

Difference in Metacognitive Awareness of Reading Strategies by Sex and Physical Location among Secondary School Students in Tanzania

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Abstract

The purpose of this study was to investigate the difference in metacognitive awareness of reading strategies by sex and physical location among secondary school students in Tanzania. Sex and physical location as independent variables were studied against metacognitive awareness of reading strategies as dependent variable. The Metacognitive Awareness of Reading Strategies inventory (MARSII) scale was used to assess subjects' awareness of reading strategies among 444 secondary school students, of whom 217 were males and 227 were females. It was found that most students reported high use of problem – solving reading strategies; followed by high use of support reading strategies and global reading strategies. While there was no statistical significant difference in the metacognitive awareness of reading strategies by sex, there was a statistical significant difference in the same by physical location whereby subjects from urban schools reported being more metacognitively aware of the reading strategies they used than their counterpart subjects from rural schools.

Key words: Sex, Physical location, Metacognitive awareness of reading strategies

1. Introduction

The term metacognition refers to the thinking about thinking itself (Santrock, 2003). It is the knowledge and control that people exert over their mental processes and involves awareness and control of planning, monitoring, repairing, revising, summarizing, and evaluating what people think or read as the act of thinking or reading takes place (Karbalaei, 2010). Studies on metacognitive awareness of reading strategies have been gaining much importance in educational Psychology because much of academic works require well organized and active reading. It follows then that students who fail to organize and control or at least being aware of the processes going on in their mind when reading might face difficulties in understanding the content they read (Al – Dawaideh, 2013). According to Grabe and Stoller (2002) metacognitive awareness of reading strategies would help a reader to plan, regulate, and monitor their understanding of the academic materials they read.

In Tanzania, efforts have been made to improve gender parity in activities related to daily living, economic and political practices so much so that it is estimated that gender balance will be reached by 2025 by fifty percent. Efforts are seen even in the political arena whereby one of the highest political posts – the Vice President of the country has been handled to a woman in the 2015 elections; an indicator that the political will to reach the goal is in a good track. It has, on the other hand, been questioned as to whether women can perform the same way as men do in many tasks if at all they are trusted with similar or the same jobs. Sex difference in metacognitive awareness of reading strategies could be a very important study as one could learn how both women and men could organize their thinking in a way that enable them to plan, regulate, and monitor their understanding of the academic materials they read and thus ultimately build their active minds of young people. Studying the difference in metacognitive awareness of reading strategies by sex is very crucial in the communities and the society of Tanzania because of the traditional beliefs about the ability of women against men. In many native cultures in the country it is still difficult to take it positive that female students can perform and excel to the higher levels of education better than do men. It is still unbelievable that women can be good and competent leaders the same way men do. In the parliament women are still given special sits by appointment rather than contesting and win elections. Given these circumstances, development of metacognition and specifically metacognitive awareness of reading strategies among both female and male students in schools might be very crucial so as to build a just and fair society which can mobilize skills from both women and men for the development of the country.

This is because as Fitriisa, *et al.* (2015) argues, unlike unskilled readers who focus on reading as a decoding process rather than as construction of meaning, skilled readers are aware of the text they read, know the reason for reading it, and set strategies to handle problems and monitor their comprehension of information.

Studying the relationship between physical location and metacognitive awareness of reading strategies requires attention of researchers as it is true that in Tanzania urbanization is rapidly coming up with a lot of technological developments and changes in culture. For example, whereas in rural schools formation of study groups could be characterized by a tendency of a group of female students studying together, in urban schools one could see female students in the same study groups with male students. It is assumed in this study that studying in an urban school is accompanied with exposure to many practices that are not found in rural schools. For instance, while electronic and other media devices such as television, mobile phones and news papers can hardly be found in rural areas it is common to find teachers struggling to avoid students in urban areas to use mobile phones. It is, however, still unclear as to what impacts could such rural urban differences have on the learning of secondary school students in Tanzania. Curiosity, thus, arises as to whether students in rural schools could report the use of metacognitive awareness of reading strategies different from their counterpart students in urban schools.

1.1 Research Questions

This study intended to investigate the difference in metacognitive awareness of reading strategies by sex and physical location among secondary school students in Tanzania by specifically addressing the following questions:

1. What is the group of reading strategies mostly used by the students in secondary schools?
2. What is the difference in metacognitive awareness of reading strategies by sex?
3. What is the difference in metacognitive awareness of reading strategies by physical location of the school?

2. Method

2.1 Subjects of the Study

This study was conducted among form four students in 12 secondary schools in Dodoma region in Tanzania. The selected schools included three main categories such as traditional government secondary schools, community secondary schools, and non-government secondary schools. Further, selection of the schools was strategically selected to include both rural and urban schools in the sample. A sample of 444 form four students was strategically drawn from twelve secondary schools in Tanzania to include both male and female students. About 48.9 percent (N=217) were males and 51.1 percent (N=227) were females. Their age varied between a low of 16 years and a high of 23 years with a mean age being 17.76 and a standard deviation of 1.19 implying that there was no big age variation as most ages clustered around the mean. Regarding physical location, subjects from urban schools were about 41.9 percent (N=186) while those from rural schools were about 58.1 percent (N=258).

2.2 Measures

To study sex and physical location differences in the use of metacognitive awareness of reading strategies, the choice of metacognitive assessment instrument was of paramount. Studies assessing metacognitive awareness of reading strategies have been using instruments such as The Metacognitive Awareness Reading Strategy Inventory (MARS) developed by Mokhtari and Reichard (2002); The Meta-cognitive Reading Strategies Questionnaire (MRSQ) developed by Taraban *et al.* (2004); The Survey of Reading Strategy (SORS) developed by Mokhtari and Sheorey (2002). The MARS was selected considering its purposes and group of people for which it was constructed. MARS is a self report instrument made up of 30 items in a five point likert-scale. The instrument was developed by Mokhtari and Reichard (2002) with the purpose to assess metacognitive awareness and perceived use of reading strategies while reading academic or school-related materials and assess the level of students' awareness of the processes they undergo during reading tasks (Mokhtari and Reichard, 2002). The scale comprises three strategy subscales or factors. The factors are global reading strategies, problem-solving strategies, and support reading strategies.

Global reading strategies subscale included items measuring setting purpose for reading, activating prior knowledge, checking whether text content fits purpose, predicting what text is about, confirming predictions, previewing text for content, skimming to note text characteristics, making decisions in relation to what to read closely, using context clues, using text structure, and using other textual features to enhance reading comprehension.

Problem-solving strategies included items measuring reading slowly and carefully, adjusting reading rate, paying close attention to reading, and pausing to reflect on reading. Other items include rereading, visualizing information read, reading text out loud, and guessing meaning of unknown words. Support reading strategies included items measuring taking notes while reading, paraphrasing text information, revisiting previously read information, asking self questions, using reference materials as aids, underlining text information, discussing reading with others, and writing summaries of reading.

2.3 Theoretical Underpinnings of MARSII

Mokhtari and Reichard (2002) developed MARSII basing on the ideas of the theory of metacognition (Flavell, 1979) whose main assumptions are that a person should have a self knowledge of the mental processes taking place in that person's mind and the perceived strategies to control the processes. In school context, learners should be in a position to reflect their learning process and the accompanied strategies they apply in controlling their strengths and weaknesses during reading and ultimately construction of meaning from their learning activities. According to Flavell (1979) a model of metacognitive monitoring is composed of four components of metacognition which are metacognitive knowledge, metacognitive experiences, tasks or goals, and strategies or activities. Flavell argues that these components can be intentionally activated. For example, some or all components of metacognitive control can be intentionally activated when one wants to retrieve specific information. On the other hand, control of mental processes can be unintentional as it happens by cue in a task situation. Mokhtari and Reichard (2002) reports that formation of the Metacognitive Awareness of Reading Strategies Inventory (MARSII) was accelerated by reading the works by Alexander and Jetton (2000); Baker and Brown (1984); Garner (1987); Paris and Winograd (1990); Pressley (2000); Pressley and Afflerbach (1995).

Flavell's (1979) theoretical view has been expanded by Presseley, Borkowski, and Schneider (1987) so as to consider both procedural and declarative metacognitive knowledge. They also linked these concepts to other features of successful information processing. According to this expanded model, sophisticated metacognition is closely related to the learner's use of strategy, motivational orientation, general knowledge about the world, and automated use of efficient learning procedures. The model assumes that there are interactions among these components as for example, the adequate application of metacognitive strategies is influenced by specific strategy knowledge. Such application not only affect knowledge but are also monitored and evaluated, leading to expansion and refinement of specific strategy knowledge.

The expanded model of metacognition has linked findings from "the theory of mind" (ToM) research and metacognitive knowledge in an attempt to explain development of metacognitive monitoring (see Figure 1.1). According to this view, by the second year of life, children engage in a pretend-play, which involves a form of mental representation, entailing the suspension of reality (Kuhn, 2009). However, at this time, children are still unwilling to accept that anyone could hold a belief that deviates what they themselves take to be a true state of affairs. Between age four and five, children recognizes the assertions as the expansion as someone's belief. This is a milestone in children's cognitive development that lay the way for the latter achievement of metacognition. Accordingly, the child realizes that assertions do not necessarily correspond to reality. Children also realize the importance of comparing the assertions and reality so as to know the discrepancies existing between the two. Such evaluation is a critical step in the development of metacognitive knowing and the origin of what will become scientific and critical thinking (Kuhn, 1999). Schneider (2008) has argued that "some declarative metamemory is already there in preschool children and develops steadily over the elementary school years" and that though knowledge of most fact about memory does exist by 11 or 12 years of age, declarative metamemory is not complete by the end of childhood.

With regard to metacognitive judgments and their accuracy, Schneider (2008) argues that the same are inferential in nature, based on various heuristics and cues with some degrees of validity in predicting memory performance. However, given that even among adults, the contribution of one's theories and knowledge to monitoring and control seems to be quite limited, Schneider assumes that children's metacognitive judgments are predominantly guided by online implicit utilization of subtle experiential cues.

2.4 Psychometric Adequacy of MARSII

To check for the Psychometric adequacy of MARSII in this study, an exploratory factor analysis was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .903, above the commonly recommended value of .6 (Field, 2009) and Bartlett's test of sphericity was significant [$(435) = 2846.288, p < .01$]. The scree plot in Figure 1 described MARSII as a three factor scale.

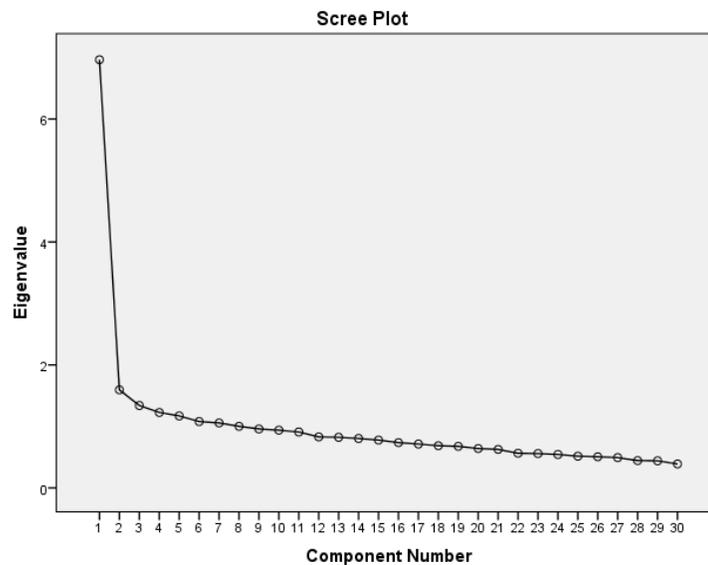


Figure 1: The Factor Structure of MARS I

Further, an examination of the factorability of 30 items of the scale indicated that 23 items reached a correlation of at least 0.4 suggesting reasonable factorability (see Table 1).

Table 1: Rotated Component Matrix

	Component		
	Glob.	Prob.	Sup.
When text becomes difficult, I begin to pay closer attention to what I'm reading.	.644		
I read slowly but carefully to be sure I understand what I'm reading.	.641		
I try to picture or visualize information to help me remember what I'm reading.	.606		
When text becomes difficult, I reread to increase my understanding.	.584		
I use reference materials such as dictionaries to help me understand what I'm reading.	.521		
I go back and forth in the text to find relationships among ideas in it.	.520		
I discuss my reading with others to check my understanding.	.497		
I try to get back on track when I lose concentration.	.484		
I have a purpose in mind when I read.	.479		
I paraphrase (restate ideas in my own words) to better understand what I'm reading.	.473		
I think about what I know to help me understand what I'm reading.	.471		
I critically analyze and evaluate the information presented in the text.	.463		
I ask myself questions I like to have answered in the text.	.438		
I use context clues to help me better understand what I'm reading.			
I take notes while reading to help me understand what I'm reading.			
I use tables, figures, and pictures in text to increase my understanding.			
When text becomes difficult, I read aloud to help me understand what I'm reading.		.657	
I write summaries to reflect on key ideas in the text.		.523	
I skim the text first by noting characteristics like length and organization.		.461	
I think about whether the content of the text fits my purpose.		.447	
I decide what to read closely and what to ignore.		.418	
I adjust my reading speed according to what I'm reading.		.407	
I use typographical aids like boldface type and italics to identify key information.			
I preview the text to see what it's about before reading it.			
I underline or circle information in the text to help me remember it.			
I try to guess the meaning of unknown words or phrases.			.654
I try to guess what the text is about when reading.			.646
I check to see if my guesses about the text are right or wrong.			.543
I check my understanding when I come across conflicting information.	.402		.456
I stop from time to time to think about what I'm reading.			

About 13 items clustered around the first factor, six items around the second factor, while four items clustered around the third factor. However, as indicated in Table 1 the items' clustered a bit different from the expected categories of GLOB, PROB, and SUP. With regard to reliability, Mokhtari and Reichard (2002) tested the reliability of MARSİ among 443 students in grades 6 through 12 and found that reliability for the total scale was Cronbach Alpha of 0.89. Al – Dawaideh (2013) tested the reliability of the MARSİ among 100 university students and found that reliability for the total sample was Cronbach Alpha of 0.82. In this study, reliability of the total MARSİ reached Cronbach Alpha of 0.88.

3. Results

3.1 The Group of Strategies Mostly Used by the Students in Secondary Schools

To identify the group of metacognitive awareness reading strategies mostly used by secondary school students, the analysis involved totalizing the scores for each of the subscale, and the calculation of the mean for the same. Then a total score and the mean for the MARSİ were calculated. Normally the mean scores of 3.5 or higher are interpreted as high use of the strategy; 2.5–3.4 = medium use of the strategy; and 2.4 or lower = low use of the strategy. Table 2 presents the results.

Table 2: Performance Distribution in Metacognitive Awareness of Reading Strategies

Metacognitive Variables	Levels	Proportion	
		Frequency	Percent
Global Strategies	Low	29	6.5
	Medium	194	43.7
	High	221	49.8
Problem-solving Strategies	Low	18	4.1
	Medium	87	19.6
	High	339	76.4
Support Strategies	Low	22	5.0
	Medium	164	36.9
	High	258	58.1
Total MARSİ	Low	14	3.2
	Medium	152	34.2
	High	278	62.6

Table 2 indicates that most students about 76.4 percent (N=339) reported high use of problem – solving reading strategies; followed by high use of support reading strategies for about 58.1 percent (N=258) and global reading strategies for about 49.8 percent (N=221). In the total score of the use of metacognitive reading strategies though, only 3.2 percent (N=14) of respondents reported low use of metacognitive reading strategies, 34.2 percent (152) reported medium use and 62.6 percent (278) reported high use of metacognitive reading strategies.

3.2 Difference in Metacognitive Awareness of Reading Strategies by Sex

To know sex difference in metacognitive awareness of reading strategies an independent t-test for equality of means was performed. Table 3 presents the results.

Table 3: Difference in Metacognitive Awareness of Reading Strategies by Sex

Variable	Descriptives			t-test for Equality of Means		
Sex	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Male	217	106.43	18.55763	-.125	442	.900
Female	227	106.64	16.71046			

Data in Table 3 indicates that there was no significant difference, $t [(442) = -.125, P > .05]$ between male students (N = 217, Mean = 106.43) and female subjects (N = 227, Mean = 106.64) in reporting being metacognitively aware of reading strategies they used.

This might mean that both male and female subjects were either using similar strategies or were equally unable to report metacognitive processes taking place in their academic activities.

3.3 Difference in Metacognitive Awareness of Reading Strategies by Physical Location

The difference in metacognitive awareness of reading strategies by physical location was analysed by performing an independent t-test for equality of means, and Table 4 presents the results.

Table 4: Difference in Metacognitive Awareness of Reading Strategies by Physical Location

Variable	Descriptives			t-test for Equality of Means				
	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	Mean Difference	Effect size
<i>Sex</i>								
<i>Urban location</i>	186	109.23	15.16	2.85	437	.005	4.62	$r = 0.14$
<i>Rural location</i>	258	104.60	18.99					

Data in Table 4 indicates that on average, subjects from urban schools reported using Metacognitive Awareness of Reading Strategies more often (Mean = 109.23) than their counterparts from the rural schools (Mean = 104.60). The difference was significant $t(437) = 2.85, P < .05$. However, the magnitude of difference as represented by effect size was small, $r = .14$. This might be interpreted that in a small magnitude, subjects from urban schools reported being metacognitively aware of the reading strategies they used than their counterpart subjects from rural schools.

3.3.1 Location Difference in the Specific Factors of the MARSI

It was of researcher's interest to know the specific strategies in which subjects from urban schools reported using more than their counterparts from rural areas. After splitting the file for the urban group as opposed to rural group, the means for each group was revealed as shown in Table 5.

Table 5: Difference in the specific factors of Metacognitive Awareness of Reading Strategies by Physical Location

	Rural N=258		Urban (N=186)	
	Mean	Std. Deviation	Mean	Std. Deviation
Global Strategies	43.50	9.15	45.07	7.48
Support Reading Strategies	31.10	6.20	32.56	5.23
Problem-Solving Strategies	30.00	5.92	31.60	4.81

Results in Table 5 indicate that the difference between subjects from rural and urban schools was apparent in all three factor of the MARSI. Subjects from rural schools scored lower than those from urban schools who relatively scored higher in all factors of the scale.

4. Discussion

4.1 Difference in Metacognitive Awareness of Reading Strategies by Sex

Results in this study have indicated no significant difference between male and female subjects in reporting metacognitive awareness of reading strategies. These findings are inconsistent with some results by previous studies on sex difference in meatcognitive awareness of reading strategies (Jimenez, et al., 2009; Kudeir et al., 2012; Madhumathi & Ghosh, 2012, Al – Dawaideh, 2013) who report that female subjects use strategy more frequently than do male subjects. On the other hand, the findings of this study are consistent to some findings by the previous studies that have shown that statistical difference between female and male subjects in reporting metacognitive awareness of the reading strategies was not significant. For example, Al – Dawaideh (2013) has reported that the use of supporting strategy was not statistically significant between male and female subjects; Madhumathi and Ghosh (2012) found no statistical significance of the mean difference in global strategy between male and female subjects.

Since there were no similar studies in Tanzania to make an empirical comparison, it is too early to generalize these findings to apply all over the country. However, in most Tanzanian schools including the schools included in the sample, both male and female students are taught in the same class by one subject teacher. After classroom sessions students normally study either individually in their scheduled personal studies or together in the group discussions. A culture of doing things together as a community has influenced much the habit of group studies such that some students would even rule out personal studies but rely much in group discussions. Most of the study groups are formed by students themselves basing on friendship and ability. Some students would prefer to form groups with both male and female members while others would form groups just because they are friends and would like to remain together. Yet other students would select members of their study groups basing on the past records of one's academic performance to enable the group benefit from the group discussion. In very few situations however, formulation of students' study groups are facilitated by teachers who mix the students of different abilities and sex to enable learning by all class members. This unity behavior might lead students of the same class to develop similar learning behaviors including similarity in the use of reading strategies.

These findings might also have more practical implications because among some native cultures in the country where it is still difficult to take it positive that female students can perform and excel to the higher levels of education better than or even like men; a lesson can be set that women can be good and competent leaders the same way men do. In addition, since there is no significant difference in the use of metacognitive strategies between male and females, and awareness and use of the metacognitive strategies have their practical implications in planning, regulating, and monitor users' understanding of the academic materials read; one can reach the conclusion that both men and women can similarly plan, regulate, and monitor their understanding of the academic materials read. This might follow then that women will be even be able to plan their political campaigns much effectively in the similar ways men do and then compete and win political elections without any favors as it is the practice now.

To reach this state however, development of metacognition and specifically metacognitive awareness of reading strategies among both female and male students in schools must be intentionally fostered so as to build a just and fair society which can mobilize skills from both women and men for the development of the country. Sex difference in the use of reading strategies might exist between female and male students even of the same sample studied. However, it should be taken into consideration that the use of the strategies is one thing different from reporting such use. Since one reports only what one can remember and reflect, it is important to clearly know what is being reported. As far as this study is concerned, what is important is not only the ability of being aware of the reading strategies used and report them but also being able to apply them in other practical situations in life. It is the question of how one can be able to think of one's mental processes that took place in the past or that take place in one's daily reading practices as the processes take place. This is what brings in the concept of metacognition - thinking about thinking itself.

4.2 Difference in Metacognitive Awareness of Reading Strategies by Physical Location

The results of this study have indicated significant difference in metacognitive awareness of reading strategies by physical location whereby subjects from urban schools have reported being more metacognitively aware of the reading strategies they used than their counterpart subjects from rural schools. These findings are consistent with some results by previous studies focusing on physical location differences in metacognitive awareness of reading strategies. Since there were no similar studies in Tanzania to compare with it is too early to generalize that students in urban schools are metacognitively aware of the reading strategies they use than students in rural schools. Thus more studies in different parts of the country could help in making fair generalization about this. If such generalization is established then it might have some practical implications. It is likely that students in the urban schools might benefit much in terms of planning, regulating, and monitoring their understanding of the academic materials they read while their counterparts from rural areas might be in disadvantageous end. According to Flavell (1979) the components of metacognition including awareness of and control of the strategies can be intentionally or unintentionally activated. This implies that both students and teachers might practically decide to improve the ability of metacognitive awareness of reading strategies so that students might benefit from their reading tasks. Theoretical implications of these findings are that physical location needs to be included in the models explaining metacognitive developments and performance. In the Flavell (1979)'s view, the adequate application of metacognitive strategies is influenced by specific strategy knowledge.

With these findings in place, it is logical to think that such knowledge of a specific strategy might be influenced by whether a student is living in the rural or urban. Given the difference in one's exposure to the environmental cues found in one's environment, a student in urban areas might be equipped with extra strategies than a student in the rural areas. As indicated in table 4, on average students in urban areas scored higher than those from rural areas in all the strategies categories.

5. Conclusion

This study intended to investigate the difference in metacognitive awareness of reading strategies by sex and physical location among secondary school students in Tanzania by specifically addressing three major questions which are: What is the group of reading strategies mostly used by the students in secondary schools? What is the difference in metacognitive awareness of reading strategies by sex? What is the difference in metacognitive awareness of reading strategies by physical location? From the study therefore, four conclusions were reached: First, students use problem solving reading strategies in school settings more than they use support reading strategies and global strategies. Second, sex was not a determinant of metacognitive awareness of reading strategies since both male and female students reported using similar strategies. Third, the use of metacognitive awareness of reading strategies are determined by physical location as students in urban schools reported using more reading strategies than their counterparts from rural schools. Fourth, empirical studies using the model of metacognitive awareness of reading strategies needs to include physical location as one of the variables to consider in an attempt to establish the determinants of the use of metacognitive awareness of reading strategies.

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