

Artículo de investigación

The Effectiveness of multiple intelligence based differentiated instruction on metacognitive reading comprehension in Arabic language among middle school students in Saudi Arabia

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Abstract

Identifying an effective instructional strategy, such as this of multiple intelligence based differentiated instruction to teach metacognitive reading comprehension is a goal for educators. The purpose of this study was to investigate the effectiveness of multiple intelligence based differentiated instruction on metacognitive reading comprehension in Arabic language among middle school students in Saudi Arabia. The sample consisted of 61 third year- middle school students, from Ibn Sina Middle school for boys, in Al-Kharj Governorate, Saudi Arabia. They were from two classrooms. They aged 14-15 years old (M= 14.9 years, SD= 0.621). For the purpose of this study and for analyzing the data from the pre- and post-test, the author used two way ANOVA analysis and t-test. Two way. ANOVA analysis and t-test results indicated the effectiveness of multiple intelligence based differentiated instruction on metacognitive reading comprehension in Arabic language among middle school students in Saudi Arabia.

Keywords: Multiple intelligence, differentiated instruction, metacognitive reading comprehension, Arabic language, middle school students

Introduction

The concept metacognition, as indicated by some researchers (e.g. Al Said,2014; Eissa, 2015; Hesham, 2015; Mostafa, 2014; Veenmann, 2016) is based on two main and crucial aspects. These two constitute what is called metacognition. The first aspect is where students are aware of a knowledge base. This base helps students store information about how, when, and where to use various cognitive strategies. They also are of and able to access to strategies that may support them in their learning course (e.g. monitoring difficulty level, a feeling of knowing). It is worth mentioning that this awareness can be developed and take the shape of a continuum.

Students who can be described as proficient readers may be able to use different metacognitive strategies in order for comprehending the reading texts. Three main aspects of metacognition were identified: MK (metacognitive knowledge), MM (metacognitive monitoring), and SR & C (self regulation and

control) (Mindy, 2016). Metacognitive knowledge includes CLS (cognitive learning strategies) which the learner uses in order for regulating the acquisition of knowledge process, where elaboration strategies such as the building of links to prior knowledge, or memory strategies such as note taking are included (Stephan, 2016). Whereas the central of metacognitive control strategies are some activities such as planning and monitoring students' learning activities, the ability to evaluate learning outcomes and adapt to varying task demands and unpredicted difficulties, such as a sudden increase in directed efforts (Baker, 2016).

Students in our country, as well as those in every corner of our world, come to schools with different abilities, learning styles, and even personalities. Their learning abilities may be above grade level or perhaps below grade level. That is, teachers are now dealing with students with academic variability and diversity (Eissa &

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Mostafa, 2013). Accordingly, it is the responsibility of teachers to find strategies that support their students in their way to achieve standards presented through methods such as problem solving (Hesham & Abdullah, 2014). They are mandated to see that the standards put forth by their district all the whole country are met by students in their classrooms.

Differentiated Instruction (DI) is a teaching approach through which students' needs are met and the established standards are exceeded (Levy, 2008; Omema, 2014). This approach takes into account and respects variability and diversity in students' learning styles, teaches them in accordance to their own pace, and care about the teaching and learning context that responds to this variability (Tomlinson, 1999). Moreover, DI consists of the best, applied, approved and effective teaching strategies (Middendorf, 2008).

One skill that students seek their needs to be met is reading. Comprehension, the ability to go step further beyond the prints, to understand the main and supporting ideas in the written script and the relationships that may be there between those ideas, is the main goal for reading (Al Farahati, 2012; Esam, 2015; Omema, 2015; Waleed, 2015). In order for comprehension to be achieved, it cannot occur automatically. But it takes into account student's directed cognitive effort. This what is called metacognitive processing. While processing information metacognitively, students know about and regulate their cognitive processing. During the reading process, strategies support expressing metacognitive processing. Different strategies have a nature that can be described as being procedural, purposeful, effortful, willful, essential, and facilitative. Metacognitive strategies help students (readers) put their efforts in controlling, monitoring, and evaluating the reading process (Eissa, 2012). Since multiple intelligences theory is concerned with understanding of how people (students here) learn (Adel, 2019) differentiated instruction (DI) has something to do and is suited in its research. Using MI during lessons periods makes learning more interesting and enjoyable, and students, in turn, pay more attention to what is taught and then learned (Eissa, 2012).

Purpose of the study

The purpose of this study was to investigate the effectiveness of multiple intelligence based differentiated instruction on metacognitive

reading comprehension in Arabic language among middle school students in Saudi Arabia.

Problem Statement

In our country, unfortunately, there seems to be one prevailing norm. That is, one-size-fits-all instruction. This norm groups students according to their age and grade. Teachers use whole-class lecture teaching. One can say that there is a mismatch between students' needs and preferences and the instructional opportunities their teachers provide to them.

Students may be subject to failure if the instruction is designed to be the same for all of them, or at least for many of them, in the classroom (Mavidou & Kakana, 2019). Gardner's theory of multiple intelligences calls for understanding of the ways students use to process and make information meaningful, consistent with differentiated instruction (DI) (Tomlinson, 1999). Although multiple intelligence based differentiated instruction holds a promise, especially with metacognitive reading comprehension in Arabic language, research evaluating its effectiveness in our country is only in the formative stages.

Hypotheses

The recent study tries to test the following two hypotheses

H1.: There will be significant statistical differences between experimental (taught with multiple intelligence based differentiated instruction) and control (not taught with multiple intelligence based differentiated instruction) groups in global reading strategies in post-test in favor of the experimental group.

H2.: There will be significant statistical differences between experimental (taught with response-to-intervention model) and control (not taught with response-to-intervention model) groups in problem solving reading strategies in post-test in favor of the experimental group.

H3.: There will be significant statistical differences between experimental (taught with response-to-intervention model) and control (not taught with response-to-intervention model) groups in support reading strategies in post-test in favor of the experimental group.

Method

Participants

The sample consisted of 61 third year- middle school students, from Ibn Sina Middle school for boys, in Al-Kharj Governorate, Saudi Arabia. They were from two classrooms. They aged 14-15 years old ($M= 14.9$ years, $SD= 0.621$). In order to naturalize the experimental situation, each classroom represented a group of student, where one classroom (contained 30 students) was assigned to be the control group, and the other (contained 31 students) was assigned to be the treatment group. Each classroom had heterogeneous students with low and middle levels of metacognitive reading comprehension score. Both were taught by their normal teacher.

Instrument

Metacognitive Awareness of Reading Strategies Inventory (MARSII, Mokhtari and Sheorey ,2002). It is a 30 items with a 5-point Likert scale from 1, always or almost always, to 5, never or almost never. The overall average indicates how often student uses reading strategies when reading academic materials (Mokhtari and Sheorey ,2002). 3.5 or higher=High, 2.5–3.4=Medium and 2.4 or lower=Low (Mokhtari and Sheorey ,2002). The inventory was translated into Arabic and translated back into English. The back-translated version was reviewed and approved by a panel of four assistant professors in English department. In this study, the coefficient of internal consistency of the total scale was found to be 0.89. The test-retest reliability value was 0.78. The content validity of the scale was examined by a group of 5 experts who assessed the relevance of each item using a four-point Likert scale (where 1 represents “irrelevant” and 4 represents “highly relevant”). They provided suggestions and comments. The 30 items were judged to be quite or highly relevant. A content validity index was calculated at the item level ($I-CVI = 0.90$). Moreover, for convergent validity of MARSII, correlation with Metacognitive Reading Comprehension Test (Eissa, 2015) was good ($r= 0.60$, $p< .01$).

Design

A quasi- experimental, two-groups pretest-posttest design was used, where the same dependent variables (global reading strategies, problem solving reading strategies and support reading strategies) were measured in the two

groups of students before (pretest) and after (posttest) a treatment was administered.

Data Analysis

For the purpose of this study and for analyzing the data from the pre- and post-test, the author used two way ANOVA analysis and t-test.

Procedure

Students in both groups (e.i. treatment and control) were subjected to the same procedure: pretests, intervention and posttests. However, while the classroom with control group delivered instruction in the traditional way (that is, lecture method), the treatment group continued working in another way (that is, using multiple intelligence based differentiated instruction)...

Instruction was delivered to students by their normal teachers in order not disturb the school day and lessons. Before the study started, the two classroom teachers met with the researcher for some hours (4hs) of training to learn how to implement the multiple intelligence based differentiated instruction. Teacher taught students about the MI theory and informed them how this theory was beneficial for them and could help them achieve their lessons differently.

Teacher helped students through three main strategies: planning, monitoring, and evaluating. Before reading the text, they used planning strategies (PS) where they preview the title, the included pictures, illustrations, headings, and subheadings. Students were helped by check whether the reading text had a certain text structure, such as cause and effect, question and answer, and compare and contrast.

During reading, monitoring strategies occur. Students did their best to comprehend vocabulary. They used to ask themselves whether they understood what they have read so far. When reading each paragraph, they put their efforts forth to summarize, and infer the main idea.

After reading, teachers helped students with employing valuating strategies. They were taught to think about different ways of to apply what they have read to other situations. They could identify with the author and the main character. Students could cooperate with one another for better meaning-making.

The teacher of the experimental group helped the students during the lessons using different

techniques. He used a picture walk for previewing texts. Students used to look at pictures in order for gaining a better understanding of what a story was about before it was read. Before, during, and after reading, he was helpful as he used semantic mapping to organize ideas of the reading text. Students first drew a map in order for portraying what they already have known about a text in hand, then during reading, they tried to add information gained from a passage, modifying their map as they read. After they read, they could test whether activating their prior knowledge about the text in hand was useful or not. When necessary, the teachers was modeling each strategy.

Students made use of Gardener's seven intelligences. In verbal / linguistic intelligence students brainstormed, used new vocabulary, and told the story in a different way, that is, in their own words. Students asked and answered questions about the reading text (logical / mathematical intelligence). They used illustrations, and pictures of the new vocabulary (visual / spatial intelligence). They used their

body, role play and body movements when reading the text in hand (bodily / kinesthetic intelligence). Moreover, they created rhythmic patterns. They shared their work (interpersonal intelligence), and at the same time worked alone for some times (intrapersonal intelligence).

Findings

To test the first hypothesis, the researcher used two-way ANOVA analysis for the differences in post- test mean scores between experimental and control groups in global reading strategies. The abbreviated analysis of variance output is shown in Table 1. T- test results for the differences in post- test mean scores experimental and control groups in global reading strategies are shown in Table 2. The results of the two-way ANOVA Table1. reported that $F(1, 58) = 1393.786, p < .000$. Further more, Table 2. Show T-test results for the differences in post- test mean scores between experimental and control groups in global reading strategies. As shown, $T = 5.41, p < 0.01$. (See figure 1. for the differences in mean scores on global reading strategies).

Table 1. Tests of Between-Subjects Effects.
 Dependent Variable: global reading strategies (post test)

Source	Type III Sum of squares	df	Mean square	F	Sig.
Pre Group	10.229	1	10.229		
Error	1393.786	1	1393.786	27.806	.000
Total	2907.205	58	50.124		
	4369.147	60			

a. R Squared = .335 (Adjusted R Squared = .312)

Table 2. T-test results for the differences in post- test mean scores between experimental and control groups in global reading strategies

Group	n	Mean	SD	t	p.
Experimental	31	117.25	8.21	5.41	.000
Control	30	107.50	5.51		

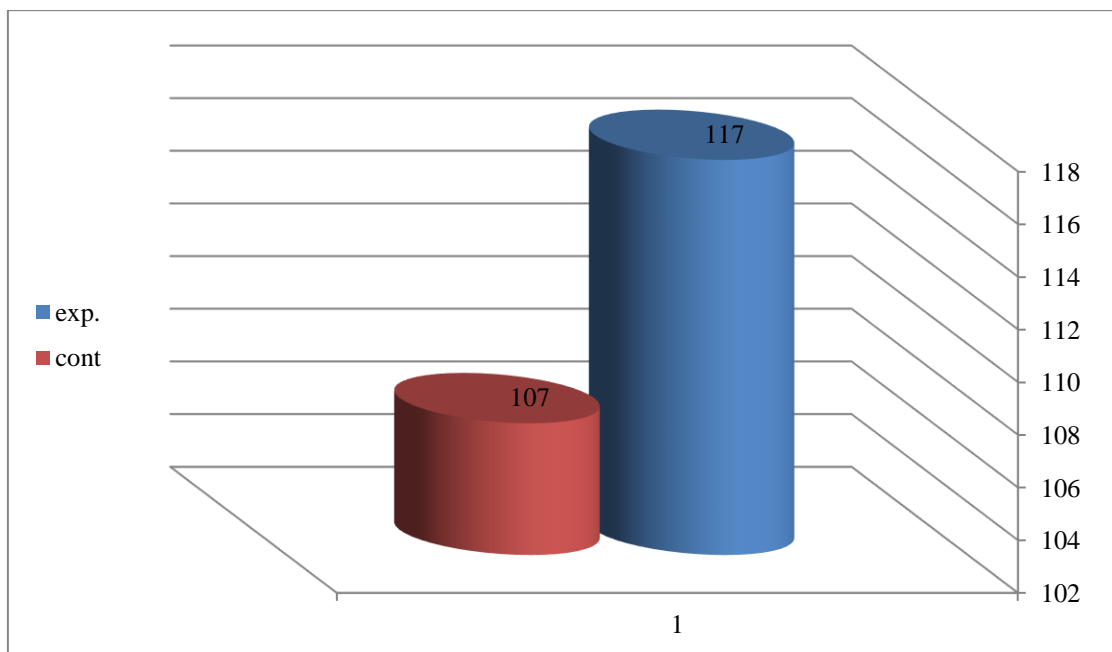


Figure 1. Experimental and control groups mean scores on global reading strategies in post- test

To test the second hypothesis, the researcher used two-way ANOVA analysis for the differences in post- test mean scores between experimental and control groups in problem solving reading strategies. The abbreviated analysis of variance output is shown in Table 3. T- test results for the differences in post- test mean scores experimental and control groups in problem solving reading strategies are shown in

Table 4. The results of the two-way ANOVA Table3. reported that $F(1, 58) = 1360.658$, $p < .000$. Further more, Table 4. Show T-test results for the differences in post- test mean scores between experimental and control groups in problem solving reading strategies. As shown, $T = 15.09$, $p < 0.01$. (See figure 2. for the differences in mean scores on problem solving reading strategies).

Table 3. Tests of Between-Subjects Effects.
Dependent Variable: problem solving reading strategies (post test)

Source	Type III Sum of squares	df	Mean square	F	Sig.
Pre Group	0.254	1	0.254		
Error	1360.658	1	1360.658	208.895	.000
Total	377.787	58	6.513		
	1837.442	60			

a. R Squared = .794 (Adjusted R Squared = .787)

Table 4. T-test results for the differences in post- test mean scores between experimental and control groups in problem solving reading strategies

Group	n	Mean	SD	t	p.
Experimental	31	32.48	1.58	15.09	.000
Control	30	22.70	3.22		

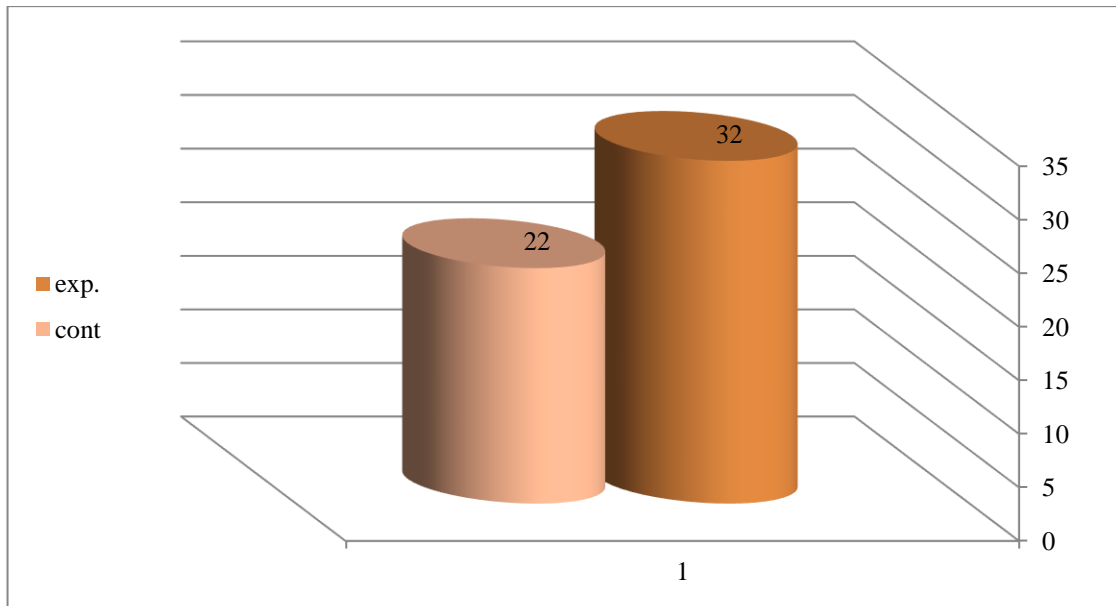


Figure 2. Experimental and control groups mean scores on problem solving reading strategies in post-test

To test the third hypothesis, the researcher used two-way ANOVA analysis for the differences in post- test mean scores between experimental and control groups in support reading strategies. The abbreviated analysis of variance output is shown in Table 5. T- test results for the differences in post- test mean scores experimental and control groups in support reading strategies are shown

in Table 6. The results of the two-way ANOVA Table5. reported that $F(1, 58) = 111.779$, $p < .000$. Further more, Table 6. Show T-test results for the differences in post- test mean scores between experimental and control groups in support reading strategies. As shown, $T = 10.93$, $p < 0.01$. (See figure 3. for the differences in mean scores on support reading strategies).

Table 5. Tests of Between-Subjects Effects.
Dependent Variable: support reading strategies (post test)

Source	Type III Sum of squares	df	Mean square	F	Sig.
Pre	0.463	1	0.463		
Group	1453.996	1	1453.996	111.779	.000
Error	754.451	58	13.007		
Total	2283.770	60			

a. R Squared = .670 (Adjusted R Squared = .685)

Table 6. T-test results for the differences in post- test mean scores between experimental and control groups in support reading strategies

Group	n	Mean	SD	t	p.
Experimental	31	34.58	3.06	10.93	.000
Control	30	24.56	4.04		

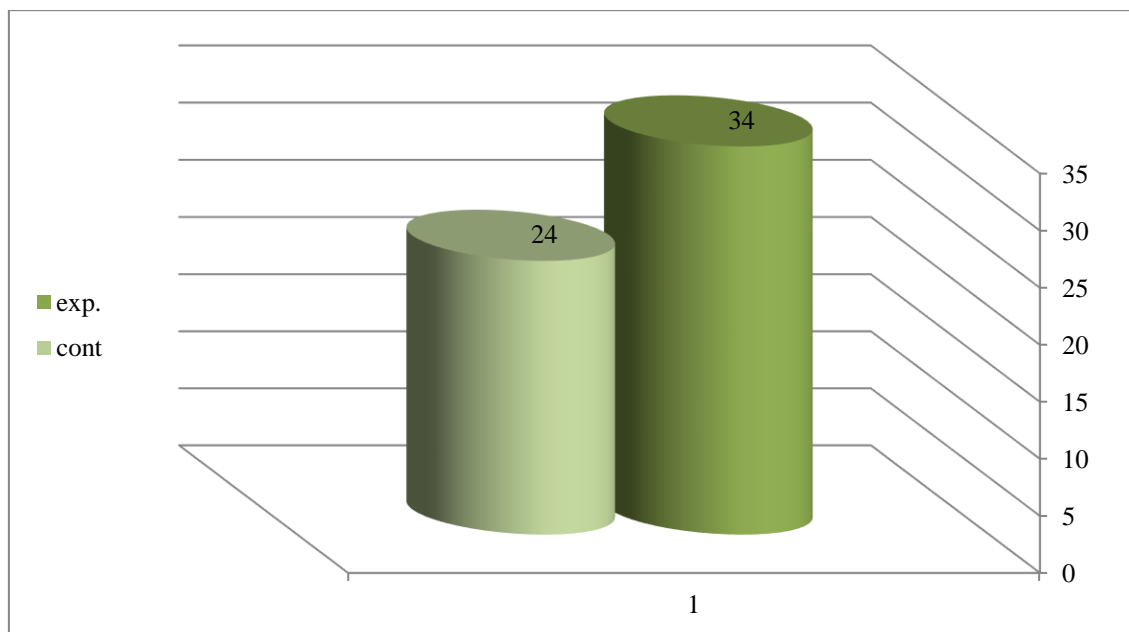


Figure 3. Experimental and control groups mean scores on problem support reading strategies in post-test

Discussion

The purpose of this study was to investigate the effectiveness of multiple intelligence based differentiated instruction on metacognitive reading comprehension in Arabic language among middle school students in Saudi Arabia. While the classroom with control group delivered instruction in the traditional way (that is, lecture method), the treatment group continued working in another way (that is, using multiple intelligence based differentiated instruction).

According to the results regarding the first hypothesis, it was found that the application of multiple intelligence based differentiated instruction had a positive impact on global reading strategies, as there were significant statistical differences between experimental (taught with multiple intelligence based differentiated instruction) and control (not taught with multiple intelligence based differentiated instruction) groups in global reading strategies in post-test in favor of the experimental group. This findings were in line with some previous research (Mohammad & Jaber, 2014) who found that the experimental group who were taught using differentiated instruction, outperformed the control who received teaching using traditional instruction strategies, in all reading comprehension skills. As for the second hypothesis, it was found that the application of multiple intelligence based differentiated

instruction had a positive impact on problem solving reading strategies, as there were significant statistical differences between experimental (taught with multiple intelligence based differentiated instruction) and control (not taught with multiple intelligence based differentiated instruction) groups in problem solving reading strategies in post-test in favor of the experimental group.

Enriching instruction using an innovative approach like differentiated instruction which is based on multiple intelligence theory gave students the chance to be interested in learning and made the environment more enjoyable. This findings were in line with some previous research (Reis et al., 2011) who found that enrichment reading approach, with differentiated instruction was more effective than a traditional whole group basal approach. The teacher in the treatment classroom was able to replace whole class instruction with multiple intelligence based differentiated instruction without detriment to students' reading achievement scores.

Concerning third hypothesis, it was found that the application of multiple intelligence based differentiated instruction had a positive impact on support reading strategies, as there were significant statistical differences between experimental (taught with multiple intelligence based differentiated instruction) and control (not taught with multiple intelligence based differentiated instruction) groups in support

reading strategies in post-test in favor of the experimental group. Enriching instruction using an innovative approach like differentiated instruction which is based on multiple intelligence theory gave students the chance to be interested in learning and made the environment more enjoyable.

This findings were in line with Tomlinson (1999) who has confirmed that differentiated instruction might be of great help to students with different abilities since it this approach takes into account the different and varied needs and strengths of students' strategies. It also addresses diversity through adjusting instruction to students needs and interests based on how students interact with the reading text.

Implications of the study

The results of this study confirmed that "one size does not fit all", that is, one standard curriculum cannot address or respond to all students' needs even if they are with the same proficiency level. Thus, teachers who teach reading as well as those who teach other school subjects, should do their best to design and implement varied educational curriculums in order to meet the students' needs as well as attracts attention and raise their interests. When differentiating instruction, students have the chance to choose. This choice can be described as a motivating factor in reading.

Differentiated Instruction (DI) helps students to plan their activities, and promote their interaction with the text and as well as their life experiences. Identifying the effective strategies will assist in closing the gap found between students with different achievement levels and promote Social Justice by increasing the number of students are able to read and comprehend the reading text.

Recommendations for Further Study

This quasi-experimental, pretest- posttest, control-group design study was limited to middle school students, students from Ibn Sina Middle School for Boys, in Al-Kharj Governorate, and metacognitive reading comprehension in Arabic language. Further study should include students in other grades (e.g. primary and secondary) from several sites. Sex differences should be put into consideration. Moreover, variables such as parental involvement, students motivation to read, in addition to varied socio-economic status might have impact on results.

Concluding Remarks

The current study adopted multiple intelligence based differentiated instruction and investigated its impact on metacognitive reading comprehension in Arabic language among middle school students in Saudi Arabia. While the classroom with control group delivered instruction in the traditional way (that is, lecture method), the treatment group continued working in another way (that is, using multiple intelligence based differentiated instruction). The findings indicated that students' scores in the treatment group outperformed students' scores in the control group in all metacognitive reading comprehension subscales (e.i. global reading strategies, problem solving reading strategies and support reading strategies).

Interestingly, it was observed that students in the treatment seemed to be more interested, comfortable and confident regarding their capability for achieving in metacognitive reading comprehension. That is, multiple intelligence based differentiated instruction really supported them in their course to be more empowered learners.

Conflicts of interest

I declares that he has no conflicts of interest.

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