



The Effectiveness of a Metacognitive Strategy during the Learning Process on Subject Matter Retention, Visual Attention, and Cognitive Allocation



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Introduction

- Metacognition is defined as “cognition about cognition” or “thinking about thinking” (Flavell, 1979, p. 906).
- The Survey, Question, Read, Respond, Recite, Record, and Review (SQ5R) strategy is a metacognitive activity that can help learners reach high level of thinking (Sangcharoon; 2010).
- Practicing metacognitive reading strategies can positively change students’ learning performance (Block & Parris, 2008).
- Eye-tracking technology has been used to explore moment to moment cognitive processes in reading comprehension (Raney, Campbell, & Bovee, 2014);

Methods

- Quasi-experimental study involved a pre-test and a post-test.
- Participants (N=40) read four passages (*mitosis*, *meiosis*, *tracheophytes*, and *bryophytes*) presented on a computer monitor while their eye movements were recorded by Tobii Pro Eye-tracker software.
- The operational measures of visual attention and cognitive allocation were the average of fixation durations and average of fixation counts on Areas of Interests (AOIs) of each passages.



Results

- Students spent more time on the key elements of the passage (AOIs) to process information in deep levels after they watched the SQ5R metacognitive strategies video.
- Students retained more information after they had been taught the SQ5R metacognitive strategy based on pre-test and post-test scores (see table 1).
- Paired t-test indicated significant differences of fixation duration, fixation counts, and fixation duration percentage before and after intervention.

Table 1
Descriptive Analysis of Average Fixation Duration, Fixation counts, Fixation Duration Percentage and Test Scores

Variable	Before Intervention		After Intervention		<i>t</i> ₍₃₉₎	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Fixation duration(<i>Sec</i>)	6.46	3.29	10.79	6.65	-3.91	< .05
Fixation counts(<i>f</i>)	28.03	11.38	52.03	39.36	-4.94	< .05
Fixation duration percentage (%)	11.35%	0.46	19.86%	0.68	-6.13	< .05
Test scores	22.79	26.94	54.35	32.34	-4.67	< .05

Note: Fixation duration (*Sec*) = the time period of the fixation on AOIs; Fixation counts (*f*) = the frequencies of fixation on AOIs; Fixation duration percentage (%) = the time period on AOIs account for the time period on the passage.

Conclusions and Recommendations

- This study provided the evidence of effectiveness of the SQ5R upon students’ reading comprehension improvement.
- This study can contribute relevant insights to metacognitive strategies in students reading comprehension.
- Educators should utilize the records of eye-movements to better design instructional materials to increase reading comprehension.

References

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SQ5R

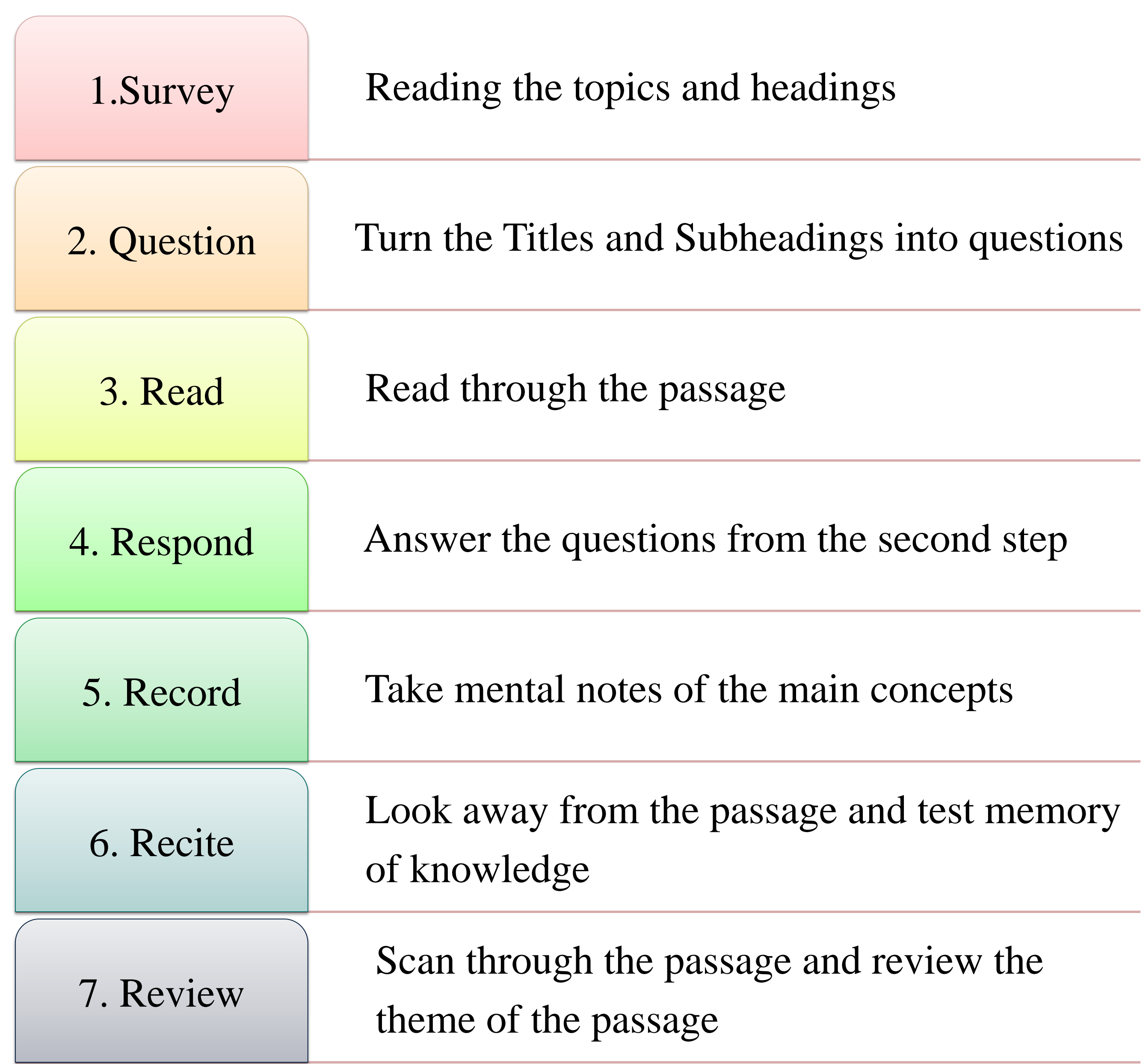
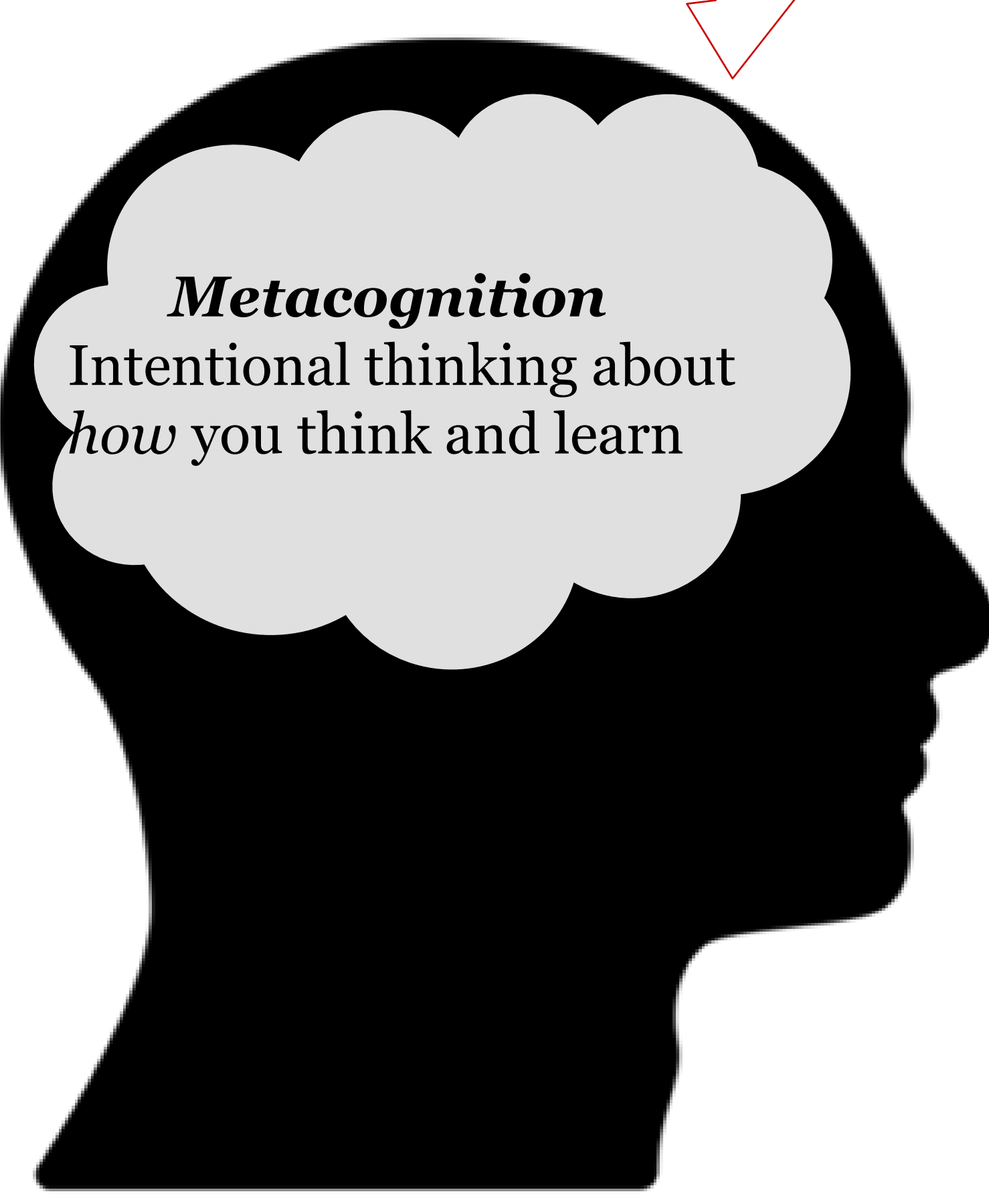


Figure 1 The Steps of the SQ5R Metacognitive Strategy



Purposes and Objectives

- Investigate the effectiveness of a metacognitive strategy (SQ5R) based on the eye-movement behaviors (fixation duration, fixation frequency) reading behaviors during the learning process.