

THE VALUE OF METACOGNITION FOR STUDENTS

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ABSTRACT

The realm of metacognition has been seen as increasingly important, particularly in the realm of education. This paper reviews some of the key concepts of metacognition and its utilization in elementary, middle school and high school and emphasizes the importance of teacher self-reflection.

Keywords: *Meta cognition, thinking, theory of mind, self-reflection*

INTRODUCTION

Educators and researchers continually search for ways that positively impact student learning in and out of the classroom. One of the more meaningful ways this can happen is through the exposure and understanding of metacognition. Livingston (2003) noted that metacognition is often defined as “thinking about thinking” but argues that actually defining metacognition is much more difficult. Metacognition is often associated with John Flavell who stated that metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation (Livingston, 2003).

Building off Flavell’s work metacognition has two constituent parts, knowledge about cognition, and monitoring of cognition (Lia, 2011). Knowledge about cognition or metacognitive knowledge can be classified into three different types. The first is person knowledge, or a person’s understanding of their own capabilities. The second being task knowledge or how an individual perceives how difficult or easy a task will be.

Lastly, there is strategy knowledge which is a person’s capability to use and identify different strategies to learn information. The second constituent of metacognition is metacognitive regulation or a person’s attempt to control their own cognition, emotion, beliefs, and values. Metacognitive regulation also has

three subparts, which are: planning, monitoring, and evaluating. Planning involves individuals planning multiple learning strategies and selecting one depending on the situation. Monitoring encourages individuals to periodically check on how well the planned strategy is working.

Lastly, evaluating involves students reviewing the outcomes as well as the selected methods to see if there can be improvement made. Combining metacognitive knowledge with metacognitive regulation gives us the idea or thought process behind what metacognition is.

Without metacognitive knowledge students would not have any knowledge to begin planning, monitoring or evaluating their learning. Without metacognitive regulation individuals would not be able to use the knowledge they have obtained to continue and further their learning, so in short, for metacognition to be viable both metacognitive knowledge and regulation need to be present and reinforced.

RESEARCH ABOUT METACOGNITION

Now this begs the question, why is this important? How does teaching and educating students about their own thought process help them succeed more in and out of the classroom? Zepeda et al. (2015) conducted a study to investigate if direct instruction of metacognition benefitted adolescents in their science learning. Specifically, they examined whether a 6-hour intervention designed to teach the declarative and procedural components of planning, monitoring, and evaluation could increase student's metacognition, motivation, learning, and preparation for future classes (Zepeda et al., 2015).

This study assigned forty-six eighth grade students randomly to either a metacognitive instruction and training group or a control group of problem-solving practice. They looked to study if students from the metacognitive group acquired knowledge and skills about metacognition and if those skills improved their learning of the target instructional content as well as new material (Zepeda et al., 2015). Zepeda et al. (2015) found that metacognitive training can improve both cognitive and motivational aspects of learning and demonstrated how metacognition can impact transfer of information in near, far, and future learning.

Concerning metacognition, they found that students in the experimental group demonstrated greater declarative knowledge in being able to plan, monitor, and evaluate their learning, which was assessed through responses to multiple-choice and open-ended questions (Zepeda et al., 2015).

Furthermore, one of the more interesting pieces of the study had to do with motivation, and how students perceived tasks differently after they had been introduced to metacognition. Zepeda et al. (2015) argued that students receiving the metacognition intervention reported greater task value and increased self-

efficacy values from students. A more impactful part of this study has to do with students learning and knowledge transfer. Although the control group attempted practice problems for a longer period of time than the group receiving metacognitive training the metacognitive group showed greater understanding of the physics content that was being covered because it optimized student learning by making small amounts of practice more effective and relevant for students.

Zepeda et al. (2015) found this result impressive because it highlighted that metacognitive training could promote deeper learning and understanding of content than just assigning additional practice problems to students. This study highlights how teaching metacognition can encourage students to be active within their learning environment through increased motivation and deeper understanding of content. Furthermore, this study showed that teaching metacognition can help students see the value within school or completing different tasks because they will have a better understanding of how it can be helpful to them in the future.

The previous study highlighted how teaching metacognition can be beneficial to eight grade students, now the question comes to mind can it be just as beneficial for high school and adult learners? Yanqun (2019) wanted to show the significance and instruction of metacognition and how it could be impactful for adults who are continuing their education.

Yanqun (2019) argued that understanding and employing metacognition could be extremely valuable to adult learners because adult learners have a complexity of roles and responsibilities to handle that metacognitive strategies can help them tackle more easily. Furthermore, most adult learners only have limited time that they can dedicate to schoolwork requiring them to make the most of their time and energy which could possibly be increased through metacognitive strategies. This study had several interesting findings concerning how metacognition can affect self-efficacy, motivation, and different learning strategies for adult learners.

Firstly, Yanqun (2019) states that previous studies on metacognition and self-efficacy show that self-efficacy stimulates the development of metacognition, but this study shows that self-efficacy and metacognition are interactive. This implies that metacognition could also promote a learner's self-efficacy by helping the learner develop a more complete learning experience, as well as increasing reflective practices that drive the learner to evaluate their learning strategies and make adjustments when needed (Yanqun, 2019).

Furthermore, this study highlighted the correlation of metacognition to intrinsic motivation compared to metacognition and external motivation. Yanqun (2019) found that the correlation between metacognition and intrinsic motivation was greater than metacognition and extrinsic motivation which showed that

increasing metacognition enhancements helped guide students to pleasant learning experiences with positive results because they saw a greater value and pleasure to learning.

Overall, Yanqun (2019) concludes that with the continuous development of technology students and adult learners are continually dealing with ever occurring problems which can be stressful and overwhelming at times.

This is why Yanqun (2019) argues that metacognition is important for adult learners because metacognition takes all relevant factors of learning into consideration to make full use of one's time, energy, ability, and resources to optimize their learning experience.

UNDERSTANDING METACOGNITION

Now what is the next step? Both of the previously covered studies provide evidence that metacognition can be beneficial for both young learners and adult students but how can teachers successfully instill metacognition and encourage metacognition within their environment? The first step is for educators to have a basic understanding of what metacognition entails, both metacognitive knowledge and metacognitive regulation, and how to effectively implement metacognitive strategies. In a study to examine teachers understanding of metacognition and their pedagogical understanding of how to teach metacognition.

Wilson and Bai (2010) argued that the teachers understandings metacognition appeared to be related to their perceptions of the instructional approaches that helped the students become metacognitive. In other words, the teachers own understanding was directly related to what they viewed as successful for their students. Wilson and Bai (2010) recommended that teachers receive more professional development classes and teacher education programs so that they can gain a deeper understanding of multiple instructional routines that can be successful in improving student's metacognition. In another study to examine pre-service elementary teachers understanding of metacognition and its pedagogies one participant was concerned that thinking about thinking would confuse elementary students (Ozturk, 2016).

What the pre-service educator did not understand was that the Theory of the Mind starts to develop around ages 3-5, while metamemory and metacognitive skills emerge around ages 8-10, so while metacognition, or thinking about thinking can be a difficult concept, students already have the skills necessary to be successful (Ozturk, 2016). Providing some examples of how to help pre-service teachers increase their understanding of metacognition Ozturk (2016) states that teachers should be given opportunities to observe experts teaching for metacognition. Furthermore, teachers need a multitude of opportunities to

demonstrate their understanding of metacognition and how they can successfully teach for metacognition, as well as continually reflecting on their teaching practices (Ozturk, 2016).

Teachers should also look to guidance from other faculty so they can become aware of their own metacognition and also notice their own strengths and weaknesses in teaching metacognition before trying to teach it in the classroom (Ozturk, 2016). Overall, teachers cannot effectively teach what they do not understand, so if teachers do not have a great understanding of metacognition then it will be difficult to portray that effectively to students.

IMPLEMENTING AND EVALUATING METACOGNITION

After teachers have an understanding of metacognition the next step is implementing that understanding to help and encourage students to grow their own metacognitive processes. Veenman (2006) states that the vast majority of students spontaneously develop some metacognitive knowledge and skills to differing degrees from their parents, peers, and teacher, but students who grow up in favorable positions receive more opportunities to acquire metacognitive knowledge or skills. This leaves a large group that cannot spontaneously acquire metacognitive skills because they were not afforded the opportunity or did not see the relevance in the activity (Veenman, 2006).

Veenman (2006) recommends three principles from the literature for successful metacognitive instruction: a) embedding metacognitive instruction in the content matter to ensure connectivity, b) informing learners about the usefulness of metacognitive activities to make them exert the initial extra effort, and c) prolonged training to guarantee the smooth and maintained application of the metacognitive activity. In short, teachers should make the activity and content meaningful and relevant for the students, teachers should explain to students how metacognition can benefit them in and out of the classroom, and lastly give students time to practice so they can use that knowledge or skill in the future on a similar or different task.

There are certain activities that teachers can employ that are designed to help teachers and students alike with understanding and fully utilizing metacognition. Tanner (2012) explains several differing approaches such as: preassessments, the muddiest point, reflective journals, and retrospective post-assessments to help explicitly teach students metacognitive strategies. Preassessments, according to Tanner (2012), help encourage students to examine their current thinking, and helps educators understand how students think about a topic before it is introduced and covered in class.

The muddiest point is a great way of giving students practice in identifying what they are most confused about and allows the teacher an opportunity to see what was most challenging for their students. Furthermore, Tanner (2012) explains that the regular use of the muddiest point within classrooms can help students understand that confusion is a continuous part of learning and encourages students not to get discouraged but capitalize on their confusion.

Reflective journals help provide students a forum where they can monitor their own learning and allows teacher to explicitly give students a strategy to deepen their own metacognition (Tanner, 2012).

Lastly, retrospective post-assessments challenge students to analyze how they thought about a concept before learning it and how they think about the concept after learning it.

Tanner (2012) explains that using retrospective post-assessments is designed to challenge students to examine how their thinking changed when presented with new information to help students understand how to utilize self-questioning. Tanner (2012) explains how to use each of these approaches within a science classroom, but Perry et al. (2019) argue that there is sufficient evidence to show that metacognitive strategies can be useful within any classroom environment and age group. Furthermore, Perry et al. (2019) state that metacognition is a human characteristic that allows people to solve novel or old problems in new or different contexts. This is one of the main reasons that metacognitive strategies are gaining more and more traction is because the skills that metacognition employ can be useful and relevant to students long after they are finished with their basic education.

Overall, as Perry et al. (2019) explain metacognition can have significantly positive effects for students especially when a cross-curricular approach towards metacognition is applied across a school-system or curriculum. Understanding metacognition can be difficult for teachers and students alike, but once teachers understand the value and benefits behind metacognitive practices, they can potentially make a larger impact on their students' lives. The use of metacognition is not limited to one subject or area but can be utilized effectively across multiple classrooms to help students deepen their own understandings and approaches to their learning (Perry et al., 2019).

Furthermore, Sternberg (1998) argues that what is truly important for students now is knowledge that they can use across multiple environments or scenarios.

Students need knowledge that they can use to help solve problems they will face in the real world rather than static knowledge that students only use to pass rote-recall assignments (Sternberg, 1998).

CONCLUSION

In conclusion, this paper was aimed to examine the value of utilizing metacognition within a variety of classrooms. For metacognition to be successful there must first be an understanding of what metacognition entails. As Livingston (2003) described metacognition is commonly referred to as “thinking about thinking” but as John Favell explained there are two main constituents to metacognition which are metacognitive knowledge and metacognitive regulation. Metacognitive knowledge is comprised of three subtypes: person knowledge, task knowledge, and strategy knowledge. Teachers will be unsuccessful trying to implement metacognitive strategies without fully understanding how what composes metacognitive knowledge. The second constituent of metacognition is metacognitive regulation which is also composed of three subgroups which are: planning, monitoring, and evaluating.

Again, metacognition cannot be effective without a basic understanding of how it can be viable for students through metacognitive knowledge and metacognitive regulation. There were several studies presented within this paper that helped provide evidence for the effectiveness and usefulness of using metacognition within differing classroom environments. The first study analyzed if eighth grade students who were introduced to declarative and procedural components of planning, monitoring, and evaluation could increase their metacognition, motivation, learning, and preparation for future classes (Zepeda et al., 2015).

They found that the students who received metacognitive training reported greater task value, which means the students saw more value in their classroom activities after they understood more about planning, monitoring, and evaluating their own learning (Zepeda et al., 2015).

Furthermore, Zepeda et al. (2015) found that students who received metacognitive training were able to transfer their knowledge easier because the metacognitive approach optimized student learning by making a small amount of practice more effective and relevant to the students learning. Another study presented in this paper was aimed to show how teaching metacognition could be useful for adult learners. Yanqun (2019) argued that metacognition is important for adult learners because metacognition takes all relevant factors of learning into consideration to make full use of one’s time, energy, ability, and resources to optimize their learning experience. Both of these studies provided evidence about how and why metacognition can be effective for students of any age. But, for teachers to be able to implement metacognition successfully then they first need to fully understand what metacognition can entail. As Wilson and Bai (2010) explain one of the first ways that teachers can better understand metacognitive strategies

is by attending more professional developments courses or educational classes to further their understanding of metacognition.

Furthermore, Ozturk (2016) argues that teachers, especially pre-service teachers, should be given an opportunity to observe expert teachers utilizing metacognitive strategies. After teachers gain a better understanding of how to use metacognition Tanner (2012) provided several examples like, preassessments, the muddiest point, and reflective journals that teachers could utilize to explicitly teach or introduce students to metacognition. While all of the approaches that Tanner (2012) provided were used within a science classroom Perry et al. (2019) argue that metacognitive strategies are not limited to one classroom or subject but can be utilized cross-curriculum.

Overall, the main emphasis and benefit of metacognition boil down to Sternberg's (1998) assessment in that we want to provide students with knowledge they can utilize in the future to help them solve novel or old problems rather than continuing to instill constant rote-recall assignments and tests.

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