See Appendix F for the scores gained on inferential reading and receptive vocabulary scores in both groups on the posttest).

Table 8

Descriptive Statistics for Scores Gained on two Elements of Reading Comprehension by Group (Posttest)

Variable	Group	N	Mean	SD	SEM
Inferential reading	Experimental	20	3.25	1.293	.289
	Control	20	2.50	1.051	.235
Receptive vocabulary	Experimental	20	2.80	1.240	.277
	Control	20	2.40	1.188	.266

As shown in Table 8 and Figure 3, the mean score for the elements i.e., 'Inferential reading and 'Receptive vocabulary' is noticeable greater than the control group.
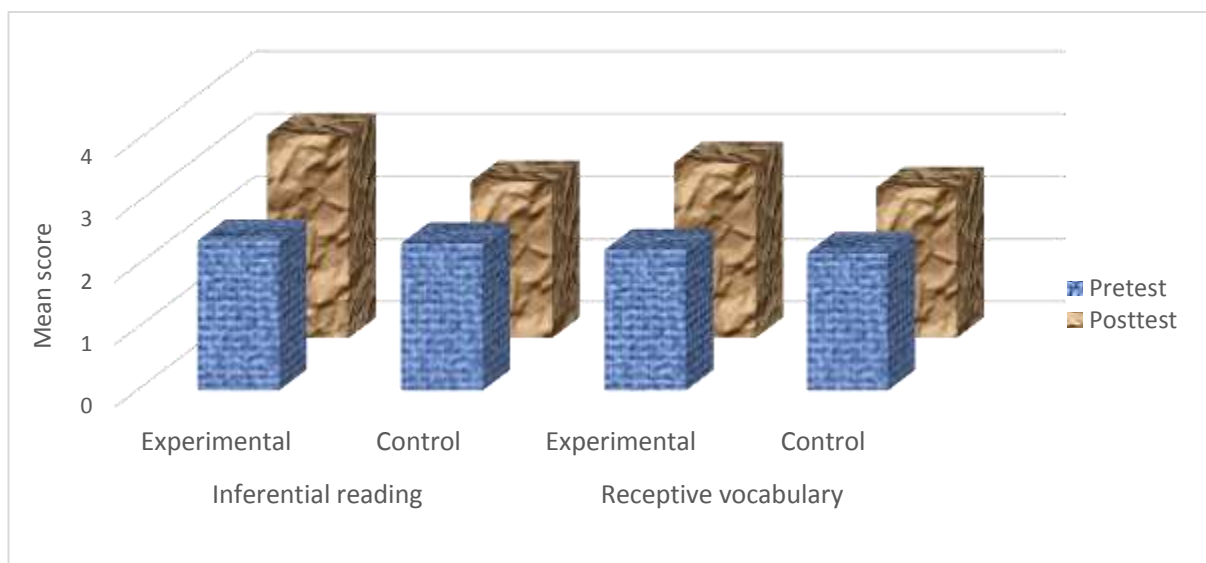

Figure 3

Bar graph of mean scores gained on elements of reading comprehension by group (pretest & posttest)

Testing assumptions: According to (Field & Miles, 2009), three assumptions (interval data, independence of subjects, and homogeneity of variances) should be checked before one decides to perform parametric statistical tests. In the present study, the first assumption is not violated as the present data are measured on an interval scale.

Moreover, Bachman (2005, p. 236) states that the assumption of independence of subjects is met when "the performance of any given individual is independent of the performance of other individuals" and in fact it was the case in this research.

Also, the results of homogeneity of variances are summarized in Table 9. Since the majority of them met the homogeneity of variances assumption in addition to enjoying the assumption of equality of covariance matrices discussed in the next section, the current researcher decided that the homogeneity of variance assumption was not violated.

Table 9

Levene's Test of Equality of Error Variances for Scores Gained on Three Elements of Learners' Reading Comprehension

Variable	F	df1	df2	Sig.
Inferential reading	.090	1	38	.764
Receptive vocabulary	19.863	1	38	.000

As evident from Table 20 the assumption of homogeneity of covariance was not violated (Box's $M = 16.23$, $F = 1.44$, $p = .16$, $p > .05$).

Table10

Box's Test of Equality of Covariance Matrices for Elements of Reading Comprehension

Box's M	F	df1	df2	Sig.
16.233	1.437	10	6903.586	.157

As observable from Table 11, multivariate tests indicated that there was a statistically significant difference (Wilks' Lambda = .48; $F_{(4, 31)} = 8.20$; $p = .000$, $p < .05$) in the total learners' reading comprehension measures between the two groups on the posttest while controlling the effect of the pretest. The results showed that Partial $\eta2$ was .51 reflecting a large effect size based on Cohen's guidelines (1988, pp. 284-7).

Table 11

Multivariate Tests for Scores Gained on Elements of Learners' Receptive vocabulary in the by Group

Effect		Value	F	Hypothesis df	Error df	Sig	Partial Eta Squared
Intercept	Pillai's Trace	.263	2.763	4.000	31.000	.045	.263
	Wilks' Lambda	.737	2.763	4.000	31.000	.045	.263
	Hotelling's Trace	.357	2.763	4.000	31.000	.045	.263
	Roy's Largest Root	.357	2.763	4.000	31.000	.045	.263
Group	Pillai's Trace	.514	8.205	4.000	31.000	.000	.514
	Wilks' Lambda	.485	8.205	4.000	31.000	.000	.514
	Hotelling's Trace	1.059	8.205	4.000	31.000	.000	.514
	Roy's Largest Root	1.059	8.205	4.000	31.000	.000	.514

However, multivariate tests do not specify the precise place of difference between the two groups in terms of the four elements of learners' Receptive vocabulary. That's why tests of between-subjects' effects were run (Table 4).

But, Table 11 indicates that tests of between-subjects' effects detected a significant difference in 'Inferential reading' posttest scores between the experimental and control groups ($F_{(1, 34)} = 33.17$, $p = .000$, $p < .05$); therefore, the current researcher could reject the first null hypothesis that says, "Using scaffolded differentiation strategies does not have any effect on inferential reading

comprehension of intermediate students". In other words, it can be claimed that using scaffolded differentiation strategies affects inferential reading comprehension of intermediate students.

Likewise, Table 12 shows that tests of between-subjects' effects found a significant difference in 'Receptive vocabulary' posttest scores between the experimental and control groups ($F_{(1, 34)} = 7.33$, $p = .01$, $p < .05$); for that reason, the present researcher could reject the second null hypothesis that mentions, "Using scaffolded differentiation strategies does not have any effect on receptive vocabulary improvement of intermediate students". That's why, it can be declared that using scaffolded differentiation strategies improves receptive vocabulary of intermediate students.

Table 12

Tests of Between-Subjects Effects for Scores Obtained on Elements of Learners' Receptive vocabulary by Groups

Source	Dependent Variable	Type III Sum of Squares	Df	Type III Sum of Squares	Df	Sig.	Partial Eta Squared
Corrected Model	Post-Inferential reading	53.624b	5	10.725	76.748	.000	.919
	Post-Receptive vocabulary	52.726d	5	10.545	73.557	.000	.915
Group	Post-Inferential reading	4.636	1	4.636	33.173	.000	.494
	Post-Receptive vocabulary	1.050	1	1.050	7.327	.011	.177
Error	Post-Inferential reading	4.751	34	.140			
	Post-Receptive vocabulary	4.874	34	.143			
Total	Post-Inferential reading	389.000	40				
	Post-Receptive vocabulary	328.000	40				

Addressing Research Question 5

The third research question of this study asked about the effect of using scaffolded differentiation strategies over students' use of reading strategies. To do so, the researcher used Meta-Cognitive Awareness Reading Strategy Inventory (Mokhtari & Reichard, 2002) consisting of 30 items that measure three factors: Global Reading Strategies (13 items), Problem-Solving Strategies (8 items), and Support Reading Strategies (9 items). In fact, there are three dependent variables to be explored, so the multivariate ANCOVA (MANCOVA) was utilized to examine this research question. In fact, (Pallant & Manual, 2013) maintains that multivariate analysis of covariance (MANCOVA) is a statistical technique that is the extension of analysis of covariance (ANCOVA). In fact, it is themultivariate analysis of variance (MANOVA) with a covariate(s). In MANCOVA, we measure for statistical differences on multiple continuous dependent variables (posttest scores gained on three subscales of reading strategies i.e., global, problem-solving, and supportive reading strategies) by an independent grouping variable (using scaffolded differentiation strategies), while controlling for a third variable called the covariate (pretest scores acquired on global, problem-solving, and supportive reading strategies). Covariates are added to reduce error terms and so that the analysis eliminates the covariates' effect on the relationship between the independent grouping variable and the continuous dependent variables.

The descriptive statistics for the pretest of three subscales of reading strategies in the experimental and control groups were calculated before presenting the results of MANOVA (Table 13).

Table 13
Descriptive Statistics for Scores Gained on Three Subscales of Reading Strategies by Group (Pretest)

Variable	Group	N	Mean	SD	SEM
Global	Experimental	20	3.714	.399	.089
	Control	20	3.687	.394	.088
Problem-solving	Experimental	20	3.870	.464	.103
	Control	20	3.854	.452	.101
Supportive	Experimental	20	3.799	.407	.091
	Control	20	3.781	.411	.092

Additionally, Table 14 below includes the descriptive statistics for the posttest scores obtained on three subscales of reading strategies in the experimental and control groups.

Table 14
Descriptive Statistics for Scores Gained on Three Subscales of Reading Strategies by Group (Posttest)

Variable	Group	N	Mean	SD	SEM
Global	Experimental	20	3.877	.403	.090
	Control	20	3.720	.37	.084
Problem-solving	Experimental	20	3.924	.455	.101
	Control	20	3.898	.452	.101
Supportive	Experimental	20	3.871	.413	.092
	Control	20	3.810	.39	.08

As shown in Table 14 and Figure 4, on the posttest, the mean score for the two subscales of 'Global', 'Supportive', in the experimental group is noticeably greater than the mean scores in the control group but not for the other subscale of 'Problem-solving'.
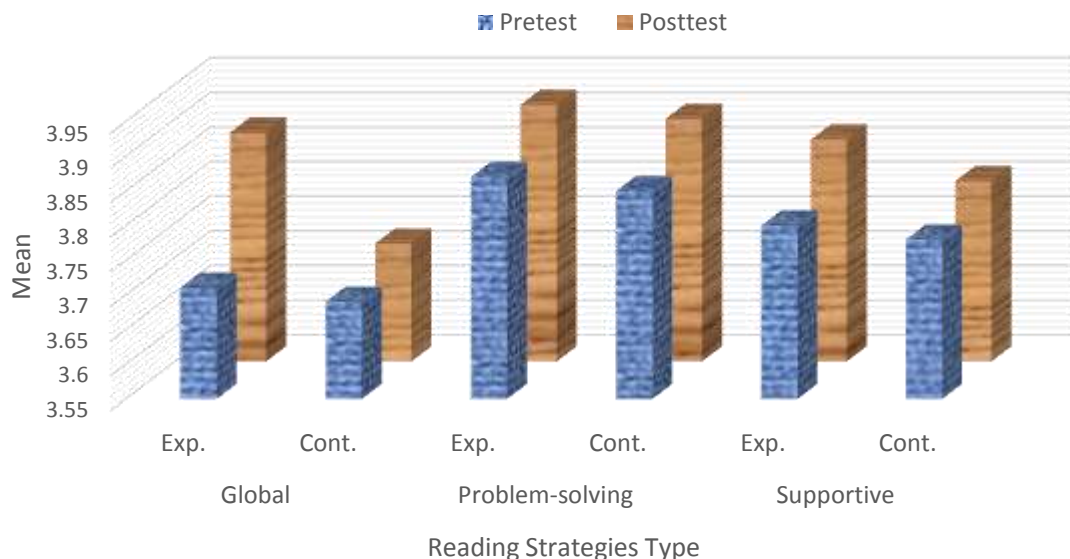

Figure 4
Bar graph of mean score for subscales of reading strategies (pretest & posttest)

Testing assumptions: According to Field and Miles (2009), three assumptions (interval data, independence of subjects, homogeneity of variances) should be checked before one decides to perform parametric statistical tests. In the present study, the first assumption is not violated as the present data are measured on an interval scale.

Moreover, Bachman (2005, p. 236) states that the assumption of independence of subjects is met when "the performance of any given individual is independent of the performance of other individuals" and in fact it was the case in this research.

Also, the results of homogeneity of variances are summarized in Table 15. Table 15

shows that the significant value associated with Levene's test for the scores obtained on two subscales i.e., 'Global' ($p = .11$) and 'Problem-solving' ($p = .80$) is larger than the selected significant level ($p > .05$) showing that the homogeneity of variance assumption was achieved for these two variables but not for the third one i.e., 'Supportive' ($p = .000$),

Table 15

Levene's Test of Equality of Error Variances for Scores Gained on Subscales of Reading Strategies

Variable	F	df1	df2	Sig.
Global	2.741	1	38	.108
Problem-solving	.063	1	38	.803
Supportive	15.510	1	38	.000

As evident from Table 16, the assumption of homogeneity of covariance was not violated (Box's $M = .20$, $F = .05$, $p = .94$, $p > .05$).

Table 16

Box's Test of Equality of Covariance Matrices for Subscales of Reading Strategies

Box's M	F	df1	df2	Sig.
.204	.051	6	10462.189	.943

As observable from Table 17 multivariate tests indicated that there was a statistically significant difference (Wilks' Lambda = .37; $F_{(3, 33)} = 18.37$; $p = .000$, $p < .05$) in the total reading strategies measures between the two groups on the posttest while controlling the effect of the pretest. The results showed that Partial $\eta2$ was .63 reflecting a large effect size based on Cohen's guidelines (1988, pp. 284-7).

Table 17

Multivariate Tests for Scores Gained on Subscales of Reading Strategies in the by Group

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.088	1.057	3.000	33.000	.381	.088
	Wilks' Lambda	.912	1.057	3.000	33.000	.381	.088
	Hotelling's Trace	.096	1.057	3.000	33.000	.381	.088
	Roy's Largest Root	.096	1.057	3.000	33.000	.381	.088
Group	Pillai's Trace	.626	18.375	3.000	33.000	.000	.626
	Wilks' Lambda	.374	18.375	3.000	33.000	.000	.626
	Hotelling's Trace	1.670	18.375	3.000	33.000	.000	.626
	Roy's Largest Root	1.670	18.375	3.000	33.000	.000	.626

However, multivariate tests do not specify the precise place of difference between the two groups in terms of the three subscales of reading strategies. That's why tests of between-subjects' effects were run (Table 18). As represented in Table 15, tests of between-subjects' effects found significant differences in posttest scores between the experimental and control groups for the two sub-

scales of reading strategies, i.e., 'Global' ($F_{(1, 35)} = 44.30$, $p = .000$, $p < .05$), 'Supportive' ($F_{(1, 35)} = 7.90$, $p = .008$, $p < .05$), but not for 'Problem-solving' ($F_{(1, 35)} = .69$, $p = .41$, $p > .05$) between the experimental and control groups while controlling for the covariate of pretest scores. Accordingly, since two out of three main types of reading strategies (i.e., global and supportive) were

influenced by applying the intervention of the current study (i.e., applying scaffolded differentiation strategies), it can be claimed applying scaffolded differentiation strategies affects students' use of reading strategies.

Table 18
Tests of Between-Subjects Effects for Scores Obtained on Subscales of Reading Strategies by Groups

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Post-Global	5.936	4	1.484	385.885	.000	.978
	Post-Problem-solving	7.791	4	1.948	1370.633	.000	.994
	Post-Supportive	6.231	4	1.558	659.988	.000	.987
Group	Post-Global	.170	1	.170	44.300	.000	.559
	Post-Problem-solving	.001	1	.001	.695	.410	.019
	Post-Supportive	.019	1	.019	7.902	.008	.184
Error	Post-Global	.135	35	.004			
	Post-Problem-solving	.050	35	.001			
	Post-Supportive	.083	35	.002			
Total	Post-Global	583.367	40				
	Post-Problem-solving	619.834	40				
	Post-Supportive	596.291	40				

Discussion

This study aimed at exploring the effect of implementing scaffolded differentiation strategies in EFL reading comprehension classes. Therefore, six research questions were raised by the current researcher to achieve this main goal: 1) Does using scaffolded differentiation strategies have any effect on literal reading comprehension of intermediate students? 2). Does using scaffolded differentiation strategies have any effect on inferential reading comprehension of intermediate students? 3). Does using scaffolded differentiation strategies have any effect on referential reading comprehension of intermediate students? 4). Does using scaffolded differentiation strategies have any effect on receptive vocabulary improvement of intermediate students? 5) What is the effect of using scaffolded differentiation strategies over students' use of reading strategies? And 6). What are the challenges of using scaffolded differentiation strategies in heterogeneous EFL reading comprehension classes?

MANCOVA results ($F_{(1, 34)}$ = 1.38, p = .25) indicated that the first research question of this study was negatively answered. In fact, it was shown that using scaffolded differentiation strategies does not have any effect on literal reading comprehension of intermediate students.

The results of MANCOVA ($F_{(1, 34)}$ = 33.17, p = .000) revealed that answer to the second research question of the current study was positive. In other words, it was proved that using scaffolded differentiation strategies influences inferential reading comprehension of intermediate students.

MANCOVA results ($F_{(1, 34)}$ = 9.14, p = .005) showed that the third research question of this study was positively responded as well. In fact, it was shown that using scaffolded differentiation strategies affects referential reading comprehension of intermediate students.

The results ($F_{(1, 34)}$ = 9.14, p = .005) demonstrated that the answer to the third research question of this study was positive. In other words, it was found that using scaffolded differentiation strategies affects receptive vocabulary of intermediate students.

Regarding the fifth research question, MANCOVA results (Wilks' Lambda = .37; $F_{(3, 33)}$ = 18.37; p = .000) proved that applying scaffolded differentiation strategies affects students' use of reading strategies. Further, the results showed that scaffolded differentiation strategies improved 'Global' ($F_{(1, 35)}$ = 44.30, p

= .000), 'Supportive' ($F_{(1, 35)} = 7.90$, $p = .008$) subscales of reading strategies, but not 'Problem-solving' ($F_{(1, 35)} = .69$, $p = .41$).

Moreover, the answer to the sixth research question of this study was that "inappropriate institute atmosphere", "unfamiliar and unmotivated English teachers", "improper curriculum and material", and "special demands for nature of scaffolded differentiation approach" were the main challenges of using scaffolded differentiation strategies in heterogeneous EFL reading comprehension classes.

The results of this study are in line with Safadi's and Rababah's (2012) study in which they explored the influence of scaffolding instruction on 11th grade Jordanian EFL learners' reading comprehension skills. The students in the experimental group were taught three units chosen from the participants' English textbook using scaffolding instruction, whereas the students in the control group practiced the same units with no special scaffolding. Reading comprehension pretest and posttest procedures were applied to measure the effect of the scaffolding program on the participants' reading comprehension achievement. Finally, one-way analysis of co-variance (ANCOVA) was conducted to measure any statistically significant differences in the mean scores of both groups. In addition, multivariate analysis of covariance (MANCOVA) was performed to find any significant differences in their posttest mean scores. Results of their study showed that there are significant differences in the subjects' achievement in reading comprehension skills, in favor of the experimental group. Therefore, it is recommended that scaffolding instruction be integrated into the EFL curriculum, and that teachers be advised to match their teaching techniques with the students' zones of proximal development.

Similarly, the results of the present study are incongruent with previous study Aliakbari and Khales Haghighi (2014), which explored the usefulness of differentiated instruction and traditional-based pedagogy in the promotion of male and female learners reading comprehension in separate gender educational system. Forty-seven elementary students of a language institute in Iran were chosen and divided into experimental and control groups, including one male one female classroom in each category. The students of the experimental group were taught through the strategies of differentiated instruction, viz. flexible grouping, tiered instruction, and tiered assignments, in the areas of content, process, and product. The students of the control group also received traditional instruction strategies. The outcomes of ANOVA from post-test results indicated that the students of the experimental group outperformed the control one. Further, the computation of post hoc analysis revealed that female learners of the experimental group performed better in comparison to male ones in the post-test.

Likewise, the findings of this study are in consistent with DeWeese (2018) who conducted an action research to investigate the effect of strategy group differentiation during literacy on accuracy, fluency, and comprehension development. In fact, the aim of his study was to find out if strategy group differentiation affects the academic success of students in the literacy elements of accuracy, fluency, and comprehension. Teachers could study their own classrooms to develop their own educational practices through action research studies (Mertler & Charles, 2014) following a quantitative research methodology cycle that contained four stages: planning, acting, developing, and reflecting (Mertler & Charles, 2014). Recognizing the problem of practice within the classroom, reviewing the related literature regarding the problem of practice, and designing the action research method was the planning stage of the action research cycle.

The acting phase of this research included implementing strategy group differentiation in a first-grade classroom and gathering quantitative data comprising a pre- and posttest, running records, and field notes. The collected quantitative data guided the researcher's grouping of strategy groups for differentiation during reading and united to explore the research question of the study. The developing stage involved the analysis of the collected data. The results indicated that 94% of the participants improved in reading accuracy and fluency; while, all of the students enhanced in reading comprehension. Generally, 14 out of 17 learners advanced at

least one reading level and all participants revealed progress in at least one literacy element.

Finally, the reflecting stage contained a reflection of the data collected and redirecting of the study. Comparing of pretest and posttest results indicated that strategy group differentiation may improve the literacy development of accuracy, fluency, and comprehension and might be beneficial with other improving reading groups. Accuracy, fluency, and comprehension improvement is likely promising in increasing overall reading levels.

Conclusion

As mentioned earlier in this chapter, the present study aimed at probing the effect of implementing scaffolded differentiation strategies in EFL reading comprehension classes. After doing this research, the author could come to the first conclusion that using scaffolded differentiation strategies develop reading comprehension of intermediate students. In fact, it was concluded that inferential and referential reading comprehension, but not literal reading comprehension, are influenced by applying scaffolded differentiation. This conclusion follows from the fact that the teachers, by using scaffolding strategies, can facilitate learners' transition from supported to independent performance (Gibbons, 2002). In fact, scaffolding is employed to bridge between students' independent and supported operating levels.

Also, this conclusion is based on the notion that teachers need to meet the needs of a diverse group of learners. Learners' needs have changed significantly from the past and in the current era most of the classrooms comprise children of a same age with various languages, cultures, ability levels, readiness, and interests (P. Tomlinson, 1999). Therefore any type of instruction must focus on the diversity of the students(C. A. Tomlinson, 1995). In fact, teachers work with language classes in which the students are heterogeneous with various cultural backgrounds and life experiences, thus it is clear that the related instruction must reflect the diversity (Rasinski & Hoffman, 2003). Moreover, instructional scaffolding is, therefore, an effective model

for teaching reading, and such an instruction influences the development of higher functions and skills beyond the confines of a learner. Thus, it can, undoubtedly, further develop students' cognitive and metacognitive skills (Davis & Miyake, 2018; Olson & Land, 2007).

In addition, the analysis led to the following conclusions: 4) using scaffolded differentiation strategies enhances receptive vocabulary of intermediate students.

Furthermore, the researcher could conclude that using scaffolded differentiation strategies influences students' use of reading strategies. In fact, it was concluded that this effect was more noticeable in 'Global' and 'Supportive' but not for 'Problem-solving reading strategy subscales. This conclusion follows from the fact comprehension strategies can be taught, and when taught, can develop better processing systems that increase comprehension (Walqui, 2006). These comprehension skills are taught and reinforced in a number of ways. When approaching a text, teachers guide students to think of the title and build ideas about what the text will say. Teachers help their students master the habit of evoking their prior knowledge and information on a subject when they read to enhance comprehension (Walqui, 2006).

Unfortunately, according to (Elleman, Compton, Fuchs, Fuchs, & Bouton, 2011) struggling readers remain quite passive while they are reading. They do not employ the strategies that effective readers apply before, during, and after reading. In fact, poor readers do not monitor their understanding and are not aware of the strategies that might improve comprehension, like identifying main ideas and key details (Gersten, Fuchs, Williams, & Baker, 2001; Klingner, Vaughn, & Boardman, 2015).

Besides, after accomplishing this study, the researcher came to the conclusion that "inappropriate institute atmosphere", "unfamiliar and unmotivated English teachers", "improper curriculum and material", and "special demands for nature of scaffolded differentiation approach" are the main challenges of using scaffolded differentiation strategies in heterogeneous EFL reading comprehension classes.

Pedagogical Implications

It is acknowledged that everyone has to be very cautious in drawing implications from a single study. There are pedagogical implications that yield productive language teaching results regarding different ELT issues, such as language teaching methodology and teacher training courses for pre-service or in-service teachers.

The results of this and other related studies cited in line with the present study strengthen empirical support for the effectiveness of scaffolded differentiation strategies in EFL reading comprehension classes.

The present study results are expected to be valuable to novice EFL teachers, EFL teachers, and teacher trainers in various ways.

EFL teachers should choose their teaching methods depending on students' needs in the classroom since not all learners demonstrate the same readiness to learn. Some learners have poor English language skills and are not motivated to overcome this situation whereas others do not fit the way the teacher gives a lecture. In fact, they should use a range of classroom practices that accommodate differences in their learners' learning styles, prior knowledge, socialization needs, interests, and comfort zone. In addition, teachers must design activities that support their students' learning preferences and strengths while providing tasks that inspire growth in areas of weakness. The more times the teacher can engage students in the learning process and give them more opportunities to use their preferred ways of thinking, the better their ability to learn. Teacher who are prepared now for differentiation classes must be ready for these new changes in teaching methods, and gain the awareness, skills, and dispositions suitable to teach diverse leaners of this recent years.

Test designers and examiners are advised to pay special attention to differences in the learners' culture, learning styles, background knowledge, socialization needs, personal interests, and comfort zone while designing tests to these diverse learners. It is not fair to give all diverse students the same test.

Material developers should also include variety of tasks in the textbooks so as to fit and motivate a variety of students with different English proficiency, background knowledge, motivations, needs, preferences, goals, etc. For instance, for teaching reading comprehension, the material providers can include different reading passages with various topics and exercises so that all students enjoy their preferred reading topics and tasks. In fact, this way can help them not to be discouraged by uninterested and difficult reading comprehension texts and exercises.

Language educators, trainers, and school and institute supervisors can prepare teaching training courses to novice teachers and include the way to use scaffolded differentiation strategies to teach reading comprehension and other main language skills. Novice teachers should be equipped with the way to employ scaffolded differentiation strategies in their classes. These novice teachers require to be aware of its importance, be informed of the facilities, equipment, textbooks, techniques, problems and challenges and the way to overcome these problems.

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