The Potential Benefits of a Metacognition-Based Platform for Guiding Projects in Educational Practicum and Industrial Internship Programs

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Abstract. Vocational education becomes a bridge for students between their school life and working life. The programs of this education are designed for equipping students with competencies that will be beneficial for their future careers. This makes the cooperation between industries or the world of work with this educational type inevitable to be done because of its high importance. Educational practicum and industrial internship gives real-life work experiences for the students to be ready to work after school life. This paper aims to discuss theoretically the potential benefits of developing and implementing a platform based on metacognition in practicum and internship programs, especially in project forms. The discussion will be divided into two general topics, which are what a metacognition-based platform is and what the potential benefits of the platform are. Generally, metacognition is cognition about cognition or thinking about thinking. A platform that utilizes this issue as the basis of the development could stimulate students to think about what they are thinking. This eventually makes them aware of their learning progress. If the metacognitive strategies were implemented in the educational activities, it would encourage students to have learn-how-to-learn skills. These skills are essential for today's working life since many challenges force individuals to conduct effective sustainable learning. The discussion about those two important topics related to a platform as a projects' guide in educational practicum and industrial internship programs would be elaborated on in this paper.

Keywords: Vocational Education · Educational Media · and Technology · Metacognition-Based Platform · Educational Projects · Internship Programs

1 Introduction

Many challenges exist nowadays that particularly will affect the educational sector for preparing their students to be able to survive facing those challenges. The industrial revolution, for instance, is one of the existing challenges nowadays that has changed how people live, work, and learn [1]. By having those changes, the educational sectors need to introduce appropriate teaching and learning activities for students by conducting many innovations. The innovations should meet the students' needs and the desired

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learning outcomes. The challenges force everyone to conduct sustainable learning for being able to survive in working life [2]. This activity needs to be done by individuals for conducting continuous learning during their career life.

One of the challenges that nowadays is facing toward educational sectors is the corona pandemic. This forces educational sectors to conduct online learning leaving doing face-to-face classroom meetings [3–6]. This is mainly because online education is needed to reduce offline meetings among students then it eventually could reduce the spread of the coronavirus. By having online education, at the beginning of the pandemic, many students felt that such an educational type could not be done effectively for achieving the desired learning outcomes since there were many obstacles students faced [7–9]. Therefore, educational practitioners should improve the quality of their educational programs so that the desired learning outcomes that students need to master could be achieved through an online learning mechanism.

A kind of educational type that focuses on preparing students for being able to work in particular job fields after graduating is vocational education [10–12]. This education facilitates students from school life to working life [13]. This makes the effort of improving the quality of this educational type is necessary. This is because this educational type plays an important role in improving the quality and the competitiveness of human resources, particularly in working life. Moreover, vocational education has a contribution to the growth of the national economy [14–19]. Thus, raising the standard of vocational education could have a number of positive implications on both its students and the country's economy.

Preparing qualified future vocational teachers is one thing that might be done to raise the caliber of vocational education. The reason behind this is that the teachers have significant roles and also become key figures in education [20, 21]. They could help students in improving their learning achievements [22–26]. By having good achievements, it could be declared that the students have mastered desired competencies. Additionally, not only for conducting teaching and learning activities, but the teachers should also conduct administrative tasks [27]. In the end, improving the caliber of teachers in the field of vocational education may have a substantial impact on raising the standard of that education.

Vocational teacher education is an educational institution that has an objective for having educational programs for preparing prospective vocational teachers. This educational type, teacher education, focuses on two elements which are mastering the subject matter and mastering the way how to teach that matter [28]. Therefore, the students of this education need to be equipped with competencies in both vocational and educational fields depending on their department. For being able to equip the students with both competencies in the real world context, there are two programs which are industrial internship and educational teaching practicum. The former has an objective for being able to equip students with vocational competencies and the latter has an objective for equipping the students with real-world teaching experiences. Both activities are important for students to be able to become qualified prospective vocational teachers.

During those programs, students will have many opportunities to learn many things in real-world situations. Firstly, they could learn the science and technology development in workplaces that they could not find those in classroom activities. Secondly, they

could learn how to become a part of workplace systems that forces them to be a good worker. Thirdly, could develop skills needed by the workplace. Also, they could learn the culture, communication style, and collaboration style in the workplace both in industrial or educational places. Therefore, those programs need to be implemented effectively for being able to prepare qualified prospective vocational teachers.

Technology integration could be one of the measures to help educational practitioners for maximizing the effectiveness of every educational program for students [29, 30]. By integrating this technology, students are expected to be helped for mastering particular competencies during teaching and learning processes including during the programs of industrial internship and educational practicum. This is mainly because those programs give students many opportunities of learning something new in the real world. Therefore, it is beneficial to have a platform of educational media and technology to help students during learning something new in the real-world situation.

Learn-how-to-learn skill is one of the essential skills for conducting sustainable learning [31, 32]. Metacognition, in this context, has a tight relationship with this kind of skill. This is because metacognition has a role in guiding individuals during mastering learn-how-to-learn skills [33–39]. Ultimately, integrating metacognitive strategies in educational media and technology is expected to be a beneficial effort in helping students during sustainable learning. The discussion about the potential benefits of integrating metacognition strategies into specific programs which are industrial internship dan educational practicum will be discussed as follows.

2 Discussion

In this section, two topics which are the definition of metacognition and its potential benefits will be discussed. The first topic will elaborate on the definition, characteristics, and also strategies of mastering metacognition skills. Based on the discussion in the first topic, the potential benefits of metacognition integration in industrial internships and educational practicum will be discussed in the following section.

2.1 What the Metacognition Is

Metacognition was first introduced by Flavel in 1979 that has a definition as cognitive about cognitive phenomena [40]. This could be meant as the cognitive ability toward the cognitive process. Metacognition is generally understood to be the act of thinking about one's own thinking [41–46]. Based on this explanation, it could be concluded that someone who has an ability of metacognition means he or she could monitor his or her thinking processes during learning activities so that they could examine how well he or she is in learning processes. Therefore, when people could master the ability of metacognition, they could conduct learning effectively since they always monitor their thinking and learning progress.

Comprehensively, in many studies about metacognitive projects, metacognition is also called as learn-how-to-learn [34–36, 38, 39]. Metacognition utilizes prior knowledge to consider the plan and the effective strategies for learning and evaluate those based on several considerations [47]. Based on the term of learn-how-to-learn, this

makes metacognition has significant effects on the effectiveness of learning activities and achieving learning achievements eventually. Many studies have proven that metacognition has high significance for achieving high learning achievements [48–51]. Individuals that have a skill of learn-how-to learn, could conduct learning effectively because they know the ways how they learn best. Therefore, metacognition has a role in guiding individuals to be able to conduct learning effectively particularly for being able to learn something new.

According to various pieces of literature, knowledge of cognition and management of cognition are the two theoretically distinct aspects of metacognition. Both dimensions are complementary [52] and together build metacognitive skills eventually [53–57]. The former refers to knowing about someone's thinking while the latter refers to guiding someone's thinking [58]. Therefore, knowing about cognition and guiding cognition are the core of the ability of metacognition that needs to be elaborated in detail toward the practical issue in an educational context.

On the one hand, as mentioned above, knowledge about cognition refers to knowing about someone's thinking. This knowledge consists of three main components which are declarative knowledge, procedural knowledge, and conditional knowledge [58–63]. Firstly, declarative knowledge is knowledge about a person as a learner and several factors that affect learning performance. Secondly, procedural knowledge is knowledge about strategy for dealing with the task or the problem-solving. Thirdly, conditional knowledge is knowledge about when and why during task working or problem-solving. Therefore, knowledge about cognition consists of knowledge about a person as a learner, learning performance factors, learning strategies, when and why of using cognitive strategies during task working or problem-solving.

On the other hand, regulation of cognition refers to the process of regulating cognitive processes during learning activities. This consists of three iterative steps which are planning, monitoring, and evaluating activities [58, 60–62]. Firstly, the planning step focuses on the analysis of the given task, the analysis of strengths and weaknesses during task working, and also the analysis of strategies that need to be done for doing the task. This step will guide individuals as fundamental consideration during task working. Secondly, the monitoring step is done when doing the task. This step has an objective for monitoring whether the strategy is effective or needs to be changed, whether the time for dealing with the task is still available or has been over, and also whether the target has been achieved or not. Thirdly, the evaluation step forces individuals to consider whether the task has been done completely, whether the criteria have been met, whether the strategy during task working works effectively, and also whether we have found the better strategy to solve the task. By having this step, individuals could get learning experiences, and eventually, they could use those experiences in the next following tasks so that they will do the task effectively (Fig. 1).

Knowledge about cognition and regulation of cognition build a metacognitive process. This process could be adapted in educational settings [45]. Therefore, in the implementation of metacognition into educational settings, declarative knowledge, procedural knowledge, conditional knowledge, planning step, monitoring step, and evaluation step need to be accommodated in teaching and learning activities. Detailly, based on this explanation, metacognition in educational settings consist of several activities which are

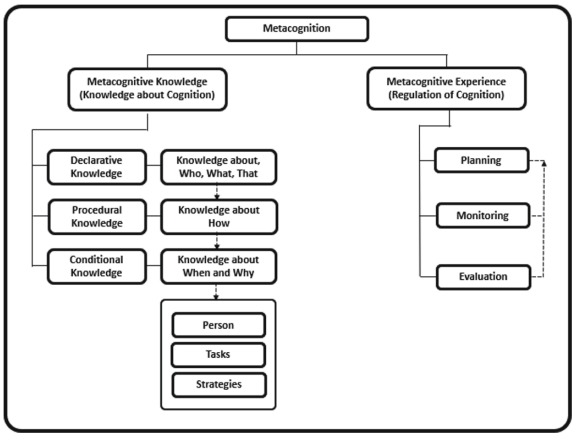

Fig. 1. The components of Metacognition

knowing what the task and the learner, knowing how to deal with the task, knowing when and why about the strategy of task working, analyzing the task, analyzing self strengths and weaknesses, analyzing strategies, monitoring the progress during task working, monitoring the effectiveness of the strategies that might need to be changed during task working, evaluating the task achievement, and finally finding the best strategy to deal with the task.

2.2 What the Benefits from Metacognition Are

Industrial internships and educational practicum have various programs or activities in them. A student who is doing an industrial internship needs to do some jobs in a workplace that sometimes the jobs are something new for the student beyond what he or she found in the classroom. Therefore, he or she needs to deal with those jobs by doing learning effectively in workplace contexts. Similarly, a student who is having an educational practicum needs to conduct teaching and learning activities in a school environment. He or she needs to deliver learning materials for students in schools. During this activity, he or she will meet many new things and many new experiences so that they need to learn many things during the program effectively. Therefore, those two programs have the same characteristic which students need to learn many new things and need to deal with many real-world tasks.

Based on the explanation above, a metacognition concept that has been discussed in the previous section could be possible to be brought into those programs. Students need to be helped during learning and task working in those real-world situations. The Metacognition concept, in this case, has high relevance to be used for helping students. Students would be compelled to study methodically and successfully by understanding of cognition and control of cognition processes by engaging in learning activities based on metacognition processes. They need to know about the task, themselves, and strategies during task working. Moreover, they need to plan, monitor, and evaluate the learning progress during the task working. Eventually, they could deal with many challenges

that they face during those real-world programs particularly during learning many new things.

A digital learning platform could be a choice to integrate the metacognition concept into educational settings. This platform could be developed based on several metacognition activities that need to be done in learning processes. Many activities in the metacognition concept need to be accommodated into that platform for helping students during their learning in industrial internships and educational practicum. This is mainly because those programs would have many tasks that need to be done. By having metacognition processes during the task working, the students will be guided for analyzing the task, their strengths, and weaknesses, the strategies, monitoring the progress, and also evaluating the task result into getting the better strategy to deal with that kind of task. By doing the metacognition processes, students would get used to learning something new systematically and effectively so that this is expected to be a beneficial ability for doing effective sustainable learning in their future working life.

Several metacognition processes or learning activities that could be integrated into the platform could be divided into seven stages. Firstly, it could be named as initializing stage. This stage consists of analyzing the task and analyzing self-strengths and weaknesses. Secondly, there is a planning stage. In this stage, students need to conduct needs analysis such as needed competencies, needed strategies, and also needed resources that they need to deal with the task. Moreover, in this stage, the need to make a schedule for dealing with the task. Thirdly, the stage name is finding resources. This stage consists of three steps which are collecting, reviewing, and summarizing resources that are needed to deal with the task. Fourthly, the task working stage is needed after completing the previous stages. This stage consists of 2 steps which are doing the task and evaluating the progress during task working. Fifthly, there is a monitoring stage which consists of peer assessment and self-assessment activities. This stage has an objective to monitor task achievement so that students could make revisions as necessary. Sixthly, the stage of refinement is necessary which consists of finding new resources and conducting revisions. Finally, the stage of evaluation and reflection is needed to evaluate the learning achievement and reflect learning experiences that might be useful for further learning (Fig. 2).

3 Conclusion

Knowing about cognition and controlling cognition together make up metacognition, which is the act of thinking about thinking. Those elements build several activities called metacognition processes. These processes could be integrated into teaching and learning processes particularly in an industrial internship and educational practicum in this context. By integrating them, students will be helped during those programs, and eventually, they could learn many new things and deal with some tasks effectively. This ability is necessary especially in their future work career since they need to conduct sustainable learning effectively.

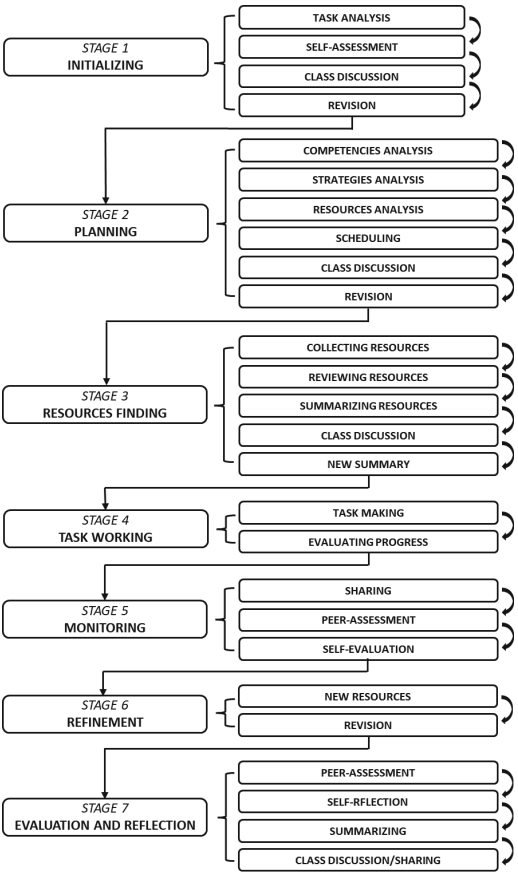

Fig. 2. The Learning Activities of Metacognition Concept

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