

METACOGNITION AS A TOOL IN ADVANCING READING COMPREHENSION IN A SCIENCE CLASS

Partosa, Jocelyn D

Ateneo de Zamboanga University, Zamboanga City, Philippines

ojdpartosa@yahoo.com

Abstract: Reading comprehension is a critical learning outcome and cuts across all content areas. Using metacognition as a tool, this study aimed at advancing reading comprehension among biology majors. Specifically, the foci of the study were to recognize reading comprehension problems among biology majors; improve their reading strategies and reading comprehension and promote metacognition. Fourteen sophomore biology students in Plant Systematics were assigned 3 articles on separate occasions. A reading survey adopted from Joseph (2006) showed that the reading comprehension problems are generally of cognitive and affective origin, with all 14 students pointing to inadequate vocabulary as their most challenging. Reading behaviors like preference for a particular reading position and reading aloud were crucial to comprehension for some students, just as writing questions and appreciating pictures in the article were contributory to comprehension. Students' reading strategies mostly involved consulting the dictionary or the internet, rereading, note taking of important points or a combination of those strategies. Several students claimed that with metacognition they learned new ways on how to comprehend articles; even identifying factors that proved ineffective to comprehension were evident. Students also claimed to develop skills in monitoring their comprehension and correct misunderstandings. According to some students however, they need to improve in making inferences, synthesizing information and asking questions.

Keywords: reading survey, reading log, comprehension problems, reading behaviors, reading strategies

Introduction

Metacognition is awareness and management of one's own thoughts. It is thinking about one's own thinking and has to do with self-monitoring and reflection on learning (Kuhn and Dean, 2004, Bauseman and Block, 2005, Donovan and Bransford, 2005 cited in Abell, 2009). Most students though need direct instruction, ample coaching and opportunities for guided practice to develop self-reflective abilities on their own (Burke, 2000 cited in Joseph, 2006).

Reading is basic in all academic disciplines and one key component of learning outcomes is reading comprehension (White, 2004 cited in Lei et al, 2010). However, it is common observation that college students are not necessarily good readers. It is often a general assumption among college teachers that students have developed proper reading skills from previous academic years. Yet, comprehension in textbooks, scholarly books and research journal article, with identification of key information can be difficult for college students (Lei, Rhinehart, Howard & Cho, 2010).

The literature on using metacognition in reading comprehension emphasizes on explicit instruction, explanation, modeling, discussion, systematic direct instruction of metacognitive strategies in fostering reading comprehension across all levels of education,

from children (as shown in the studies of Eilers & Pinkley, 2006, Courtney & Montano, 2006, Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007, Allan and Hancock, 2008) to adult learning (as shown in Cubukcu, 2008).

But how does metacognition support science learning? Particularly, how does metacognition improve reading comprehension and reading strategies in science class?

The use of metacognition in fostering reading comprehension in science class shows that students develop meaningful learning and sound scientific understanding. According to Abell (2009), researchers point to the effect of metacognitive instruction on the transfer and durability of conceptual understanding in science.

Thus, using metacognition the present study aimed at advancing reading comprehension in a biology class. Specifically to recognize reading comprehension problems among biology students, improve their reading strategies and reading comprehension and promote metacognition.

The relevance of this study then is two-fold. Using metacognition it attempts to improve reading comprehension and reading strategies and at the same time promote metacognition (self-regulation) among biology students. In this context, reading comprehension refers to the students' ability to access prior knowledge, monitor their comprehension, correct misunderstandings when reading, recognize main points, synthesize information, make inferences and ask questions. Reading behaviors refer to the students' actions or manners during each reading episode, including their attitude and or feelings toward the reading assignments. Reading strategies refer to the students' attempts—cognitive or behavioral to solve or address difficulties met with reading to achieve reading comprehension.

It is thus the working framework (Figure 1) of this paper that metacognition as a tool in advancing reading comprehension in science class supports meaningful learning and enhances students' capacity to self-regulate their thinking; as is evident in their ability to access prior knowledge, monitor their comprehension, correct misunderstandings when reading, recognize main points, synthesize information, make inferences and ask questions. To facilitate reading comprehension though, it is imperative for students to identify for themselves their reading comprehension problems, as well consider their reading behaviors and reading strategies.

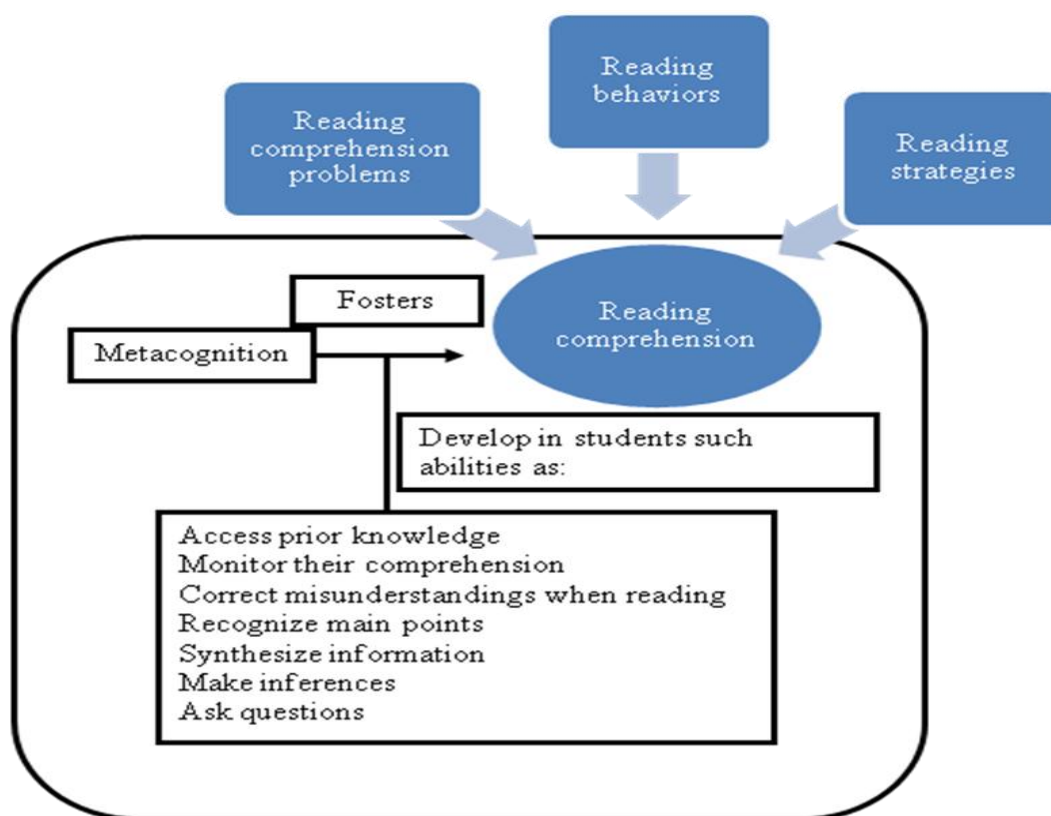


Fig 1 Metacognition in Reading Comprehension

Method

1. Research Design

The design is descriptive specifically this study adopted a reading survey instrument by Joseph (2006) which was modified to gain information on biology students' reading comprehension problems, their reading behaviors and reading strategies. The students completed a reading survey in three separate occasions they were given reading assignments on journal articles during the semester.

2. Participants

The participants of this study were all second year BS Biology students enrolled in Plant Systematics in the first semester of Calendar Year 2009-2010.

3. Research Instrument

A reading survey instrument adopted from Joseph (2006) was modified to include reading assignment guidelines and the rubrics for some items in the reading survey (Appendix A). The guidelines are a set of instructions to help students in reading.

Items in the reading survey are generally grouped into: time spent on reading, rate of reading comprehension and note taking of the actual reading process. There are also items which give information on students' comprehension problems, reading behaviors and reading strategies.

In addition to the reading survey, students were asked to complete a reading log at each time they complete one reading assignment. The reading log consists of each

student's narrative focusing on their comments and observations as a response to certain guide questions in the reading assignment guidelines.

4. Data Gathering Procedure

At the start of the semester students were oriented as to the tasks ahead and copies of the reading assignment guide for the reading survey and reading log were also distributed.

As a preliminary activity, the article on Plant Systematics was discussed in class to guide the students in their reading to give them ideas as to how to go about the reading process for the remaining two articles. Table 1 shows the details of the activities in the semester the study was conducted.

Table 1 Schedule of activities

<i>Month (2009)</i>	<i>Activities</i>
June	<ul style="list-style-type: none"> • Orientation with students on their reading assignment • Distribution of handouts (reading assignment guidelines for the reading survey and reading log) • First reading assignment (June 25) on the article <i>Plant Systematics in the age o Genomics</i>” by Daly, Cameron and Stevenson (2001)
July	<ul style="list-style-type: none"> • Class discussion of reading assignment using the reading assignment guidelines • Submission of first entry of reading log and reading survey • Collating journal entries from reading log and reading survey
August	<ul style="list-style-type: none"> • 2nd and 3rd reading assignments (1st week of August) <i>“Learning about Coastal Trends: What is the story with seagrass...and how does it affect me?”</i> by Ksiazek et. Al (2009) <i>“Effects of De- and Rehydration on Food-conducting cells in moss Polytrichum formosum: A Cytological Study”</i> by Pressel, Ligrone and Duckett (2006) • Class presentation of 2nd and 3rd reading assignments (2nd week of August) • Submission of 2nd and 3rd entries of reading log and reading survey
October	<ul style="list-style-type: none"> • Student evaluation on the reading assignment

5. Data Analysis

The units of analysis were the entries in the 3 reading surveys summarized in Table 2 of the Results and Discussion. As well the observations by students including written transcripts from their journal entries are described in the subsequent paragraphs.

Results and Discussion

There were a total of 14 students in this class, 12 females and 2 males. Eleven were second year students, 1 third year and 2 were fourth year. Table 2 summarizes the self-ratings of students on their rate of comprehension, rate of enjoyment and rate of effort on the 3 articles. Students are denoted as letters in place of their real names.

Table 2 Summary of the Reading Surveys of 3 article reading assignments

Student	Pre Reading (in min)				Reading Time (in min)				Rate of Comprehension			Rate of Enjoyment			Rate of Effort		
	A1	A2	A3	Ave	A1	A2	A3	Ave	A1	A2	A3	A1	A2	A3	A1	A2	A3
A	36	8	20	21	120	14	33	56	Poor	VG	VG	Ave	VE	Ave	Max	Max	Ave
B	22	10	12	15	180	15	47	81	Ave	VG	Ave	LE	VE	LE	Max	Ave	Max
C	25	25	13	21	40	40	18	33	Ave	Ave	Ave	Ave	Ave	Ave	Max	Max	Max
D	16	20	10	15	230	45	30	102	Ave	Ave	VG	LE	Ave	Ave	Ave	Max	Ave
F	27	8	8	14	35	20	92	49	Ave	VG	Ave	Ave	Ave	LE	Poor	Max	Poor
H	27	7	10	15	48	12	40	33	Ave	VG	Ave	Ave	VE	Ave	Max	Max	Max
I	23	5	5	11	75	10	40	42	Ave	VG	Ave	LE	VE	LE	Poor	Ave	Ave
J	15	4	6	8	150	31	90	90	Ave	VG	Ave	LE	VE	Ave	Max	Max	Max
K	6	7	2	5	28	15	27	23	Ave	VG	VG	Ave	VE	VE	Max	Max	Max
L	6	5	10	7	32	25	60	39	Ave	VG	Ave	Ave	VE	VE	Max	Max	Max

*Data are from 10 students with complete entries.

*Rate of comprehension [VG – 10, Ave – 5, Poor – 1]

*Rate of enjoyment [VE – 10, Ave – 5, LE – 1]

*Rate of effort exerted [Max – 10, Ave – 5, Poor -1]

*Qualitative descriptions in Appendix A

On reading time, rate of comprehension, rate of enjoyment and rate of effort

Apparently, for this group of students reading time on the average takes longer than usual; with 3 students reading time ranging from 81 to 102 minutes (B, J & D, Table 2). For example, for article 1 alone, students B, J and D average more than one hour to finish reading. Reading an article for more than 1 hour suggests that the students may not be concentrating well enough or they may have too many distractions and interruptions.

The following are possibly some of the distractions students met while reading as suggestive of lines like: *"Yes I was confused. What I did was reread, or for unfamiliar word, consulted a dictionary (B)."* *"Yes I stop after every paragraph or chapter to remember the content and write a synthesis in my own understanding (J)."* *"Some statements/concepts were hard to be understood. To avoid confusion, I search the meanings of the new terms in the dictionary and sometimes search it online (D)."*

In retrospect, for these 3 students, longer reading time was associated with behaviors like having to reread the article, to stop after every paragraph or consult other references to facilitate reading comprehension; though apparently more of a distraction and interruption than they were helpful.

Regarding rate of comprehension, self-ratings of 6 students vary between average comprehension for articles 1 and 3 and very good comprehension for article 2. This means that these 6 students found some parts of articles 1 and 3 difficult to follow, with most terms new to them and experienced occasional distractions. Self-ratings of students A and K (Table 2) were very good for articles 2 and 3 and poor and average for article 2 respectively. Except for students C and D (Table 2), everybody gave herself a very good rating for article 2.

According to one student, *"article 2 is very interesting and easy to understand even during the pre-reading (L)."* Another student found the article light and thought that a 6th grader could relate to it (J).

Regarding rate of enjoyment, self-ratings show 7 (A, B, H, I, J, K & L) out of 10 students appreciated article 2, as it was very interesting, relevant and the presentation was clear and simple. The others however, thought that the presentation was seldom technical and difficult to follow and occasionally felt frustrated, bored and disliked the article.

Concerning rate of effort, students C, H, J, K, & L (Table 2) gave themselves a rating of maximum which means that they observed all the guidelines in completing the reading assignments. Also, despite having difficulty with the text, they tried their best to understand each article by looking up the meaning of new terms, and recalling some lessons in the past.

The other 5 students rated themselves between average and maximum (A, B & D), poor and average (I) and poor and maximum (F). Students with self-ratings of average and poor, either skipped some guidelines in reading, occasionally looked for meaning of terms and try to recall some past lessons or read the article for the sake of reading without care for understanding it and find the task boring and taking too much of their time.

Completing the reading survey encourages students to be critical about their performance and to engage in self-monitoring processes which are basic to metacognition or self-regulation.

Besides the foregoing, the reading survey provides insights into the comprehension problems of students as well their reading behaviors and reading strategies. Table 3 outlines the reading comprehension problems, reading behaviors and reading strategies of students.

Table 3 Summary of Students' Reading comprehension problems, reading behaviors and reading strategies

Reading comprehension problems	Reading behaviors	Reading strategies
<ul style="list-style-type: none"> •Inability to focus or concentrate as a result of emphasizing meaning-making of new, unfamiliar and technical terms •Distractions from noise, frequent stops during reading to refer to dictionary or other references, feelings of boredom, lethargy and discomfort owing to small font size of articles, single spacing and little if no interest in the article. •Inadequate vocabulary •Lack of background or limited background on reading material •Inability to connect past lesson with concepts from the article •Length and complexity of articles and generally, not the usual reading materials of interest 	<ul style="list-style-type: none"> •Preference for a particular reading position as in lying in bed while reading •Appreciates pictures in articles as these are helpful in reading and adds to the fun side of the activity •Easily distracted by noise, feelings of boredom and lethargy, perceived difficulty of the article •Reading aloud •Writing questions and attempting to answer the same •Attachment to particular comfort zones like reading in the room •Forming pictures in their mind •Eating, drinking iced tea, stretching •Forcing oneself to read for fear of getting a low mark 	<ul style="list-style-type: none"> •Note taking of important points or highlights of the article •Writing questions for clarification purposes •Referencing of dictionary and or related materials from the internet •Asking their classmates at times •Synthesizing or reading aloud to be more focused •Finding a quiet and comfortable place before reading and as much as possible outside one's room to refrain from possibly sleeping •Resort to a combination of rereading that part they find confusing, look for meaning in the text, dictionary or the internet. •Attempts at overcoming boredom include eating, stretching

Reading comprehension problems

The reading comprehension problems are generally of cognitive and affective origin, with all 14 students pointing to inadequate vocabulary as their most challenging (Table 3). According to the National Institute of Child Health and Human Development (2000, cited in Boulware-Gooden et al 2007), vocabulary plays a critical role in comprehension.

As a process comprehension entails constructing meaning while interacting with text (Courtney and Montano, 2006). This mostly explains why students expressed difficulty comprehending articles 1 and 2 for lack of vocabulary as most of the terms were new and technical. Likewise many times students were distracted.

Students admitted that the absence of or having limited background added to the problem which made their attempts to connect past lessons with a particular article useless. Distractions like noise, frequent stops during reading, lethargy, discomfort and presentation of article, all impair the focus of students and consequently their comprehension. As the articles were unusual to the students possibly explains the apparent disinterest some complained. For example, one student when asked what reading comprehension problems she had said *“attention and interest-catching capacity of articles.”* She added that *“uninteresting articles require greater effort and time to comprehend (L).”* Apparently comprehension is not only a cognitive process but a function of the affective as well.

This is consistent with what Israel, Bauseman and Block (2005) said about metacognitive experiences—to consist of any cognitive or affective experiences that accompany and pertain to any intellectual task like reading.

Reading behaviors

Whether the students' reading behaviors were crucial or insignificant to their reading comprehension problems vary from one student to another. Such as preference for a particular reading position, one student said *“I'm not comfortable reading while seated because I am used to rest in my bed to make myself relax (A, reading log 1).”* Another student finds reading aloud helpful just as others find it disturbing as evidenced in the line *“I lost focus because the area was too noisy (K, reading log 1).”*

Writing questions, attachment to particular comfort zones like reading in the room and forming pictures in their minds were helpful reading behaviors.

Reading strategies

The reading strategies mostly involved consulting the dictionary, rereading, note taking or a combination of the foregoing. Also, some resorted to eating, drinking and stretching as they struggle between reading and sleepiness. Referring to the dictionary was common to all students as this was their most challenging.

Some strategies like rereading, note taking and forming pictures in the mind as reading behavior here, were identified by Wade, Trathen, and Scraw (1990, cited in Cubukcu, 2008) in an earlier study involving 67 college volunteers who read a 15-page passage at the 11th grade level and was followed by a recall test. They classified the 14 strategies they identified into 3 types; note taking tactics, mental tactics and reading tactics. Note taking tactics included highlighting, underlining, circling, copying key words, phrases or sentences, outlining or diagramming. Mental tactics included imaging, relating information to background knowledge and reading tactics included skimming and rereading for example (Cubukcu, 2008).

Reading comprehension then requires good vocabulary, background knowledge, and

strategic readers—which in this study were rare among students.

According to Allen and Hancock (2008) there is a relationship between text comprehension and cognitive abilities. For example, vocabulary and background knowledge fall under comprehension knowledge, one of the five broad category cognitive clusters along with working memory, processing speed, short-term memory, and long-term retrieval, identified with the strongest correlations to reading comprehension achievement at each age level, in a study of 8,818 participants, ages 24 to 95 years (Evans, Floyd & McGrew, 2002, cited in Allen & Hancock, 2008).

The literature on reading and metacognition shows that successful comprehension does not happen automatically (Cubukcu, 2008). Besides it depends on directed cognitive effort, known as metacognitive processing which as Cubukcu (2008) describes consists of knowledge about and regulation of cognitive processing. Strategies which are “procedural, purposeful, effortful, willful, essential, and facilitative in nature” with “the reader purposefully or intentionally invoking those strategies” are expressions of metacognitive processing that occur during reading (Alexander and Jetton, 2000, cited in Cubukcu, 2008).

Indeed successful text comprehension involves metacognition—an observation apparent in previous works (Baker & Brown, 1984, Marshall, 2000 cited in Allen & Hancock, 2008).

The present study recognizes the need to make metacognition more common in the classroom to strengthen self-monitoring processes among students.

Yet did metacognition improve the reading strategies and reading comprehension among biology students in this study?

Table 4 shows what students consider as improved reading strategies and reading comprehension from their self-evaluation inputs.

Table 4 Students' evaluation on using metacognition as a tool in advancing reading comprehension (students' actual text)

On improving reading processes and reading comprehension among students	
<i>In what way/s did completing a reading survey improve your reading processes and reading comprehension?</i>	<ul style="list-style-type: none"> •It taught me new ways on how to comprehend articles more by asking questions etc. (B) •I was able to identify what hinders me from reading texts effectively; it made me realize that there were factors that slowed my reading comprehension I never knew before (H). •It determined my reading comprehension difficulties and evaluated how well I did in the reading (J). •It provided a step by step procedure that aids in the better way of reading the article (L).
<i>What actual skills did you learn or improve as a consequence of completing a reading survey?</i>	<ul style="list-style-type: none"> •Asking questions and trying to answer the same afterwards (B & A) •Analysis (A) •Improves my writing skill since we also write summaries and also learn how to summarize (A) •Applying or connecting what I read to our real life (H) •Connect prior knowledge to present readings (J) •Gain a little interest in reading articles such as the ones we read in class (J).
<i>Which part of the reading survey did you find most helpful in improving reading processes and reading comprehension?</i>	<ul style="list-style-type: none"> •The part that asks readers to imagine what the author says or think of something that relate to the article (D). •Everything from the rating part and answering questions. It helped me evaluate what I have read and determine whether what else to improve or know what are my lapses (E). •The part that asks questions makes me know myself better, my limitations as well, this part help me correct misconceptions and or clarify things (L). •The reading log because it was like a "diary." I'm free to write anything concerning the article (B).

The present study does not quantitatively establish how successful metacognition is at improving reading comprehension. However, metacognition as evidenced by claims of students (Table 4) did develop their ability to monitor their strengths and weaknesses and the development of the self-monitoring process. According to one student, *"I was able to identify what hinders me from reading texts effectively," "it made me realize that there were factors that slowed my reading comprehension I never knew before (H)." Another student said "it determined my reading comprehension difficulties and evaluated how well I did in the reading (J)." "*

Metacognitive knowledge about individual cognitive strengths and weaknesses, besides the process of active mediation, positively affects a student's ability to accurately monitor text comprehension (Flavell, 197), Schraw & Dennison, 1994 & Kuhn, 2000 cited in Allen & Hancock, 2008).

Thus this study showed that explicit instruction involving metacognition in improving

reading comprehension was useful. When metacognitive strategies for comprehending all text are explicitly taught, comprehension improves (Eilers & Pinkley, 2006).

Besides developing their self-monitoring ability, students claimed to improve their skills in analysis, writing summary and connecting prior knowledge to the reading material.

Regarding which metacognitive skills they learned or strengthened using the reading survey in all 3 reading assignments and in what ways did metacognition promote reading comprehension, the corresponding tables (5 & 6) identify the following.

Table 5 Students' metacognitive skills based on their self-evaluation

On the use of metacognition and development of metacognitive skills		
Metacognitive skills	Those who learned or strengthened the skill	Those who need improvement
<i>Access prior knowledge</i>	B, D, G, H & L	A & M
<i>Monitor comprehension</i>	A, B, E, H, J & L	D
<i>Correct misunderstandings when reading</i>	B, F, G, H, J, K & L	D, E, H & M
<i>Recognize main points</i>	A, E, G, K, L & M	--
<i>Synthesize information</i>	A, D & L	F, H & M
<i>Make inferences (implications, conclusions)</i>	E, H, J, K, L & M	G & J
<i>Ask questions</i>	A, B, E, J, K, L & M	G & K

Note: Data are from 11 students who submitted their self-evaluation.

Table 6 Metacognition and reading comprehension

Metacognition in promoting reading comprehension	
In what ways did metacognition promote reading comprehension?	<ul style="list-style-type: none"> • <i>“Entails us to be conscious in learning the articles by making us think of an effective plan and strategy that will enable us to really comprehend articles (E).”</i> • <i>“Reading the articles instantly facilitated in us monitoring my own comprehension (J).”</i> • <i>“For lack of background, using context clues proved useful in understanding texts (B).”</i> • <i>“Helps me relate things to others” help me analyze concepts during the reading process (D).”</i> • <i>“In reading, we are able to find out if the techniques that we are using is effective, then if not we learn to change strategies and use a better strategy (E).”</i>

Note: Data are from 11 students who submitted their self-evaluation.

Metacognition did develop metacognitive skills among several students and was useful in developing the ability to access prior knowledge among 5 (45%) students, metacognitive skills such as monitoring comprehension, recognizing main points, making inferences were each claimed by 6 (54%) of the students and 7 (63%) said they developed skills in asking questions and correcting misunderstandings when reading (Table 5). Yet some admitted they need to improve in the skills mentioned.

Clearly metacognition is crucial in strategic reading as it emphasizes the reader's participation, it is diagnostic of students' comprehension problems, behaviors and strategies (Tables 3 & 6) and it offers an alternative to traditional methods of teaching.

Despite the small number of students involved in this study, the findings that metacognition is a meaningful and valuable tool in advancing reading comprehension among biology students cannot be undermined. In fact, it must be encouraged among small classes as the work can be challenging and critical.

The data have pedagogical implications foremost is using metacognition as a fine alternative to traditional teaching methods. This is crucial not only in advancing a common learning outcome such as reading comprehension, but making metacognition or reflective thinking an integral part of developing critical thinking among students.

The foregoing data support literature in science education on constructivism—a theory of learning which refers to the active participation of students in their own learning. The ability to regulate one's own thinking is one measure of learning by doing thus fostering independent learning among students.

Conclusions and Recommendations

Data culled from the 3 reading surveys, reading log entries including the self-evaluation that the students completed show that metacognition is meaningful and valuable in advancing reading comprehension.

Specifically data show that comprehension problems were usually of cognitive or affective origin. This suggests that metacognitive experiences consist of any cognitive or affective experiences that accompany and pertain to any intellectual task, such as reading. Thus lack of vocabulary and or interest in the reading material—keys to motivation in reading for example influence success in reading comprehension.

Some reading behaviors were useful like writing questions and or notes and creating mental images while reading. Attitude towards reading which can stem from students' interest or disinterest in reading materials can either hinder or facilitate reading comprehension.

The reading strategies mainly consist of consulting the dictionary, rereading, note taking or a combination of the foregoing.

Generally metacognition was useful in developing skills in accessing prior knowledge, monitoring comprehension, recognizing main points, making inferences, correcting misunderstandings when reading and asking questions. As well metacognition did promote reading comprehension among several students in this study despite the number of articles.

However, knowing whether students improved their vocabulary could have been valuable information. Reading strategies like forming pictures in mind while reading, concept integration; including rereading, note taking and reflection (in the forms of writing in journals and reading logs) are highly encouraged to increase opportunities for self-appraisal among students. As well abilities like asking questions and monitoring comprehension can be further explored.

The students vary in their recommendation whether the number of articles was enough to promote metacognition and improve reading comprehension. Their earlier claims support the objectives of this study though.

As was shown here metacognition is challenging and critical in small classes and thus is highly encouraged.

References

Abell, S. (2009). Thinking about thinking in science class. *Science and Children*, February,

56-57.

- Allen, K. D. and Hancock, T. E. (2008). Reading comprehension improvement with individualized cognitive profiles and metacognition. *Literacy Research and Instruction*. 47(2) 124-139.
- Boulware-Gooden, R., Carreker, S., Thornhill, A., Joshi, R. M. (2007). Instruction of metacognitive strategies enhances reading comprehension and vocabulary achievement of third-grade students. *The Reading Teacher*. 61(1) 70-77.
- Courtney, A. M. and Montano, M. (2006). Teaching comprehension from the start: one first grade classroom. *Young Children*. 61(2) 68-74.
- Cubukcu, F. (2008). Enhancing vocabulary development and reading comprehension through metacognitive strategies. *Issues in Educational Research*. 18(1) 1-11.
- Eilers, L. H. and Pinkley, C. (2006). Metacognitive strategies help students to comprehend all text. *Reading Improvement*. 43(1) 13-29.
- Hobson, E. (2008). The role of metacognition in teaching reading comprehension. Metacognition in teaching.htm. Date Retrieved. May 26, 2010.
- Israel, S. E, Bauserman, K. L. and Block, C. C. (2005). Metacognitive assessment strategies. *Thinking Classroom*. 6(2) 21-28.
- Joseph, N. (2006). Strategies for success: Teaching metacognitive skills to adolescent learners. *New England Reading Association Journal*. 42(1) 33-39.
- Kuhn, D. and Dean, D Jr. (2004). Metacognition: A bridge between cognitive psychology and educational practice. *Theory and Practice*. 43(4) 268-273.
- Lei, S. A., Rhinehart, P. J., Howard, H. A and Cho, J. K. (2010). Strategies for improving reading comprehension among college students. *Reading Improvement*. 47(1) 30-42.

Appendix A: Reading Assignment Guidelines and Reading Survey

Please observe the following for every reading assignment you have.

1. Before you read, prepare your reading material, reading log, reading survey and journal.
2. Whenever possible, select a quiet place when doing your homework to avoid distractions and interruptions.
3. Begin by doing some prereading. Since this is your first article reading assignment in this course, take note of the average time it takes you to do the prereading. Take note of what happens to you; for example, do you seem to lose focus? What was/were the source/s of distraction? Does this happen always? What other problems did you encounter during the prereading? Remember to take note of your experience in your reading log. You may do so during or after your prereading.
4. Read the article again. This time take note of details in the article that perhaps you find interesting, new, and difficult. This could be terms, phrases, or a paragraph.
5. Take time to think about your notes. You may use the margins of your copy of the article for taking notes or use your reading log for this purpose.
6. When taking notes, you can picture out the setting or context of the article and write about what you have in mind. You may draw a picture and describe what you have drawn.
7. Complete a reading survey. The reading survey makes you evaluate your reading strategies or behaviors. Do this prior to the discussion of the reading material in class.
8. Remember to keep a pen in hand to facilitate your interaction with the text.

1. How much time did you spend on prereading? _____ minutes
2. How much time did you spend on the reading assignment? _____ minutes
3. Rate your comprehension of the reading: Very Good = 10 Average = 5 Poor = 1
4. Rate your enjoyment of the reading: Very enjoyable = 10 Average = 5 Little enjoyment = 1
5. Rate the effort you devoted to the reading: Maximum = 10 Average = 5 Poor = 1
6. Were you confused by anything you read? _____ What did you do when you became confused?
7. When you were reading, did you form pictures in your mind?
8. Did you write down any questions or mark any passages when you were reading?
9. Did you stop when reading to think about what the author was saying?
10. Did you make connections between something from the reading and ideas from class discussions?
11. Did you make connections between something from the reading and an experience in your own life?

Fig 2 Student Reading Survey (Adopted from Joseph, 2006)

Note: For items 3-5, refer to the rubrics below:

On Comprehension:

Very Good – No difficulty encountered in reading, there was facility of terms and little if no distraction occurred.

Average – Some parts of the article were difficult to follow, most terms were new and occasional distractions occurred.

Poor – For the most part, the article was difficult, terms are generally hard to understand and little if no consideration was made on student's background.

On Enjoyment:

Very Enjoyable – Article was very interesting, relevant and presentation was clear and simple. Little if no negative feelings was experienced.

Average – Article was interesting, relevant and presentation was technical and difficult to follow at times. Some feelings of frustration, dislike or boredom were felt at some points while reading.

Little Enjoyment – Article was boring, irrelevant and the entire presentation was technical and boring. Reading was dragging than it was fun.

On Effort:

Maximum Effort – I observed the guidelines in accomplishing my reading assignment.

Despite difficulty of the text, I tried my best to understand it by looking up the meaning of new terms or terms I had difficulty understanding. I recall some lessons in the past which I think can help me understand the text.

Average – I skipped some guidelines in accomplishing my reading assignment. On occasions, I looked for the meaning of terms or try to recall some past lessons.

Poor – I read the article for the sake of reading without care for understanding it. I find the task boring and taking too much of my time.

For items 6-11, please elaborate or describe further your answer. Do not stop with answering yes or no.