

Teachers' Metacognition and Higher Order Thinking Skills of Elementary School Learners in Eastern Samar, Philippines

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Abstract

This investigation primarily aims at identifying if significant relationship exists between teachers' metacognition and learners' Higher Order Thinking Skills (HOTS). The correlational method of research was employed to satisfy the primary objective of the investigation. Two groups of respondents were involved which included total enumeration of Grade VI teachers and randomly selected Grade VI learners in Can-avid District. Through the administration of adapted sets of questionnaire and analysis of data, using appropriate descriptive and inferential statistical tools, the study revealed the following salient findings: (1) Majority of the teacher-respondents indicated a very high level of conceptual knowledge of cognition and planning skills of cognition regulation rather than procedural knowledge and evaluating and monitoring skills; (2) Learners have exhibited very poor Higher Order Thinking Skills in terms of scientific inquiry skills of analyzing, evaluating, and creating; and that (3) Teachers' metacognition only manifested a negative weak correlation with learners' creating skills. The study recommends for advancement of teachers' metacognition and learners' HOTS through active integration of said skills in the curriculum and providing opportunities for teachers' professional advancement.

Key Words: Creating, Higher Order Thinking Skills, Metacognition

I. Introduction

Metacognition has been an area of interest to educational researchers for more than 40 years now. A large body of literature exists on this topic, both theoretical and empirical, relating the various definitions of metacognition. Cognitive psychologists with the likes of Stewart and Landine (1995) have tried to explain why some individuals have learnt more than others and why they remember more out of what they have learnt when compared to the others and that it “focuses on the active participation of the individual in his or her thinking process” (p. 17). Lories, Dardenne, and Yzerbyt (1998) described it as the basic characteristics of the human cognition. Some researchers define the metacognition as “thinking over thinking”. In addition, Omrod (2006) expressed that metacognition includes the knowledge and beliefs of the individual related to his/her own cognitive processes. While many have been interested to understand the metacognition in relation to educational processes and outcomes, very few have dealt with investigating its impacts to learners' Higher Order Thinking Skills.

Viewed as a thinking function of the minds' ability in solving challenging situations, Higher Order Thinking Skills (HOTS) is the expanded use of the mind to meet new challenges (Rajendran & Idris, 2008). HOTS are important aspects in teaching and learning and is fundamental in educational process. Noting that a learner's thought can affect his ability, speed, and effectiveness of learning. Therefore, thinking skills is associated

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with learning process that demonstrate a positive impact on the development of their education. Yee, et al. (2011) supported this notion by stating that it enables students to learn, improve their performance and reduce their weaknesses. Also, Othman, et al. (2011) opined that thinking skills affect learners' ability to learn, speed and effectiveness of learning. Therefore, Higher Order Thinking Skills cannot be separated from the learning process.

Meanwhile, it is believed that metacognition is prerequisite to developing important critical thinking skills of learners. Supported by constructivists' ideas, Gama (2004) believed that the engaged learner demonstrates deliberateness and conscious decision-making in taking "active control over cognitive processes" and that this level of consciousness in decision-making must be achieved through leading students to be metacognitive during their learning experiences. This belief implies that there is a connection between metacognitive skills and higher order thinking skills. This is supported by Leutwyler (2009) describing that engaging classroom is one of the critical features of the learning environment for fostering higher learning skills' strategies. This is also relevant to Dewey's conceptualization about problem solving and metacognitive strategies and the importance of teaching students to think about their own thinking processes (Kauchak & Eggen, 1998).

Despite these propositions, literature reveals that there is a dearth of investigation, leading to understanding the relationship between teachers' metacognition and learners' Higher Order Thinking Skills, as teachers are the essential element in the educative process. The Researcher was prompted to investigate on the subject matter as she is currently teaching in one of the upstream schools in the district and has observed that academic performance has been a consistent problem among elementary learners in the district particularly in the upstream areas. It is, therefore, important to understand, how they, as facilitators of learning, demonstrate prerequisite metacognitive skills in the development of learners' HOTS. Hence, the Researcher was motivated, to undertake this investigation to fully grasp the connection between these two important skills, and at the same time fill in the gap on knowledge concerning the impacts of metacognitive skills on the development of learners' critical thinking skills.

Objectives of the Study

This study investigated into the relationship between teachers' metacognition and the Higher Order Thinking Skills of learners of elementary schools in Can-avid District.

Specifically, it answered the following objectives:

1. To determine the metacognitive skills possessed by the teachers in terms of:
 - 2.1. Knowledge of Cognition
 - 2.1.1. Declarative knowledge
 - 2.1.2. Procedural knowledge
 - 2.1.3. Conditional knowledge
 - 2.2. Regulation of Cognition
 - 2.2.1. Planning
 - 2.2.2. Monitoring
 - 2.2.3. Evaluating

2. To determine the perceived Higher Order Thinking Skills (HOTS) of learners in terms of:
 - 2.1. Analyzing
 - 2.2. Evaluating
 - 2.3. Creating
3. To test the relationship between the metacognitive skills of teachers and the learners' Higher Order Thinking Skills (HOTS).

II. Methodology

Research Design

The study employed the correlational method of research as it was deemed appropriate in determining the relationship between two or more variables. According to Bhandari (2021) a correlation reflects the strength and/or direction of the relationship between two (or more) variables, whereby the direction of a correlation can be either positive or negative. With this design, teachers' metacognition was correlated with the Higher Order Thinking Skills of learners.

Research Samples

The study was conducted among elementary schools in Can-avid District, Can-avid, Eastern Samar. There are a total of 19 elementary schools in the district. One (1) of which is in the poblacion, eleven (11) are in the upstream, two (2) are along the highways, and four (5) are interior barangays.

The first group of respondents was Grade VI teachers among elementary schools in Can-avid District. The following inclusion and exclusion criteria were followed: (1) Teachers must have been in the service for at least one year prior to the conduct of the study and are working with permanent plantilla item. Newly hired and job order/volunteer teachers who have just rendered service for less than one year during the conduct of the study are excluded from the samples.

For the learners, this study involved randomly selected learners who are bona fide Grade 6 pupils in the chosen research locale, they must regularly attend basic education curriculum. This criterion specifically extends to those who have not been dropped from the class in their previous grade level or are not repeaters or returnees. Also, returnees or repeaters were not considered as respondents.

Since there were only 43 Grade VI teachers in the entire district, total enumeration was considered for the first group of respondents. On the other hand, all Grade Six learners in the district were considered as the study population from whom learner-respondents were sampled out. Finally, to proportionately determine the sample size of Grade Six learners per school, the school's Grade Six population was multiplied by the computed number of research sample and was divided by the total Grade Six learners' population in the entire district.

Research Instrument

By taking the various dimensions of metacognition into account, the Researcher adopted the modified instrument utilized by Balcikanli (2011) in his inventory on teachers' metacognition. The modifications are

based on the Metacognitive Awareness Inventory developed by Schraw and Dennison (1994). The instrument has undergone reliability and validity tests and is therefore considered standard.

The instrument is a list of 24 statements about different parameters of metacognition. Respondents were made to rate themselves using a five-point Likert scale as to what is true to them for each of the statements. A second adopted standard questionnaire was employed in assessing learners' Higher Order Thinking Skills. This instrument was adopted from Zeidan and Jayosi (2014) which is composed of 18 multiple choice questions about scientific inquiry skills.

Data Gathering Procedure

In order to successfully address the objectives for the study, the following procedures were followed: seeking of approval from the superintendent in the division of Eastern Samar to administer the instruments in the selected locale; securing permission from the district supervisor and the respective principals in all of the schools in Can-avid District to administer questionnaire to respondents; administering the questionnaires to selected respondents and ensuring completeness and authenticity of the information obtained from the groups of respondents and retrieving the set of questionnaires after a week of data gathering.

Data on learners' higher order thinking skills were measured by computing the mean or average of the percentage scores obtained by the learners from the adopted inquiry skills test interpreted using the following scale with adjectival description adopted from DepEd Order No. 8.

For data on teachers' profile characteristics and their metacognitive skill, separate inferential associational tests were performed to find out relationships among the variables since they are of different nature and are expressed in different levels of measurements. A table for the interpretation of correlation coefficient was utilized.

Analysis of Data

The following descriptive and inferential statistical tools were utilized. To analyze teachers' metacognitive skills, the median, as a measure of central tendency was employed. To interpret learners' distribution according to higher order thinking skills, data were summarized by getting the average of the percentage scores. Lastly, to find out the correlation between teachers' metacognition and learners' higher order thinking skills, the Spearman Rank Correlation was utilized at 0.05 level of significance and at 95% confidence level.

Ethical Consideration

The study adhered to acceptable ethical standards, such as securing letter of consent and permission from authorities prior to administering the questionnaires to intended respondents. The researcher ensured that anonymity was observed while obtaining relevant information to assure the respondents that all information extracted from them remain confidential. Also, respondents were informed of their participation in the study and the type of data to be obtained from them. Finally, respondents were made to give consent on the condition that all information derived from the questionnaires and their participation in full volition will not in any ways incur harm or pose any type of risks.

III. Result and Discussions

Level of metacognition skill on knowledge of cognition of elementary school teachers

Table-1 provides a descriptive summary of the teachers' level of metacognitive skills on knowledge of cognition. The result shows conditional knowledge with a "very high" level of metacognitive skills (median = 5), while the respondents have shown "high" level on procedural knowledge (median = 4.0).

The findings are aligned to the result of Wilson and Bai (2010) who revealed that teachers who have a rich understanding of metacognition report that teaching students to be metacognitive requires a complex understanding of both the concept of metacognition and metacognitive thinking strategies. Also, Pressley (2002) noted that learners need to see that strategies are flexible and that good readers implement different strategies depending on the purpose of the reading and the demands of the text. These imply that the teacher-respondents have a very high level of self-motivation that enables them to use various effective teaching techniques in their respective classes. Also, they highly recognize their strengths and weakness and are aware of the needed skills required to their instructions, effectively as possible.

Table 1. Level of metacognition skill on knowledge of cognition of elementary school teachers		
Table 1		
Indicators of Knowledge on Cognition	Median	Interpretation
<i>Declarative Knowledge</i>		
I am aware of the strengths and weaknesses in my teaching.	4.0	High
I know what skills are most important in order to be a good teacher.	5.0	Very high
I have control over how well I teach.	4.0	High
I know what I am expected to teach.	5.0	Very high
Aggregate Median	4.5	Very high/High
<i>Procedural Knowledge</i>		
I try to use teaching techniques that worked in the past.	4.0	High
I have a specific reason for choosing each teaching technique I use in class.	4.0	High
I am aware of what teaching techniques I use while I am teaching.	5.0	Very high
I use helpful teaching techniques automatically.	4.0	High
Aggregate Median	4.0	High
<i>Conditional Knowledge</i>		
I use my strengths to compensate for my weaknesses in my teaching.	4.0	High
I can motivate myself to teach when I really need to teach.	5.0	Very high
I use different teaching techniques depending on the situation.	5.0	Very high
I know when each teaching technique I use will be most effective.	5.0	Very high
Aggregate Median	5.0	Very high

Legend: 5 – Very high, 4 – High, 3 – Moderate, 2 – Low, 1 – Very low

Level of metacognition skill on regulation of cognition of elementary school teachers

Table-2 provides a descriptive summary of the teachers' level of metacognitive skills on regulation of cognition. The result shows planning with a "very high" level of metacognitive skills (median = 5), while an aggregate "high" level on monitoring (median = 4.0). These imply that the teacher-respondents plan out the lessons ahead of time with due consideration to their teaching goals and availability of teaching materials. Also, they highly employ self-check assessment on whether they have met their goals via the use of appropriate tools and by asking their students, personally regarding their instruction.

Table 2 Level of metacognition skill on regulation of cognition of elementary school teachers		
Indicators of Regulation of Cognition	Median	Interpretation
Planning		
I pace myself while I am teaching in order to have enough time.	4.0	High
I set my specific teaching goals before I start teaching.	5.0	Very high
I ask myself questions about the teaching materials I am going to use.	5.0	Very high
I organize my time to best accomplish my teaching goals	5.0	Very high
Aggregate Median	5.0	Very high
Monitoring		
I ask myself periodically if I meet my teaching goals while I am teaching.	4.0	High
I find myself assessing how useful my teaching techniques are while I am teaching.	4.0	High
I check regularly to what extent my students comprehend the topic while I am teaching.	5.0	Very high
I ask myself questions about how well I am doing while I am teaching.	4.0	High
Aggregate Median	4.0	High
Evaluating		
I ask myself how well I have accomplished my teaching goals once I am finished.	4.0	High
I ask myself if I could have used different techniques after each teaching experience.	5.0	Very high
After teaching a point. I ask myself if I'd teach it more effectively next time	4.0	High
I ask myself if I have considered all Possible techniques after teaching a point.	5.0	Very high
Aggregate Median	4.5	Very high/High

Legend: 5 – Very high, 4 – High, 3 – Moderate, 2 – Low, 1 – Very low

Level of higher order thinking skills of the learners

The higher order thinking skill also known as HOTS is the highest part in Bloom's taxonomy of cognitive domain. It has three main components namely; analyzing, evaluating, and creating (Moore & Stanley, 2010). In this investigation, an adopted questionnaire was utilized to assess learners' higher order thinking skills in which learners were made to answer the 18-item test and scores were transmuted to percentage adopting grading scale as indicated in Department of Education office order number 8, series of 2015. The results of which are presented in Table- 3 below.

It can be noted from the data, that in all of the three cognitive skills, there is higher frequency of learners who "did not meet expectations" of acceptable national literacy standard which is 75%. Around 81.5% of the learners did not meet the expectations for the skills in analyzing, 92.3% for the skills in evaluating, and 66.7% for the skills in creating. It is also significant to note that while 6.8% and 23% obtained satisfactory rating for skills in evaluating and creating, while no one performed at satisfactory level in terms of the skill in analyzing.

It is from these findings, that a declining scientific literacy in the district is implied. Based on these results, it is clearly manifested, that more and more of younger Filipino learners are not meeting the national literacy and skills standards in the country. This is a saddening performance which may further create a negative impact to learners' performance in some nationally-administered tests like the National Achievement Test and may pose serious implications to the entire national educational system.

Table 3 Level of higher order thinking skills of the learners							
Grading Scale	Descriptor	Analyzing		Evaluating		Creating	
		f	%	f	%	f	%
90 - 100	Outstanding	0	0	2	0.9	23	10.4
85 - 89	Very satisfactory	5	2.3	15	6.8	51	23
80 - 84	Satisfactory	36	16.20	0	0	0	0
Below 75	Did not meet expectation	181	81.50	205	92.3	148	66.7

Teachers' knowledge of cognition and the learners' higher order thinking skills

The third objective looked into the relationship between teachers' metacognition skills and the learners' higher order thinking skills, with metacognition being divided into knowledge of cognition and regulation of cognition. After employing Shapiro Wilks Test of Normality on the two sets of data, a Pearson r test of correlation was employed due to the normal distribution of the data sets. Table- 4 shows low negative non-significant relationship between the three indicators of teachers' knowledge of cognition and the learners' levels on HOTS in terms of analyzing and evaluating, while moderately significant relationships were observed in terms of learners' creating skills and teachers' metacognition (p values < .05). This means that teachers' ability to plan out the lessons impact learners' creating skills. Hence, this

imply the need to improve teachers' ability to bring-out creativity among their learners by any means possible.

Table 4 Test of relationship between teachers' knowledge of cognition and the learners' higher order thinking skills					
Criterion Variables (Learners' level of HOTS)	Predictive Variables (Teacher knowledge on cognition)	r_s	Level of correlation	p-value	Interpretation
Analyzing	Declarative	-.188	Low	.226	Not Significant
	Procedural	-.115	Low	.463	Not Significant
	Conceptual	-.233	Low	.132	Not Significant
Evaluating	Declarative	-.083	Low	.598	Not Significant
	Procedural	-.217	Low	.162	Not Significant
	Conceptual	-.145	Low	.354	Not Significant
Creating	Declarative	-.475	Moderate	.001	Significant
	Procedural	-.445	Moderate	.003	Significant
	Conceptual	-.521	Moderate	.000	Significant

Teachers' regulation on cognition and the learners' higher order thinking skills

Table-4 provides statistical information relative to the inferential test to find out relationship between teachers' regulation of cognition and learners' higher order thinking skills. It is shown that all parameters of regulation of cognition did not exhibit significant relationship with learners' analyzing and evaluating skills. However, all of these parameters namely planning ($r_s = -.401$, $p = .008$), monitoring ($r_s = -.312$, $p = .042$) and evaluating ($r_s = .344^*$, $p = .024$) have shown moderate significant relationship with learners' creating skills at 0.01 level of significance. Suprisingly a positive relationship was drawn between teachers' evaluating and learners' creating skills supported by p-values lower than 0.05. This implies the direct and positive impact of teachers' use of various evaluation techniques to the attitude of students in creating new concepts and inventions.

Some literature reveals that teachers' knowledge of metacognition and learners' HOTS are related to each other (Wilson & Bai, 2010). However, overall findings of this study imply the opposite. This may be supported by Zohar (2004) pointing out that teachers are not always proficient with this cognitive knowledge and skills (Zohar, 2004) as supported by the descriptive aspects of this investigation and thus implies that they may need development of varied types of metacognitive styles for the diverse thinking strategies they would address to in class in order to develop HOTS. The findings of this study also run contrary with previous literature espousing that metacognition is prerequisite in developing important critical thinking skills of learners as supported by constructivists' ideas (Gama, 2004).

Table 5 Test of relationship between teachers' regulation of cognition and the learners' higher order thinking skills					
Criterion Variables (Learners' level of HOTS)	Predictive variables (Teachers' regulation on cognition)	r_s	Level of correlation	p-value	Interpretation
Analyzing	Planning	-.133	Low	.394	Not Significant
	Monitoring	-.006	Low	.972	Not Significant
	Evaluating	.006	Low	.968	Not Significant
Evaluating	Planning	-.179	Low	.250	Not Significant
	Monitoring	-.107	Low	.494	Not Significant
	Evaluating	-.102	Low	.517	Not Significant
Creating	Planning	-.401	Moderate	.008	Significant
	Monitoring	-.312	Moderate	.042	Significant
	Evaluating	.344	Moderate	.024	Significant

The findings may run contrary with previous literatures-- that metacognition is prerequisite in developing important critical thinking skills of learners. Supported by constructivists' ideas, Gama (2004) believed that the engaged learner demonstrates deliberateness and conscious decision-making in taking "active control over cognitive processes" and that this level of consciousness in decision-making must be achieved through leading students to be metacognitive during their learning experiences. This belief implies that there is a connection between metacognitive skills and higher order thinking skills.

But looking at the descriptive aspects of this investigation, teachers only exhibited strong agreement mostly in terms of conceptual knowledge of cognition while learners did not meet expectations in all of the inquiry skills. This descriptive finding could perhaps explain why skill in creating is negatively associated with metacognition because of the fact that majority of the teachers cannot translate into action and outputs their knowledge of cognition. Finally, considering that the skill in creating is the highest cognitive skill, it does not only require high conceptual and declarative knowledge but more of a person's ability to convert knowledge into innovations or performance of creative actions.

IV. Conclusion and Recommendations

Based on the findings, respondents possessed more inclination on conditional knowledge over declarative and procedural knowledge. These findings have shown the lack of skill or ability in translating concept or knowledge into relevant actions or activities. On regulation of cognition, a consensus of strong agreement was observed on indicators about planning compared to indicators on evaluating and monitoring. These have shown that most of the teachers possess the skills to lay out plans and make good decisions, but may have inadequacies relative to plan implementation, monitoring and evaluation which are critical aspects of teaching. With respect to higher order thinking skills of the learners, measured in terms of their inquiry

skills, it was unveiled that there is a very poor situation regarding the higher order thinking skills of Grade VI learners in Can-avid District. In all of the three cognitive skills, there is higher frequency of learners who “did not meet expectations” of acceptable national literacy standard which is 75%. Majority of the learners did not meet the expectations for the skills in analyzing, evaluating, and creating skills. It is clearly manifested, that younger Filipino learners are not meeting the national literacy and skills standards in the country. This is a saddening performance which may further create a negative contribution to learners’ performance in nationally-administered tests like the National Achievement Test and may pose serious implications to the entire national educational system. Finally, the metacognitive skills of teachers have only shown significant relationship with learners’ creating skills, but not on analyzing and evaluating. A result like this may be attributed to teachers’ possession of conceptual knowledge over procedural knowledge which is critical to being creative.

From the findings and conclusions, the following suggestions are advanced. The middle and top management of Can-avid District should look into opportunities to provide activities that will help elevate learners’ scientific inquiry skills into acceptable standards. This can be done by looking into the curriculum and redesigning specific teaching and learning activities which will focus on strong integration of these skills in most of the learning competencies. School administrators should provide teachers with ongoing support. A multilayered array of different types of assistance that help teachers to successfully enhance the transfer of learning from a professional development setting to a classroom setting. A variety of metacognitive skills and strategies should be introduced for them to develop skills that could help them meet their professional needs strategically and metacognitively. It can include administrative, instructional, resources, peer support, supervisory support and instructional support from a “more knowledgeable other.” Teachers who receive on-the-job support, guidance and feedback from a supervisor or a trained support person apply new skills and metacognitive strategies more frequently and appropriately and adopt a more diverse range of instructional practices than teachers who do *not* receive such supports. Teachers should design learning activities strategically for learners to attain proficiency on higher order thinking skills. They should design learning activities such as drills which will help learners master inquiry skills. They should likewise revive giving homework or assignment to foster extension of learning from the confinements of classroom. School supervisors should not only be concerned with instructional supervision and management but must likewise consider professional growth and development of the teachers. As frontline agents in the field of education, their professional advancement plays indispensable role in achieving over-all vision and mission of the Department of Education. Hence, they should be able to design learning opportunities for teachers to grow as professionals.

INSETS, school-based training and simple mentoring may be done throughout so as to provide immediate feedback to teachers’ instruction in coping with the changes in their field. With respect to the higher order thinking skills of the learners. Teachers should design performance tasks or test items that require students to use the targeted thinking and content knowledge. Making sure the assessment really does call forth from pupils the desired knowledge and thinking skills. This requires that individual items and tasks tap intended learning, and that together as a set, the items or tasks on the assessment represent the whole domain of desired knowledge and thinking skills in a reasonable way. Lastly, for future researchers, it is recommended that this investigation of a wider scope be done so as to really understand the relationship between the variables considered in this study and in order to fully appreciate the impact of metacognition to learners’ skills which contrarily not proven in this paper.

References

- Bhandari, P. (2021). *An introduction to correlational research*. Scribbr. <https://www.scribbr.com/methodology/correlational-research/>
- Bloom, B. S. (Ed). (1956). *Taxonomy of educational objectives. Handbook I: Cognitive domain*. New York: McKay.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: D. C. Heath and Company.
- Gama, C. (2004). Metacognition in interactive learning environments: The reflection assistant model. In F. Paraguu, J. Lester, & R. Vicari (Eds.), *Intelligent tutoring systems: Proceedings of the 6th international conference* (pp. 668-677). New York: Intelligent Tutoring Systems.
- Imel, S. (2002). Metacognitive skills for adult learning. *Clearinghouse on Adult, Career, and Vocational Education*, 39.
- King, F. J., Goodson, L., & Rohani, F. (2013). Higher Order Thinking Skills. Retrieved from <http://www.cala.fsu.edu>
- Leutwyler, B. (2009). Metacognitive learning strategies: Differential development patterns in high school. *Metacognition and Learning*, 4(2), 111-123.
- Lories, V. Y., Dardenne, G. & Yzerbyt, B. (1998). *Metacognition: Cognitive and Social Dimensions*. London: Sage Publications Ltd.
- Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, C. S., Rankin, S. C., & Suhor, C. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Moore, B., & Stanly, T. (2010). *Critical thinking and formative assessments*. Larchmount, New York: Eye onEducation, Inc.
- Ormrod, J. E. (2006). *Educational psychology: Developing learners*. Upper Saddle River, N.J: Pearson/Merrill Prentice Hall.
- Pressley, M. (2002). Comprehension strategies instruction: A turn-of-the-century status report. In C. C. Block & M. Pressley (Eds.), *Comprehension instruction: research-based best practices* (pp. 11–27). New York: Guilford.
- Schraw, Gregory, Robinson, DH. 2011. *Assessment of Higer Order Thinking Skills*. America: Information Age Publishing.
- Stewart, J., & Landine, J. (1995). Study skills from a metacognitive perspective. *Guidance & Counseling*, 11(1), 16-20. Teacher Performance Assessment (2012). About the TPA. Retrieved from http://tpafieldtest.nesinc.com/PageView.aspx?f=GEN_AbouttheTests.html
- Wilson, N. S., & Bai, H. (2010). The relationships and impact of teachers' metacognitive knowledge and pedagogical understandings of metacognition. *Metacognition and learning*, 5(3), 269-288. <https://link.springer.com/content/pdf/10.1007/s11409-010-9062-4.pdf>