METACOGNITION AND THE BETTER LEARNERS' PERFORMANCE IN THE LEARNING

Sounantha PHAVADEE[1]

ABSTRACT

This article aims at reviewing the related literature of metacognition toward the learning performance of students, as well as the models and concepts which scholars commonly choose for the project of a thesis or the journal article for publication. The focusing points in terms of metacognition of the learners are planning, monitoring, and self-regulated learning. The aims of this study is a) to review the concepts and model of metacognition; b) to find out whether metacognition can develop learners' performance in their learning or not; c) to seek for how is the metacognition can support on problem-solving and critical thinking of the learners; and d) to ascertain on the relationship of the mindfulness and metacognition. In the point of view emphasis in three aspects such as metacognitive knowledge, metacognitive monitoring, and metacognitive control. Moreover, to review how metacognition develops the self-regulated learning of the learners, and there is self-reflection plays a significant role between self-regulated learning and metacognition. Additionally, the review of metacognition in the teacher has been focused on in terms of teacher professionals. In any of the reviewing of the research, a good result in the academic achievement of the students has found after instruction on metacognition.

KEYWORDS

Metacognition, self-regulated learning, problem-solving, critical thinking, self-reflection, mindfulness, teacher professionals

INTRODUCTION

In this modern-day, the education trend needs the cognitive development skill as the priority for the learner, that related to critical thinking, innovative learning, the use of reasoning into problem-solving and the responsibility skill. All the things mentioned are the necessary for the real-life careers that are the need of all kind occupations. In another meaning is about the today world trend of lifelong learning, which is the common necessary and it's the today global trend that requests the large numbers of educational institutions should consider in their curriculum, as well as the metacognitive skill, self-regulated learning and social interaction. In the study of Özden Demir and Ahmet Doğanay about the study of preservice teacher education in lifelong learning tendency into metacognition, self-regulation, and social intelligence variables (Demir & Doğanay, Volume 15 Number 5, 2019).

In the words of the great ancient philosopher Socrates "I know that I know nothing", this is shown the ability of the human in the process of the human knowledge in terms of metacognition from the feature of the human know by our own that what we don't know. And Confucius words which quite close to Socrates "When you know a thing, to hold that you know it; and when you do not know a thing, to allow that you do not know it - that is knowledge" (Hacker, Dunlosky, & Graesser, 2009), this is called the confidence knowledge of

---

[1] PhD Student in Adult Learning Program, PPK, Eötvös Loránd University; sounanthabesss@gmail.com; sounantha@caesar.elte.hu

one own self, to know what we don't know and know what we know and this is the form of metacognition. The metacognition term has known since the earlier 20th century by the group of psychologists, for instance, John Dewey, William James, Lev Vygotsky, Jean Piaget, and it finally terminated in the 1970s (Quirk & Flavell, 2006), nonetheless, John Flavell started to use the metacognition term again in the same years or we can say that he is earnestly the starter researching on metacognition while he was inclined by Jean Piaget on his publication the book named The Developmental Psychology of Jean Piaget (John, 1963), and modified the concept more specific in the research term especially focuses on cognitive activity. More concepts are represented by many of the researchers in many terms which consist of the self-management, meta-learning and meta-components (Raoofi, Swee, Mukundan, & Rashid, 2014).

Education exists together with the existence of the human, the cause is when human exist on the earth, the most important thing is learning to know what is around, and the learning is through the senses, understanding, remembering, and applying. The education certainly changes from time to time which depends upon the environment, society, and the needs in the current situation. Presently, education is not the only goal for the qualification or degree for the learners but it's very important to produce the human resources to be ready in the workforce and promote education as lifelong learning. This is clearly shown that, education is for life and career. To build that, the first priority for consideration relates to teachers and learners. Therefore, the metacognition will be focused here, that is to understand how is important into the development of the teaching and learning process.

PURPOSES OF THE STUDY
- To review the concepts and model of metacognition.
- To find out whether metacognition can develop learners' performance in their learning or not.
- To seek for how the metacognition can support on problem-solving and critical thinking of the learners; and
- To ascertain on the relationship of the mindfulness and metacognition.

METHODOLOGY
This article is the reviewing of the literature from different scholars in different areas of their studies during the five-year back of their work for the project include the thesis and the articles, it's approximately fifteen to twenty works have been reviewed. There also includes the books and the documents in the finding of the theories and the concepts. In the work of this article is going to mention how important of metacognition skill in lifelong learning especially in terms of problem-solving and critical thinking, it's also important to see how metacognition correlates to the mindfulness of the students. And the study will emphasize three aspects such as metacognitive knowledge, metacognitive monitoring, and metacognitive control.

METACOGNITION: DEFINITION, CONCEPTS AND MODEL
In the word Metacognition came from the combination of Greek and Latin which 'Meta' means 'Beyond', it's from Greek, and 'Cognoscere' is Latin word means 'getting to know' (InnerDrive, 2020). Wherefore, metacognition is the ability to know what we have known, or we haven't known. In the first introduction of metacognition from John H. Flavell in his article in 1976, he gave the cognomen of metacognition as a high-level cognition and he defined is as "one's knowledge concerning one's own cognitive processes and outcomes or anything related to them" (Flavell, 1976) Metacognition is the ability of the individuals to work in the task(s) by planning, monitoring and evaluating.

Metacognition is not only thinking about thinking, but another big part of metacognition is about actively monitoring and receive the strategies from the result of what one has monitored his/her own self then can make the changes in the best way (team, 2020). Similarity, thinking about thinking is the ability of individual beyond the thinking, it's about understanding, analysing, and controlling in the cognitive process. The metacognition helps in developing various skills that are applicable to the students' life until their future occupation when students understand themselves and know their learning process.

There are 4 historical roots in the concept of metacognition according to Brown and his colleagues (1983) namely issue of verbal reports as data, notion of executive control, self-regulation, and regulation which it transfers of control from others to self (Hacker, Dunlosky, & Graesser, 2009). The issue of the verbal report as data always come in the type of questions to find the answer that means to solve those things like how reliable are the people's report of their thinking process? How we can make what we have known are clear or how do we know in what we have known is the right thing? Or how can we explain that clear or right thing to others and relate with what we understand? The notion of executive control relates to the model of information processes like planning, monitoring, evaluating, and revising. Self-regulation emphasizes on the process of active learners that learner can adjust or change their learning activities directly and continuously which depend upon their needs and suits to them. And the regulation which it transfers of control from others to self, this root relates to the social contexts according to Vygotsky's theory about social interaction in the development of the cognitive process, in the context of social transformative to the intrapersonal through the experience.

PROBLEM-SOLVING, CRITICAL THINKING AND METACOGNITION

Problem-solving is the process of finding any way to solve any solution which is happening during in the difficult situation or for any kind of issue that one is facing. It consists of many components which depends upon the issues or the problems, for instance, when you think about the problem of the waste are more increased day by day especially the plastic; in this case, the needs of creativity and divergent thinking are important as well as how to reduce the plastic use, what else can be replaced the plastic or how to reuse it. In other components, problem-solving requires convergent, domain-specific knowledge, deductive reasoning and practicing. According to Anderson, 1985 the behaviour is demanded in any solution of the problem to lead weather can reach to goal or not. Metacognition is the instruction in the human cognitive process toward the problem-solving process of individual, therefore, the ability of problem-solving in any individual depends on the metacognition (Metcalfe & Shimamura, 1996). In the work of Melanie Guzman Gurat (Gurat, 2018) under the title the mathematical problem-solving strategies of student teachers, the involvement of metacognition strategies in problem-solving are critical-thinking and self-regulation. Apart from that, other strategies have found include planning, monitoring, and evaluation. The study shown that, the student teachers who has metacognition strategies like organizing, critical thinking, collaborating can be assessed as achieving in solving problem of their tasks in learning. Furthermore, many researchers have found the positive relationship of metacognition and problem-solving (Kozikoğlu, 2019)

Critical thinking is the way of thinking thoughtfully before the judgement of what is the right or wrong, correct or incorrect by reasonably analyze and logic. Critical thinking includes three main skills such as curiosity, scepticism, and humility (Study.com, 2014). Someone who has critical thinking skill can be able to handle his or her thinking about somethings in certain way and can find the proper way of solving any issue. In the work of researchers have found out there is also the positive relationship in metacognition and critical thinking as well as the work

of Buku and his colleagues (2016) have found out the correlation between metacognition and critical thinking of students of class X and class X1 for their work at state senior high school 8 in Malang, Indonesia (Buku, Corebima, & Rohman , 2016); in the work of Marheny and colleagues (2019) have found strong positive relationship between these two component, the students have the more habitual in analysis critically in their task help them develop the metacognition skill and the higher metacognition ability the more improvement of critical thinking skill (Lukitasari, Hasan, & Murtafiah, 2019).

To sum up on critical thinking and problem-solving are the crucial skills needed in the students to enhance their learning and academic achievement. Moreover, these abilities are requirement skills in the career and life. The students who have high in metacognition strategies can be able to handle on their tasks, and can help them in organizing, thinking critically, collaboration and solve the problems, then they can achieve the goal of their study and lifegoals.

METACOGNITION AND MINDFULNESS

The mindfulness derived from the Pali language word that is used in Theravada Buddhism called 'Sati' which means the consciousness of mind. According to Brown and Ryan (2003) worked and their support this term that mindfulness is a state of consciousness spontaneously (Brown & Ryan, 2003). There are many researchers such as Langer and Moldoveanu in 2000; Bodner & Langer in 2001 gave the definition of mindfulness as similar to 'wakefulness' to the work of active cognitive operation in Langer's formulation (Brown & Ryan, 2003). Basically, the concept of mindfulness is mainly in both formal and informal meditation practically (Pirson, Langer, Bodner, & Zilcha, 2012). By individual can practice the mindfulness and there are many advantages to get from it, because its role covers both body and mind which mindfulness concerns with the health and well-being (Jankowski & Holas , 2014). In the review work from Jankowski and Holas (2014) at the same time, they have found that, mindfulness is the conceptualized of metacognition (Jankowski & Holas , 2014). Under the work from Sanger and Dorjee (2016) for their work on mindfulness training with adolescent enhances metacognition and the inhibition of irrelevant stimuli; and they've found that, the school-based mindfulness curriculum can increase the old-adolescent in terms of inhibition skill of attention and perceived mental capacity in the task-relevant, which the inhibition skill is one element skill in self-control. Through this competency, it can help in the students' learning and academic performance (Sanger & Dorjee, 2016).

To conclude, the mindfulness is conceptualized of metacognition, during one is sitting for meditation it can help in stay focus and while metacognition is working on thinking of something, for example, may think about worrying, stressed or reflection on any task and when you have realized how much you are over-controlled about anything the self-controlling in metacognition can bringing it back, while the mindfulness is working on stay focusing. Which the mindfulness relates specifically in self-control and the best result of practicing mindfulness enhances learners' learning and academic performance.

SELF-REGULATED LEARNING

The policy-makers have considered the self-regulated learning is the most important part of the research work of educational psychology that relates to achieve the goal for the students, and the training about metacognition skill in the students will help students get more in self-regulated learning (Harskamp & Henry, 2009). There are many components within self-regulated learning, the majors are cognitive, metacognitive, behavior, motivation and emotion (Panadero, 2017). There are many models of self-regulated learning have been encountered and developed time to time from many researchers includes Zimmerman, Pintrich, Winne and Hadwin, and many more. In here some models are going to mentioned.

A social-cognitive perspective of self-regulated learning from Zimmerman, his work firstly started from the area of cognitive which emphasized on social-cognitive, the learner can learn from the interaction of the social around. The Zimmerman amplified into three models: Triadic model, cyclical phases model, and multi-level model.

1. Triadic model: This is for the self-regulated learning analysis into 3 forms interact to self-regulated learning like environment, behaviour and person level (Figure 1) according to Zimmerman, 1989 (Panadero, 2017) through his collaboration with Bandura and used the Bandura's Triadic model of social-cognition and explained the way of self-regulated learning in terms of this model.
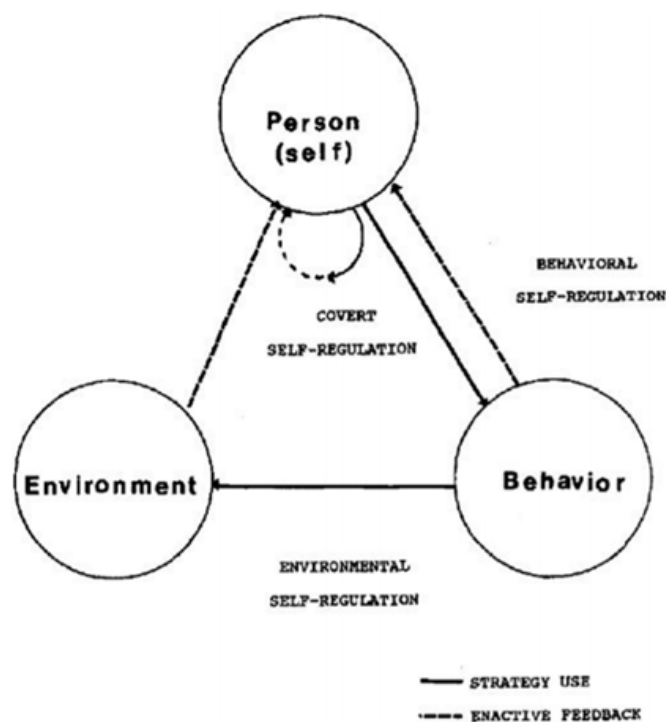

Figure 1: Triadic analysis model of self-regulated learning

2. Cyclical phases model (Figure 2): well-known as Zimmerman's model, which emphasizes on the metacognition and motivational interrelatedness processes. This model includes 3 phases such as forethought, performance and self-reflection. In the first phase, it's for the beginning for the learner to make a plan or set the goal. So that, the self-motivation beliefs have been influenced on this phase, it shows how much self-efficacy in the individual, what are their outcome expectation, what is their interest and how can the reach the goal. The second phase performance focuses on the monitoring on the progress. And the last phase for self-reflection is to see the result of what the task learners have been done by seeing how they have been performed toward the task, is it acceptable or should change to be better, if it was in the negative how to be fixed.
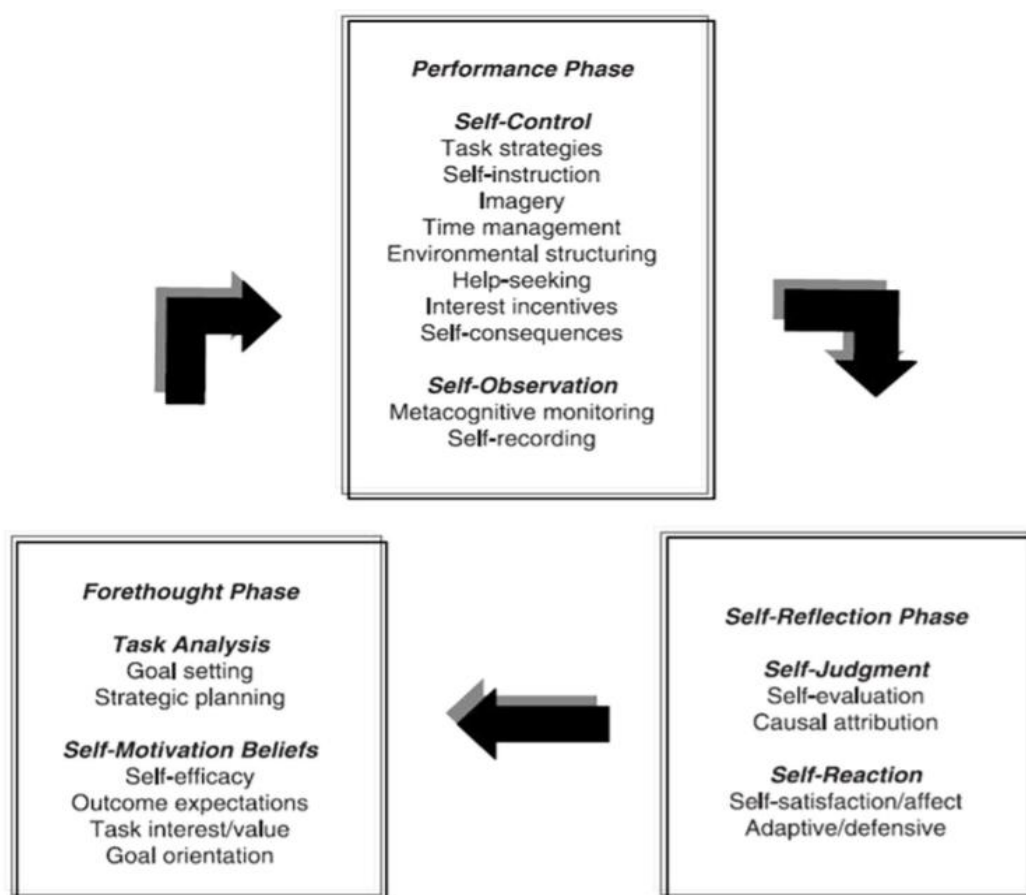
Figure 2: Cyclical Phases Model

3. Multi-level model: Consists of four stages of the learner to achieve in self-regulated learning of the learners' accomplishment in this model, there are observation, emulation, self-control, and self-regulation (Table 1).

Self-regulated learning is a new term after metacognition and self-regulation (Mannion, 2020), it's the application of both metacognition and self-regulation, while self-regulation concerns about the environment interaction as well as keeping monitoring and controlling how behaviour and emotion work, and metacognition is dealing with monitoring and controlling the process of thought. All things considered, they aim at helping the learners to have better learning by planning, monitoring, and evaluating strategies. Because of self-regulated learning is the application of metacognition, both are working for and with each other, so, self-regulated learning divided into three components such as cognition, metacognition and motivation (Foundation, 2016).

Table 1: Multi-level model

Level	Name	Description
1	Observation	Vicarious induction of a skill from a proficient model
2	Emulation	Imitative performance of the general pattern or style of a model's skill with social assistance
3	Self-control	Independent display of the model's skill under structured conditions
4	Self-regulation	Adaptive use of skill across changing personal and environmental conditions

CONCLUSION

Metacognition encourages the students' capability to develop their diverse strategies of learning, to help them in understanding themselves what are the needs and interests, what is the strength and weakness, and what should be improved, changed, or develop to reach the goal. It can point out the right way for students to walk through and develop growth mindset, build confident and enhance the academic performance together with the behaviour performance which it's well required in not only in the educational institution but in the global levels from workplaces and society. The institutions-based curriculum is necessary to include the metacognition strategies that can help in promoting the quality and efficiency of teaching-learning process, which it certainly to get satisfactory effectiveness for both teacher and learner.

REFERENCES

[1] BROWN, K. W., & RYAN, R. M. (2003). The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. *Personality and Social Psychology*. https://doi.org/10.1037/0022-3514.84.4.822

[2] BUKU, M. N., COREBIMA, A. D., & ROHMAN, F. (2016). The correlation between metacognitive skills and the critical thinking skills of the senior high school students in biology learning through the implementation of problem based learning (PBL) in Malang, Indonesia. *International Journal of Academic Research and Development* .

[3] DEMIR, Ö., & DOĞANAY, A. (Volume 15 Number 5, 2019). An Investigation of Metacognition, Self-Regulation and Social Intelligence Scales' Level of Predicting Pre-Service Teachers' Lifelong Learning Trends. *International Journal of Progressive Education, .* https://doi.org/10.29329/ijpe.2019.212.10

[4] FLAVELL, J. H. (1976). *Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), The nature of intelligence (pp. 231-235).* Hillsdale, NJ: Lawrence Erlbaum Associates.

[5] FOUNDATION, T. E. (2016). *Metacognition and self-regulation*. Retrieved from https://www.summaedu.org/: https://www.summaedu.org/meta-cognition-and-self-regulation/?lang=en#:~:text=Self%2Dregulated%20learning%20can%20be,our%20metacognitive%20and%20cognitive%20skills.

[6] GURAT, M. G. (2018). Mathematical problem-solving strategies among student teachers. *Efficiency and Responsibility in Education and Science, Vol. 11, No. 3, pp. 53-64.*

[7] HACKER, D. J., DUNLOSKY, J., & GRAESSER, A. C. (2009). *The Handbook of Metacognition in Education.* New York: Routledge. https://doi.org/10.4324/9780203876428

[8] HARSKAMP, E. G., & HENRY, D. (2009). Introduction to this special issue. *Routledge: Educational Research and Evaluation.* https://doi.org/10.1080/13803610903444469

[9]   INNERDRIVE. (2020). How to improve metacognition in the classroom. Retrieved from https://blog.innerdrive.co.uk/: https://www.innerdrive.co.uk/improve-metacognition/#

[10] JANKOWSKI, T., & HOLAS, P. (2014). Consciousness and Cognition: Metacognitive model of mindfulness. *Elsevier*.

[11] JOHN, F. H. (1963). *The Developmental Psychology of Jean Piaget*. New York, N.Y. 10001: D. Van Nostram! Company. https://doi.org/10.1037/11449-000

[12] KOZIKOĞLU, İ. (2019). Investigating Critical Thinking in Prospective Teachers: Metacognitive Skills, Problem Solving Skills and Academic Self-Efficacy. *Journal of Social Studies Education Research*.

[13] LUKITASARI, M., HASAN, R., & MURTAFIAH, W. (2019). Using critical analysis to develop metacognitive ability and critical thinking skills in biology. *JPBI (Jurnal Pendidikan Biologi Indonesia)*. https://doi.org/10.22219/jpbi.v5i1.7262

[14] MANNION, J. (2020). Metacognition, self-regulation and self-regulated learning: What's the difference? *Impact*. Retrieved from https://impact.chartered.college/article/metacognition-self-regulation-regulated-learning-difference/

METCALFE, J., & SHIMAMURA, A. P. (1996). *Metacognition: Knowing about knowing.*   London: "A Bradford Book" Massachusetts Institute of Technology.
https://doi.org/10.7551/mitpress/4561.001.0001

[15] PANADERO, E. (2017). A review of self-regulated learning: six models and four directions for research. *Frontiers in Psychology*.   https://doi.org/10.3389/fpsyg.2017.00422

[16] PIRSON, M., LANGER, E., BODNER, T., & ZILCHA, S. (2012). The Development and Validation of the Langer Mindfulness Scale - enabling a socio-cognitive perspective of mindfulness in organizational contexts. https://doi.org/10.2139/ssrn.2158921

[17] QUIRK, M., & FLAVELL, J. (2006). *Intuition and Metacognition in Medical Education: Keys to Developing Expertise*. New York, NY 10036: Springer Publishing Company, Inc.

[18] RAOOFI, S., S. H., MUKUNDAN, J., & RASHID, S. M. (2014). Metacognition and Second/Foreign Language Learning. https://doi.org/10.5539/elt.v7n1p36

[19] *RESNICK, L. B. & UNIVERSITY OF PITTSBURGH. Learning Research and Development Center (1976). The nature of intelligence.* Lawrence Erlbaum Associates ; New York : distributed by Halsted Press Division of J. Wiley, Hillsdale, N.J. (n.d.).

[20] SANGER, K. L., & DORJEE, D. (2016). Mindfulness training with adolescents enhances metacognitionand the inhibition of irrelevant stimuli: Evidence from event-relatedbrain potentials. *Elsevier: Trends in Neuroscience and Education*. https://doi.org/10.1016/j.tine.2016.01.001

[21] Study.com. (2014, December 23). *What is Critical Thinking? - Definition, Skills & Meaning*. Retrieved from https://study.com/: Retrieved from https://study.com/academy/lesson/what-is-critical-thinking-definition-skills-meaning.html

[22] TEAM, C. I. (2020). *Getting started with Metacognition*. Retrieved from https://cambridge-community.org.uk: https://cambridge-community.org.uk/professional-development/gswmeta/index.html#:~:text=Metacognition%20is%20simply%20'thinking%20about,strategies%20based%20on%20this%20monitoring.