Assessing Metacognitive Awareness of Reading Strategy Use for Students from the Faculty of Education at the University of King Abdulaziz

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In this study, we aimed to investigate the metacognitive awareness reading strategies used by students from the Faculty of Education at the King Abdulaziz University in Jeddah, Saudi Arabia. We also aimed to determine whether the strategies varied with gender, area of specialization, and academic achievement variables. To achieve the objectives of the study, the metacognitive awareness reading strategies inventory (MARSI) was used. The inventory consisted of 30 items distributed into 3 subscale categories, namely problem-solving strategies, global-reading strategies, and support-reading strategies. The sample of the study consisted of 550 randomly selected undergraduate students, comprising 269 male and 281 female participants, aged 19 to 22 years. The results of the study revealed that the study sample practicing degree of the strategic reader behaviors was high, where the problem-solving strategies scale came firstly with high degree, followed by global-reading strategies with moderate degree, followed by support-reading strategies with moderate degree too . The results demonstrated that female participants read more, and performed better academically, and these results were statistically significant. No significant statistical difference existed for reading performance linked to area of specialization, except on the global subscale where variance was visible between junior students and students with learning disabilities. The reading performance of students with learning disabilities was superior. In addition, statistical variance was observed regarding the interaction between variables.

Introduction

Students with reading difficulties are often characterized as disorganized and passive readers. These difficulties have been described as metacognitive impairments or ascribed to students' inability to think about what they read (Padeliadu et al., 2000). According to Flavell (1976, p. 232), the term metacognitive "refers to one's knowledge concerning one's cognitive processes and products or anything related to them." Grabe and Stoller (2002) described metacognitive awareness as an essential method that explains readers' explicit awareness of reading strategies used to plan, regulate, and monitor comprehension. In addition, O'Malley et al. (1985) demonstrated that students without metacognitive awareness were learners without

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direction or chance to review their progress, accomplishment, and future directions. Anderson (2002) indicated that the use of metacognitive strategies force learners to apply a higher level of thinking for better performance. In addition, Onovughe and Hannah (2011) indicated that students who use a variety of metacognitive skills perform better in examinations and complete work more effectively. Anastasiou and Griva (2009) highlighted that metacognitive strategies involve the planning, monitoring, and evaluation that take place before, during, and after any thinking act, such as reading.

Reading is a necessary skill for success in academic learning. Goodman (1994) defines reading as psycholinguistic processes to construct meaning for readers through their interaction with the text expressing the meaning the writer had in mind. Reading is a complex process involving a combination of perceptual, psycholinguistic, and cognitive abilities (Anastasiou & Griva, 2009).

Reading strategies are the mental processes used by readers to approach a text and attempt to make sense of what they read. Effective readers apply more strategies more frequently and more effectively than do inefficient readers (Pani, 2004). Garner (1987) identified the use of reading strategies as an action, or a chain of actions that readers practice to make meaning in the reading process (Madhumathi & Ghosh, 2012). Barnett (1988) demonstrated that reading strategies were the mental operations involved when readers read a text and attempt to make sense of what they read. Mayor et al. (1995) classified these strategies into three categories, namely information processing strategies, problem-solving strategies, and regulation-processing strategies.

Certain characteristics of efficient and inefficient readers were indicated by Paris and Jacobs (1984). They demonstrated that efficient readers typically applied elastic strategies, such as periodic self-monitoring; they contemplate the title, look to the top and bottom of a passage, and ask themselves if they understand what they read. By contrast, beginner readers or inefficient readers do not develop and apply these skills. Anastasiou and Griva (2009) reported that efficient readers use cognitive strategies much more regularly than inefficient readers do.

Schmitt and Sha (2009) indicated that effective readers must perform a number of tasks, most notably problem-solving tasks at the processing stage. They also self-monitor comprehension processes by identifying harmonious and disharmonious aspects among sources of information. Furthermore, the effectiveness of the processing stage is evaluated, the author's intention interpreted, and alternative strategies attempted.

Problem-solving strategies are applied when there is a need to repair comprehension failure. Onovughe and Hannah (2011) argued that certain strategies are used to repair comprehension failure, including reading slowly and carefully, controlling the reading rate, rereading, pausing to reflect on the reading, and reading text aloud.

Literature Review

Studies on reading have demonstrated a positive relationship between students' reading processes and their ability to understand what they are reading. In addition, Madhumathi and Ghosh (2012) indicated that reading process and reading ability strongly influence academic success. Certain studies have focused on reading process rather than on comprehension. Garner (1987) demonstrated that students with inadequate vocabulary and decoding ability find reading comprehension challenging, but this could be because of lack of

strategic knowledge. This study's results support the notion that awareness and monitoring of a person's comprehension processes are critical aspects of skilled reading (Mokhtari & Reichard, 2002). The relationship between reading strategy and reading comprehension was investigated by Madhumathi and Ghosh (2012). They observed that Indian English-as-a-second-language students mostly preferred to apply problem-solving strategies in academic reading, followed by supporting strategies, and they least preferred global strategies. In addition, significant differences existed in student strategy use, except for the supporting strategy. Furthermore, significant gender differences were observed in strategy use; female students exhibited superior performance. The relationship between reading strategies and reading comprehension achievement was also confirmed. Additionally, Alhaqbani and Riazi (2012) observed that problem-solving reading strategies were more useful than global and support strategies for students studying Arabic as a second language. In addition, a significant relationship was observed between participants' Arabic reading ability of texts that related to the self, and their overall strategy use (r = 0.233), problem-solving strategies (r = 0.236), and global strategies (r = 0.239). The study also indicated that African students demonstrated more global strategies than did Asian students, and junior and senior students demonstrated consistently higher strategy use in all categories compared to first- and second-year students. Yau (2009) observed a relatively strong relationship between the perceived use of first-language (Chinese), and second-language (English) strategies. Their results also demonstrated that metacognitive and cognitive strategies were used more frequently for first-language reading, and support strategies were more often used for second-language reading. Kudeir et al. (2012), in their study on undergraduate students at Yarmouk University, observed that problem-solving strategies were most commonly used, followed by the moderate use of support reading strategies, as well as moderate use of global reading strategies. Their results also revealed significant gender differences, and that female participants performed better, science faculties outperformed other faculties, and high academic achievers demonstrated superior reading strategy use. They observed no statistically significant differences caused by the interaction between variables.

Certain studies have focused on the metacognitive strategies used by pre-university students. Onovughe and Hannah (2011) indicated that secondary school students were aware of metacognitive strategies in reading and comprehension exercises, and used metacognitive strategies to comprehend academic texts. A significant relationship was also demonstrated between students' awareness and use of metacognitive strategies. Jimenez et al. (2009) used ESCOLA (Reading Awareness Scale) which consists of 56 items that represent reading situations. Each situation offers the reader three alternatives to choose from. The measurement was used for students from grades three to seven, and they determined that ESCOLA instrument can quickly and accurately gather information about a student's level of reading awareness. Their results also revealed that younger students had lower levels of reading awareness than did older students, and female students had a higher level of reading awareness than did male students. Furthermore, Mokhtari and Reichard (2002) assessed the metacognitive awareness of reading strategies of elementary school students. The results indicated that students applied these strategies moderately. Problem-solving strategies were most commonly used, followed by global reading strategies, and finally support reading strategies. The results also indicated a statistically significant difference in the degree of use of these strategies attributed to reading ability variable, in favor of the students with high reading abilities.

Purpose of the Study

The intent of the current study was to assess metacognitive awareness (derived from several variables) in the application of reading strategies. The study is also interested in identifying the difference in use of strategy by gender, academic achievement, and area of specialization. The study was based on the following research questions:

(1) Which metacognitive awareness strategy do students use most?
(2) Is there a significant difference in strategy usage by gender, academic achievement, and area of specialization?
(3) Is there interaction between gender, academic achievement, and area of specialization as it associates with metacognitive awareness of reading strategies?

Methodology

Participants

The participants in this study were 550 undergraduate students, and were selected randomly, of which 269 were male and 281 were female, in the 19-22 year age category at the time of data collection. The participants were students of the Special Education Department, and 25% were at the junior level (n = 138), 26.9% had learning disabilities (n = 148), 21.4% had autism spectrum disorders (n = 118), and 26.5% had intellectual disabilities (n = 146). The participants were also distributed into the following categories: high achievement (n = 14, 24%); moderate achievement (n = 362, 65.8%); and low achievement (n = 174, 31.6%).

Instrument

The researchers used the metacognitive awareness of reading strategies inventory (MARSI), version 1.0, developed by Mokhtari and Reichard (2002). It consisted of 30 items distributed into three subscales or factors:

- Global Readings Strategies (GLOB): This strategy consisted of 13 items that form part of intentional, carefully planned techniques that learners use to monitor or manage their reading. The following figures in the inventory illustrate GLOB: Figures 1, 3, 4, 7, 13, 14, 17, 19, 22, 23, 25, 26, 29.
- Problem-solving Strategies (PROB): This strategy consisted of 8 items, including actions and procedures readers use while working directly with the text. The following figures in the inventory illustrate PROB: Figures 8, 10, 11, 16, 18, 21, 27, 30.
- Support Reading Strategies (SUP): This strategy consisted of 9 items involving a basic support mechanism intended to improve readers' text comprehension. The following figures in the inventory illustrate SUP: Figures 2, 5, 6, 9, 12, 15, 20, 24, 28.

This questionnaire was translated into Arabic. It was suitable for the purposes of this study because it was specifically designed to measure the metacognitive awareness of reading strategies among adults while reading academic or school related materials.

Validity: To check the validity of the scale, Mokhtari and Reichard (2002) reviewed the literature relevant related to reading strategies, reading comprehension, and metacognitive awareness. They compiled an initial collection of 100 reader strategies, and presented it to three experts on teaching and reading strategy assessment. They suggested deleting 40 items, and 60 items were retained for the initial student test sample (n = 825). The students were asked to indicate any items that were unclear to them. They were also asked to provide written comments regarding the clarity of the items of the scale. The observations and

comments of the students were considered, and the use factor analysis reduced the number of items to 30, which were distributed into three sub-scale categories. The revised version was then presented to the experts to be tested for appropriateness and clarity, and based on their revisions the final version was subsequently compiled.

The researchers translated the scale into Arabic to further validate it, and it was then presented to five Arabic language, translation, special education, and psychology specialists at the University of King Abdulaziz to rate it. They were asked to provide their opinions on the appropriateness and translation of scale items, as well as on clarity and integrity of meaning and word choice. In addition, the specialists were requested to verify the appropriateness of item categorization, and to provide additional comments. Revisions were made based on the comments, including rewording for clarity and ease of comprehension in places.

The researchers also carried out exploratory factor analysis in order to obtain other validity for measurement (see table 1). Initially, the factorability of 30 MARSI items was examined. Several well recognised criteria for the factorability of a correlation were used. There are 22 of 30 items correlated at least .3 with at least one other item, suggesting reasonable factorability. Furthermore, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .713, above the commonly recommended value of .6 and Bartlett's test of sphericity was significant (X^2 (435) = 1077.23, $p<.05$).

Thirteen items loaded onto Factor one. It is clear from Table 1 that this items related to represented a set of reading strategies oriented toward a global analysis of text. Furthermore, eight items load onto a second factor PROB. These items surfaced to be oriented around strategies for solving problems. In addition, nine items that load onto factor three related SUP. These items related to outside materials that help reader.

Table 1. Factor analysis for MARSI

Inventory item	Factor		
	GLOB	PROB	SUP
I have purpose in mind when I read1	.39		
I take notes while reading to help me understand what I read2			.46
I think about what I know to help me understand what I read3	.38		
I preview the text to see what it's about before reading it4			
When text becomes difficult, I read aloud to help me understand what I read.5			.34
I summarize what I read to reflect on important information in the text.6			.40
I think about whether the content of the text fits my reading purpose.7	.41		
I read slowly but carefully to be sure I understand what I'm reading 8		.50	
I discuss what I read with other to check my understanding.9			.43
I skim the text first by noting characteristics like length and organization.10	.45		
I try to get back on track when I lose concentration. 11		.46	
I underline or circle information in the text to help me remember it 12			.42
I adjust my reading speed according to what I'm reading.13		.41	
I decide what to read closely and what to ignore.14	.30		
I use reference materials such as dictionaries to help me understand what I read. 15			.38
When text become difficult, I pay closer attention to what I'm reading.16		.51	
I use tables, figures, and pictures in text to increase my understanding 17			
I stop from time to time and think about what I'm reading.18		.57	
I use context clues to help me better understanding what I'm reading 19	.39		
I paraphrase (restate ideas in my own words) to better understand what I read.20			.40
I try to picture or visualize information to help remember what I read.21		.40	
I use typographical aids like boldface and italics to identify key information.22	.37		
I critically analyze and evaluate the information presented in the text.23	.46		
I go back and forth in the text to find relationship among ideas in it.24			.61
I check my understanding when I come across conflicting information.25	.53		
I try to guess what the material is about when I read.26	.41	.29	
When text becomes difficult, I reread to increase my understanding.27		.44	
I ask myself questions I like to have answered in the text.28			.43
I check to see if my guesses about the text are right or wrong.29	.40		
I try to guess the meaning of unknown word or phrases.30		.30	

Reliability: To check the reliability of the scale, Mokhtari and Reichard (2002) administered the scale in its final version to a sample of 443 students in grades 6 to 12. Cronbach's alpha was calculated for each subscale, and for each grade level. The reliability of the total sample was 0.89.

To further establish reliability, the researchers administered the final version of the scale on an exploratory sample (n = 100) of students at the University of King Abdulaziz. Cronbach's alpha was calculated, and reliability for the total sample was 0.82

Data Collection Procedure

The study was conducted during the first semester of the 2013 academic year. Participants were asked to complete the demographic questionnaire, which included questions regarding gender, academic achievement, and area of specialization. Participants were then asked to complete the MARSI questionnaire by reading each item, and then answering it according to their experiences with reading academic material.

Data Analysis Procedures

Descriptive statistics for each of the strategy items and each strategy category were performed, and a multivariate analysis of variance (MANOVA) was then used to analyze the collected data.

Results and Discussion

The results, which were obtained after analyzing the data acquired in accordance with the study's purpose, take place below taking account of the questions of the study.

Q.1. Which metacognitive awareness strategy do students use most?

To answer this question, means, standard deviations, and the average usage of each strategy were assessed. In addition, the order ranking statistic method was performed for each strategy according to the subscale and the total of questionnaires collected (see table 2). In general, the results indicated that the mean of individual strategy items ranged from 4.53 to 2.22. The strategy of "reread to increase my understanding" was the most frequently used strategy. By contrast, the "I use reference materials, such as dictionaries to help me understand what I read" was the least frequently used strategy. The mean indicated a low to high overall usage of reading strategies according to the established strategy use criteria. Twenty-four out of 30 strategies fell within the high usage group (M ≥ 3.5 or above). The results showed five strategies with moderate usage (M between 3.4 and 2.5). Only one strategy had a low usage value (M ≤ 2.4). The reason for the overall high usage of reading strategies might be that reading for academic courses encourages readers to use more strategies, because academic courses have greater cognitive demands (Alhaqbani & Riazi, 2012, p. 239). In addition, motivation plays a crucial role in motivating learners to increase reading strategy usage. Studies have indicated that academic need was a major contributor to high usage of reading strategies, and students in the humanities and the social sciences tend to use reading strategies more often than students who study technical or hard science subjects (Alhaqbani & Riazi, 2012). Therefore, because all participants in the current study were studying in the Department of Special Education (a humanities specialty), they were likely to use reading strategies.

Overall, the mean of the three subscale categories were 3.71, 4.1, and 3.38 for global reading

strategies, problem-solving strategies and support reading strategies, respectively. The problem-solving (PROB) strategy was the preferred strategy, followed by global reading strategy (GLOB), and support reading strategies (SUP). These results were partially consistent with some studies that assessed reading strategy perceptions by using MARSI. A study by Mokhtari and Reichard (2002) demonstrated that the total average use of reading strategies was moderate, and the prime preference was for problem-solving, followed by global and support reading strategies. Another study by Alhaqbani and Riazi (2012) revealed that the total average use of reading strategies fell under a high usage level, and the primary preference was problem-solving, followed by global and support strategies. This study's results were consistent with the results of Kudeir et al. (2012), which indicated that the total average use of reading strategies was moderate, and problem-solving strategies were most used, followed by support and global reading strategies.

Students' preferred problem-solving strategies because the items in this category help readers to overcome difficulties that arise when a text is complicated. In addition, students were able to concentrate and understand the meaning of the text effectively. All items in this category were high degree used. For instance, the most preferred strategy (see table 2) was "When text becomes difficult, I reread to increase my understanding" (Item 27, M = 4.53, SD = .723), which indicates actions students take when not comprehending. Another strategy in this category, "When text become difficult, I pay closer attention to what I'm reading" (Item 16, M = 4.23, SD = .896), indicates that students concentrated harder to resolve reading-related problems. To summarize, the use of problem-solving strategies is associated with skilled reading and strong comprehension, which requires skillful thinking, self- monitoring and going forward and backward in the text (Mokhtari & Reichard, 2002).

The supporting strategy "I use reference materials, such as dictionaries, to help me understand what I read" (Item 15, M = 2.22, SD = 1.125) was least preferred. This indicates that students do not use supporting strategies, although they can increase their comprehension of a text. This also demonstrates that the students were not familiarized with these strategies in the general education schools they attended before university, and that they were accustomed to teacher-directed styles of learning.

Table 2: Means, standard deviations, the average used and order for each strategy according to subscale and over all.

Strategy No.	M	SD	Order Subscale	over all	Average used	Type
1	3.71	.891	7	17	High	GLOB
2	3.21	1.284	6	25	Moderate	SUP
3	4.00	1.003	4	11	High	GLOB
4	4.06	1.065	3	9	High	GLOB
5	3.72	1.378	3	16	High	SUP
6	2.90	1.278	8	28	Moderate	SUP
7	3.55	1.017	11	23	High	GLOB
8	4.21	.854	4	6	High	PROB
9	2.99	1.090	7	27	Moderate	SUP
10	2.85	1.310	13	29	Moderate	GLOB
11	4.29	.891	2	4	High	PROB
12	4.41	.938	1	3	High	SUP
13	4.03	.988	6	10	High	PROB
14	3.78	1.024	6	14	High	GLOB
15	2.22	1.125	9	30	Low	SUP
16	4.23	.896	3	5	High	PROB
17	4.18	.860	2	8	High	GLOB
18	3.67	.892	8	18	High	PROB
19	3.60	1.001	10	22	High	GLOB
20	3.87	1.070	2	13	High	SUP

21	4.19	.903	5	7	High	PROB
22	4.45	.879	1	2	High	GLOB
23	3.15	1.111	12	26	Moderate	GLOB
24	3.64	1.176	4	19	High	SUP
25	3.91	.983	5	12	High	GLOB
26	3.61	1.005	9	21	High	GLOB
27	4.53	.723	1	1	High	PROB
28	3.53	1.274	5	24	High	SUP
29	3.62	.982	8	20	High	GLOB
30	3.77	1.081	7	15	High	PROB

Q.2. Is there a significant difference in strategy usage by gender, academic achievement, and area of specialization?

The means and standard deviations of gender, academic achievement, and students' area of specialization for metacognitive awareness of reading strategies are shown in Table 3. The support reading strategy is least preferred by students.

Table 3: Means and standard deviations of gender, academic achievement and students' area of specialization for metacognitive awareness of reading strategies

Metacognitive subscale			Global	Problem – Solving	Support Reading St	Total
Gender	M	n = 269				
		M	3.64	3.96	3.34	10.95
		SD	.425	.475	.610	1.182
	F	n = 281				
		M	3.81	4.25	3.43	11.50
		SD	.482	.422	.647	1.345
academic achievement	Low	n = 14				
		M	3.40	3.80	3.16	10.37
		SD	.761	.747	.692	2.041
	Moderate	n = 362				
		M	3.72	4.06	3.39	11.18
		SD	.427	.471	.565	1.221
	High	n = 174				
		M	3.77	4.23	3.38	11.39
		SD	.495	.418	.695	1.354
area of specialization	Junior	n = 138				
		M	3.64	4.08	3.33	11.06
		SD	.480	.488	.647	1.369
	LD	n = 148				
		M	3.82	4.10	3.41	11.34
		SD	.411	.531	.709	1.384
	ASD	n = 118				
		M	3.75	4.20	3.42	11.39
		SD	.510	.406	.626	1.311
	ID	n = 146				
		M	3.68	4.08	3.38	11.15
		SD	.440	.437	.527	1.100

Abbreviations Note: LD = Learning Disabilities; ASD = Autism Spectrum Disorders; ID = Intellectual Disability

Multivariate analysis of variance (MANOVA) analysis was used to examine the effect of gender, academic achievement, and students' area of specialization on metacognitive awareness of reading strategies (global, problem-solving, and support reading). ANOVA was conducted on each dependent variable as a follow up test to the MANOVA. Post hoc tests were conducted using the Scheffe procedures to control for Type 1 errors. Analysis of variance A preset alpha level of .05 was used for all statistical procedures.

Results of the MANOVA indicated significant differences for gender and area of

specialization, but not for academic achievement in relation to the global, problem-solving, and support reading strategies. Regarding gender, a significant effect was observed for the metacognitive awareness of reading strategies subscale (Wilks' Lambda λ = .968, $F(3, 528)$ = 4.10, $p < .007$, η^2 = .023(. The MANOVA also revealed a significant area of specialization effect on the dependent variables (Wilks' Lambda λ = .901, $F(9,1285)$ = 1.94, $p < .043$, η^2 = .011).

The ANOVA result showed a significant gender difference in the problem-solving subscale ($F(1,530)$ = 44.45, p = .001) with a small size effect (η^2 = .021). A significant effect was observed for interaction of academic achievement on the global subscale ($F(1, 530)$ = 8.91, p = .003, η^2 = .017). Furthermore the interaction of academic achievement and area of specialization exerted a significant effect on global ($F(6, 530)$ = 3.64, p = .002, η^2 = .040), problem-solving ($F(6, 530)$ = 3.20, p = .004, η^2 = .035), and support reading strategies ($F(6, 530)$ = 3.97, p = .001, η^2 = .043).

The interaction of gender, academic achievement, and area of specialization exerted a significant effect on global ($F(3, 530)$ = 3.51, p = .015, η^2 = .019) and support reading strategies ($F(3, 530)$ = 10.80, p = .000, η^2 = .058).

Reading Strategy Use by Gender

As shown in Table 3, the mean difference of the students with gender variable was statistically significant, in favor of the female students, the male students (n= 269) had a mean of M= 10.95 and a standard deviation of SD = 1.182; the female students (n= 281) had a mean of M = 11.50 and a standard deviation of SD = 1.345. The overall strategy use explains that both male and female students more frequently use problem-solving reading strategies, the male students (n=269) had a mean of M = 3.96 and a standard deviation of SD = .475; the female students (n=281) had a mean of M = 4.25 and a standard deviation of SD = .422. These findings consistent with the results of previous studies based on gender, that indicated female participants use strategy more frequently than do male participants (Jimenez, et al., 2009; Kudeir et al., 2012; Madhumathi & Ghosh, 2012). Only the mean difference of the problem-solving strategy approaches statistical significance in favor of the female students; this result is consistent with that of Madhumathi and Ghosh (2012). The global reading strategy also approaches statistical significance in favor of the female students, whereas the mean difference in use of the supporting strategy between male and female students is not statistically significant; these results are inconsistent with those of Madhumathi and Ghosh (2012), which indicated that the mean difference of supporting strategy was statistically significant, and the mean difference of global strategy between male and female students was not statistically significant. The current study results are attributed to the difference between the interest shown by men and women in reading skills, that is, women are more accustomed to extra reading at home, such as reading novels, newspapers, and cookbooks. The regular reading habits might be improved the awareness and employment of the reading strategies (Madhumathi & Ghosh, 2012). Thus, this habit helps them to enhance their reading strategy and their reading skills. This may be attributed also, to the females beholding generally to reading as a source of material to increase their culture and knowledge; making them more able to cope with instructions and suggestions in text readable compared with males, this is indication that they are more aware and conscious, including use reading skills and strategies (Linkin, 1993).

Reading Strategy Use According to Academic Achievement

Post hoc analyses of the MANOVA consisted of determining the differences between academic achievements in metacognitive awareness of the reading strategies subscale. Significant differences were observed within the global subscale between low achievement students and those with moderate achievement (*p* = .031), and between low and high achievement (*p* = .012) students. Moreover, significant differences were observed for the problem-solving subscale between low and high achievement groups (*p* = .002) and between moderate and high achievement groups (*p* = .000).

As shown in Table 3, the mean difference was statistically significant for a whole scale associated with academic achievement variables in favor of the high achievement group. The students with high academic achievement (n=174) had a mean of M = 11.39 and a standard deviation of SD = 1.354; and the students with moderate academic achievement (n=362) had a mean of M = 11.18 and a standard deviation of SD = 1.221; and the students with low academic achievement (n=14) had a mean of M = 10.37 and a standard deviation of SD = 2.041. The overall strategy use shows significant differences for the global subscale between low achievement students (M = 3.40) and those with moderate achievement (M = 3.72), and between low (M = 3.40) and high achievement groups (M = 3.77). Moreover, significant differences were observed for the problem-solving subscale between low (M= 3.80) and high achievement groups (M= 4.23), and between moderate (M = 4.06) and high achievement groups (M = 4.23). This result can be attributed to students with high achievement typically being considered to be classified under the category of gifted, and therefore consistently perform conscientiously, striving to achieve their goals, and constantly seeking the optimal reading strategies to increase their understanding of texts. They are also distinguished from other students that they are more willing to knowledge; they are characterized by their ability to manage the time allotted for the study and organize study subjects according to their importance. They also have the ability to ask about the importance of the strategies they use; these properties are essential dimensions in metacognitive thinking. Based on this is expected to be students with high achievement more interested in the use of reading strategies , and ultimately contribute to increased academic achievement. This result is consistent with those of previous studies (Kudeir et al., 2012; Madhumathi & Ghosh, 2012). In general, successful students have a greater sense of self-efficacy and attribute their success to controllable factors such as effort and strategy use (Schraw, 1998, p.122).

Reading Strategy Use According to Area of Specialization

Post hoc analyses of the MANOVA consisted of determining the differences between the groups of area of specialization. Significant differences were observed only for the global subscale between junior and learning disability students, in favor of the learning disability group (*p* = .007); students with learning disabilities were observed to be more strategic readers than are junior students. The results indicate proving hypothesis that students in the humanities and social sciences tend to use strategies more often than do those who study technical or scientific sciences. Therefore, since all students in the current study were studied in Department of Special Education, motivation and academic major can be considered factors accounting for the high use of reading strategies (Alhaqabani & Riazi, 2012). In contrast, the results inconsistent with findings of the study conducted by Kudeir et al. (2012) that indicated the students in scientific sciences are more use reading strategies than other sciences.

Q.3. Is there interaction between gender, academic achievement, and area of specialization as it associates with metacognitive awareness of reading strategies?

A significant interaction was observed between gender and academic achievement, and the dependent variables (Wilks' Lambda λ = .980, F(3, 528) = 3.53, p < .015, η^2 = .020). Furthermore, a significant interaction was observed between gender and area of specialization, and metacognitive awareness of the reading strategies subscale (Wilks' Lambda λ = .959, F(9,1590) = 2.49, p < .008, η^2 = .014). A significant interaction was also observed between academic achievement groups and area of specialization, and the dependent variables (Wilks' Lambda λ = .879, F(18,1493) = 3.87, p < .001, η^2 = .042). Gender, academic achievement, and students' area of specialization exerted a significant effect on the dependent variables (Wilks' Lambda λ = .902, F(9,1285) = 6.17, p < .001, η^2 = .034). These results show that interaction between variables contributes to the effective understanding of academic texts. This result is inconsistent with that of Kudeir et al. (2012), which indicated no statistically significant differences between the mean estimates of the study sample and all areas of the scale, based on the interactions between gender and area of specialization, gender and academic achievement, and area of specialization and academic achievement.

Conclusions and Recommendations

From the findings of the study, it could be concluded that male students have weaker reading habits, which might be a reason for making less use of strategies, compared with female students; The interaction between variables contributes to the effective understanding of texts; High achievement students frequently use reading strategies, compared with low and moderate achievement students; and Students use problem-solving strategies more frequently than global and support reading strategies. It was therefore recommended that Students should be guided in using various metacognitive strategies in reading, and teachers should be trained through workshops on how to use metacognitive strategies to help their students, and future studies could detect the extent of students' use of metacognitive reading strategies and comprehension in general education schools. Finally, future studies could assess metacognitive awareness of reading strategy as related to students' grades, ages, and I.Q score.

Overall, however, the results of this study should be treated with caution, as it is limited to the students' perceptions of strategy use awareness rather than their actual use of reading strategies.

Acknowledgement

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Appendix

Metacognitive Awareness Reading Strategies Inventory
(MARSI) Version 1.0
Kouider Mokhtari and Carla Reichard (2002)

Directions: Listed below are statements about what people do when they read academic or school related materials such as text books, library books, etc. Five numbers follow each statement (1,2,3,4,5) and each number means the followings:

- 1 means " I never or almost never do this"
- 2 means " I do this only occasionally"
- 3 means " I some times do this (about 50% of the time)"
- 4 means " I usually do this"
- 5 means " I always or almost always do this"

After reading each statement, click the number (1,2,3,4,or 5) that apply to your using the scale provided. Please note that there are no right or wrong answer to the statement in this inventory.

Type	Strategies	Scale				
GLOB	I have purpose in mind when I read 1	1	2	3	4	5
SUP	I take notes while reading to help me understand what I read. 2	1	2	3	4	5
GLOB	I think about what I know to help me understand what I read. 3	1	2	3	4	5
GLOB	I preview the text to see what it's about before reading it. 4	1	2	3	4	5
SUP	When text becomes difficult, I read aloud to help me understand what I read. 5	1	2	3	4	5
SUP	I summarize what I read to reflect on important information in the text. 6	1	2	3	4	5
GLOB	I think about whether the content of the text fits my reading purpose. 7	1	2	3	4	5
PROB	I read slowly but carefully to be sure I understand what I'm reading. 8	1	2	3	4	5
SUP	I discuss what I read with other to check my understanding.9	1	2	3	4	5
GLOB	I skim the text first by noting characteristics like length and organization. 10	1	2	3	4	5
PROB	I try to get back on track when I lose concentration. 11	1	2	3	4	5
SUP	I underline or circle information in the text to help me remember it. 12	1	2	3	4	5
PROB	I adjust my reading speed according to what I'm reading. 13	1	2	3	4	5
GLOB	I decide what to read closely and what to ignore. 14	1	2	3	4	5
SUP	I use reference materials such as dictionaries to help me understand what I read. 15	1	2	3	4	5
PROB	When text become difficult, I pay closer attention to what I'm reading. 16	1	2	3	4	5
GLOB	I use tables, figures, and pictures in text to increase my understanding. 17	1	2	3	4	5
PROB	I stop from time to time and think about what I'm reading. 18	1	2	3	4	5
GLOB	I use context clues to help me better understanding what I'm reading. 19	1	2	3	4	5
SUP	I paraphrase (restate ideas in my own words) to better understand what I read.20	1	2	3	4	5
PROB	I try to picture or visualize information to help remember what I read. 21	1	2	3	4	5
GLOB	I use typographical aids like boldface and italics to identify key information. 22	1	2	3	4	5
GLOB	I critically analyze and evaluate the information presented in the text. 23	1	2	3	4	5
SUP	I go back and forth in the text to find relationship among ideas in it. 24	1	2	3	4	5
GLOB	I check my understanding when I come across conflicting information. 25	1	2	3	4	5
GLOB	I try to guess what the material is about when I read.26	1	2	3	4	5
PROB	When text becomes difficult, I reread to increase my understanding. 27	1	2	3	4	5
SUP	I ask myself questions I like to have answered in the text. 28	1	2	3	4	5
GLOB	I check to see if my guesses about the text are right or wrong. 29	1	2	3	4	5
PROB	I try to guess the meaning of unknown word or phrases. 30	1	2	3	4	5