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Metacognition Analysis of 7th Grade Students Junior High School After Applying Li-Pro-GP Learning Design

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Abstract: Students' metacognitive abilities develop from the knowledge they have and the management of that knowledge. Knowledge management will lead to students' strategies and skills in solving problems and higher-order thinking skills. The students' metacognitive skills play a major role in activities involving cognitive abilities such as understanding, communicating, paying attention, remembering, and solving problems. This research was aimed to find out the metacognitive skill of 7th grade students of Junior High School 23 Malang after applying Li-Pro-GP (*literasi berbasis proyek terintegrasi GLS dan PPK*: Li-Pro-GP) Learning Design. This is a descriptive qualitative research. It takes time from August to October 2021. This research was carried out at Junior High School 23 Malang. The population were 7th grade students and the sample were students of class VII.2 and VII.4. The research procedures included; 1) compiling MAI questionnaires to measure metacognitive ability in the form of short questions using likert scale (1-4), 2) giving students an instrument via Google Form before and after giving the Li-Pro-GP learning model. The instrument used to collect data was MAI (Metacognitive Awareness Inventory) from Schraw and Dennison. The method used to collect data is giving questionnaires to students. Data analysis technique was using Independent T test. The results of this study indicated that students' metacognitive abilities increased after the implementation of Li-Pro-GP learning model (sig 0.000 < 0.05). Apart from the research results obtained, further research can apply Li-Pro-GP model to teach other materials.

Keywords: Learning Model; Li-Pro-GP; Metacognitive Awareness Inventory; Science Literacy; Strengthening Character Education

Introduction

Metacognitive knowledge is knowledge about self's strengths and weaknesses and how to use them in learning technical, detailed, specific, contextual and conditional complex knowledge regarding science, technology, art, and culture related to society (Kemendikbud, 2016). Metacognition can be described as a skill where students can recognize themselves as students and are able to overcome their weaknesses or shortcomings in the learning process (Wardana et al., 2020). Metacognitive skills possessed by students play a major role in activities involving cognitive abilities such as understanding, communication, attention, memory and problem solving skills. Metacognitive ability is one's knowledge of one's cognitive system, one's thinking about one's thinking and one's essential skills in learning to learn (Sophianingtyas & Sugiarto, 2013; Sumampouw, 2011). Metacognitive ability is directly related to students' thinking ability. However, it should be noted that the metacognitive ability or thinking ability of each student is always different.

The research result of Rizkiani & Septian (2019) stated that Metacognitive abilities of students in Indonesia were at the level of cannot really (students were not able to separate what they think and how to think) and level of at risk (students did not seem to have awareness of thinking as a process). This related closely to students' level of literacy and scientific literacy. Good literacy skills will affect the development of each individual's thinking ability. The results of the survey at the international level showed that the literacy ability of

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the Indonesian people is still low. The study result of Programme for International Student Assessment (PISA) 2018, which released on Tuesday, December 3, 2019, showed that Indonesia's PISA ranking in 2018 has decreased when compared to the 2015 PISA results. Of the 79 countries that participated in the PISA assessment, Indonesia ranked 74th in the reading category, 73rd in the reading category, and 71st in the science category (Tohir, 2019).

In the 21st century, metacognitive ability becomes a parameter that needs to optimize in learning. According to Nurhayati et al. (2017) stated that metacognitive ability is included in the part of planning, monitoring, and evaluating the learning process. In addition, metacognitive abilities can arise from students' awareness in using their thinking processes to plan, consider, control, and evaluate the cognitive process they possess. This is in line with Panggayuh (2017) conveyed that metacognitive abilities help students to be responsible for their own learning progress and adapt their learning strategies to achieve task demands. Metacognition abilities which include students awareness of thought processes and self-regulation abilities which play an important role for students strong and thorough understanding (Anggo, 2011).

The observation results in 7th grade of Junior High School 23 Malang showed that students tend to be less active or interact in learning, and shy in expressing opinions. This is important to pay attention to and become homework for educators or teachers. If it is left unchecked, this will have an impact on habits, ways of thinking, and student learning outcomes. These problems cannot be fully directed to one side, namely from the students. Many aspects need to consider. In terms of educators, namely teachers, good teaching and learning strategies are also an important factor and become one of the solutions in problem solving. Thus, innovative learning strategies that can direct students to think in problem solving processes, familiarize students with improving reading, science and technology literacy are needed.

Li-Pro-GP learning model is a project-based learning model which is combined with School Literacy Movement (SLM) in integrated manner, which direct students in solving a problem and requiring students to be literate in reading, science, and IT. Li-Pro-GP is a project-based learning model that is integrated in an integrated manner with SLM dan Strengthening Character Education (SCE) (Pantiwati et al., 2020). SLM is an effort that aims to foster a culture of reading and writing to create lifelong learning. On the other side, SCE is an activity in schools that aims to foster residual character by aligning it in terms of kinaesthetic (movement), aesthetic (heart), ethics (courtesy) and literacy (thought pattern). The working principles of the Li-Pro-GP learning process are 1) Problem Recognition, 2) Planning Design, 3) Scheduling, 4) Implementation and Monitoring, 5) Results Testing, 6) Evaluation and Reflection. These steps are supported by the integration of the three stages of SLM, namely literacy strategies, graphic organizers, media and learning resources, and academic and non-academic assessments. While the integrated SCE is in the form of aspects of integrity, religion, nationalism, mutual cooperation, and independence (Pantiwati et al., 2020).

Based on the explanation of the theory and facts above, it can be understood that metacognitive ability is an important ability for students in learning activities. Metacognitive abilities can help students make the right, careful, systematic, logical, and consider decisions from various perspectives (Suryaningtyas & Setyaningrum, 2020). In this case the teacher needs to provide opportunities for students to practice metacognitive abilities. Metacognitive abilities are easier to empower when applied to a learning model (Pantiwati et al., 2022). The purpose of this study was to analyze the metacognitive abilities of seventh grade students of Junior High School 23 Malang after using the Li-Pro-GP learning model.

Method

This is a descriptive research. It uses one-group pre-post-test research design. This research was done in Junior High School 23 Malang, taking time from September to October, 2021. The population of this study is the 7th grade of junior high school students at Junior High School 23 Malang. The sample of this research is students in class VII.2 and VII.4.

Table 1. Metacognitive Knowledge Components

Item	Number of questions
Declarative knowledge	3 questions
Procedural knowledge	4 questions
Conditional knowledge	4 questions
Planing	8 questions
Information management strategies	8 questions
Monitoring	6 questions
Debugging strategies	3 questions
Evaluating	4 questions

Source: Adapted from Asy'ari et al. (2018); Schraw & Dennison (1994)

The data was obtained by applying steps in procedure: (1) Preparing a questionnaire in the form of short questions with an assessment using likert scale (1-4). (2) Giving MAI (Metacognitive Awareness Inventory) instruments to students via google form (Pre). (3) Learning the topic of Mixed Compound Elements using Li-Pro-GP. (4). Giving MAI instruments to students via google form (Post). The data collection instrument used is MAI from Schraw & Dennison (1994). The researcher obtain data by giving a questionnaire to students.

Independent T Test is a technique for analyzing data. The MAI instrument developed contains components of metacognitive knowledge and metacognitive awareness. Each indicator is developed into a number of questions from the 40 questions provided (Table 1).

Result and Discussion

The number of questions in MAI instrument used in this research are 40 questions. From 40 questions adapted from Schraw and Dennison (1994), there are 8 indicators. Those are declarative knowledge which consists of 3 questions, procedural knowledge which consists of 4 questions, conditional knowledge which consists of 4 questions, planning which consists of 8 questions, information management strategies which consists of 8 questions, monitoring which consists of 6 questions, consisting of 3 questions, and evaluating which consists of 4 questions (Asy'ari et al., 2018). The results of the average percentage of students' answer to MAI questions are presented in Figures 1 and 2.

There were 29 students of grade 7.2 who became sample in the study. Of the 29 students who filled out the MAI questionnaire, there were several average percentages in each indicator. In the first indicator, declarative knowledge, 9% of students answered strongly agree, 19% of students answered agree, 3% of students answered somewhat disagree, and 1% of students answered disagree. The second indicator is procedural knowledge, where 8% of students answered strongly agree, 20% of students answered agree, 5% of students answered somewhat disagree, and 1% of students answered disagree. The third indicator is conditional knowledge, where 3% of students answered strongly agree, 21% of students answered agree, 7% of students answered somewhat disagree, and 2% of students answered disagree. The fourth indicator is planning, where 8% of students answered strongly agree, 16% of students answered agree, 7% of students answered somewhat disagree, and 2% of students answered disagree.

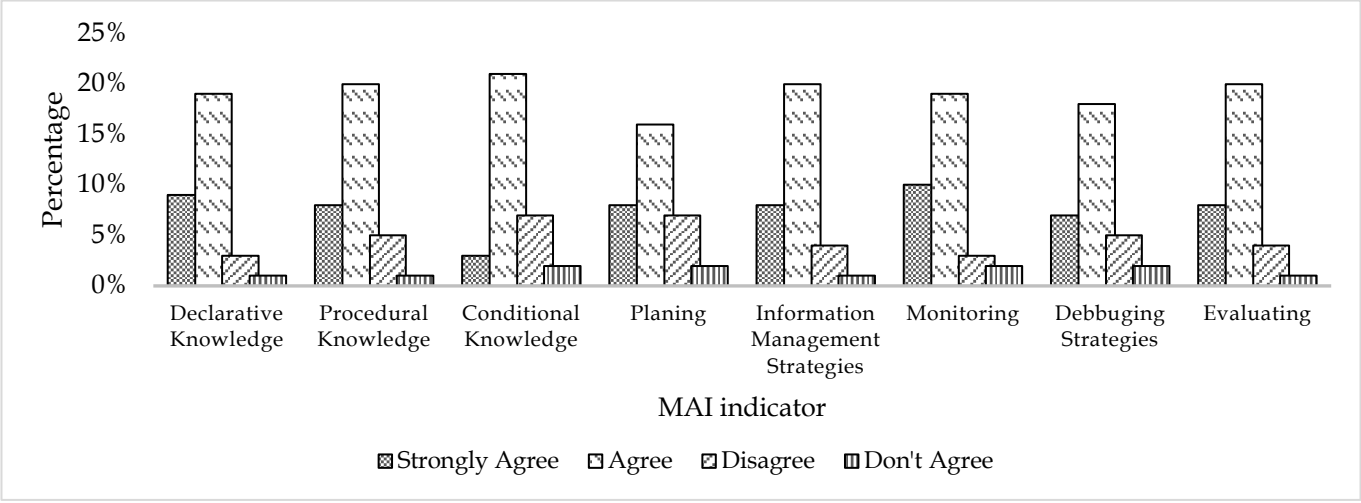

Figure 1. Average Percentage of MAI Components of Class 7.2

The fifth indicator is information management, where there are 8% of students answered strongly agree, 20% of students answered agree, 4% of students answered somewhat disagree, and 1% of students answered disagree. The sixth indicator is monitoring, where 10% of students answered strongly agree, 19% of students answered agree, 3% of students answered somewhat disagree, and 2% of students answered disagree. The seventh indicator is action strategy, where 7% of students answered strongly agree, 18% of students answered agree, 5% of students answered somewhat disagree, and 2% of students answered disagree. The eight indicator is evaluation, where 8% of students answered strongly agree, 20% of students answered agree, 4% of students answered somewhat disagree, and 1% of students answered disagree.

Declarative knowledge relates to one's knowledge or insight and knowledge about the learning process and the factors that affect the learning process (Sugiharto et al., 2018). Procedural knowledge relates to knowledge about strategies that can be used to solve problems related to learning activities that grow along with the ability to apply cognitive skills (Zoupidis et al., 2016). Conditional knowledge is awareness of how, when, and where to use certain strategies (Sugiharto et al., 2018).

Information management strategies refer to specific strategies used by students to help them solve problems more effectively (Taasoobshirazi & Farley, 2013). Planning is the ability to plan learning activities. Monitoring is the ability to monitor the learning process and things related to the process. Debugging strategies are strategies used to correct wrong actions in learning. Evaluating is the ability to evaluate the effectiveness of

the learning strategy, whether to change the strategy, give in to the situation, or end the activity (Izzati & Mahmudi, 2018).

There were 29 students of grade 7.4 who became sample in the study (Figure 2). Of the 33 students who filled out the MAI questionnaire, there were several average percentages in each indicator. In the first indicator, declarative knowledge, there are 14% of students answered strongly agree, 13% of students answered agree, 1% of students answered somewhat disagree, and 1% answered disagree. The second indicator was procedural knowledge, where 8% of students answered strongly agree, 16% of students answered agree, 5% of students answered somewhat disagree, and 1% answered disagree. The third indicator was conditional knowledge, where 5% of students answered strongly agree, 15% of students answered agree, 7% of students answered somewhat disagree, and 3% of students answered disagree. The fourth indicator was planning, where 5% of students answered strongly agree, 16% of students answered agree, 6% of students answered somewhat disagree, and 2% of students answered disagree.

The fifth indicator was information management, where 8% of students answered strongly agree, 17% students answered agree, 4% students answered somewhat disagree, and 1% students answered disagree. The sixth indicator was monitoring, where 7% of students answered strongly agree, 17% of students answered agree, 4% of students answered somewhat disagree, and 1% of students answered disagree. The seventh indicator was the strategy of action, where 6% of students answered strongly agree, 16% of students answered agree, 6% of students answered somewhat disagree, and 1% of students answered disagree. The eighth indicator was the evaluation, where 6% of students answered strongly agree, 19% of students answered agree, 4% of students answered somewhat disagree, and 1% of students answered disagree.

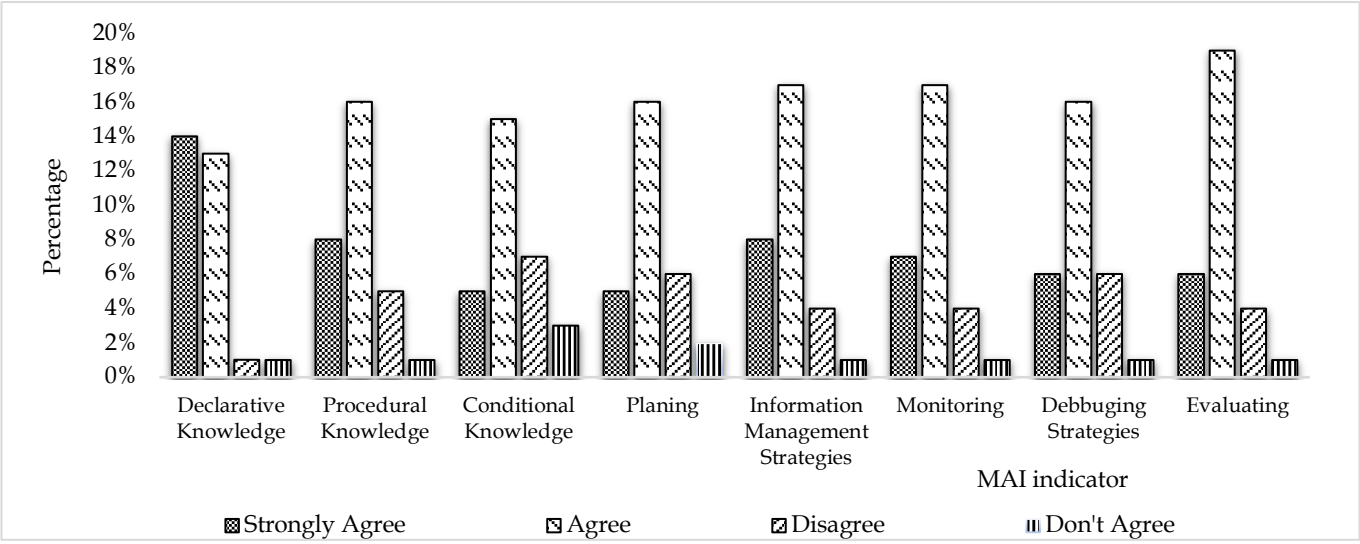

Figure 2. Average Percentage of MAI Components of Class 7.4

The test results were continued with a T-test and the results showed that there was an increase in students' metacognitive abilities after the LI-Pro-GP learning model was carried out. The summary of statistical tests is presented in Table 2.

The test results show a sig value of 0.00 <0.05. Since the sig value is smaller than the probability, it can be said that there is a significant difference between the two data groups (Hamsia, 2022). Based on statistical tests, it was found that there was an increase in students' metacognitive abilities after giving the LI-Pro-GP learning model (sig 0.00 <0.05). In general, metacognitive knowledge consists of 3 components, namely declarative knowledge, procedural knowledge, and conditional knowledge, and experience or metacognitive rules (Wardana et al., 2020). In this study, the MAI questionnaire used was adapted from Schraw & Dennison (1994) with eight indicators, namely declarative knowledge, procedural knowledge, conditional knowledge, planning, information management, monitoring, action strategies, and evaluation (Asy'ari et al., 2018).

Table 2. Summary of T-test

Levene's test for equality of variances						T-test for equality of means	
	F	Sig.	t	df	Sig. (2-tailed)	Mean	SD
Equal variances assumed	6.59	0.01	-4.05	34	0.00	-16.83	4.15
Equal variances not assumed			-4.05	22.67	0.00	-16.83	4.15

Students' metacognition can be developed through a number of steps in learning activities (Abdullah & Soemantri, 2018). The Li-Pro-GP learning model is a project-based literacy learning model integrated with SLM and SCE. The learning model was developed with the project learning model syntax, as a step for learning activities (Pantiwati et al., 2020). Project-based learning is given to students in learning through group assignments. The implementation of project-based learning is prioritized for implementation in the 21st century era. Project learning is an innovative learning designed for fairly complex problems. Thus, in this case, students can conduct investigations to understand and emphasize multidisciplinary learning and assignments (Zekri et al., 2020). According to Adinugraha (2018), Project learning has several advantages, such as improving learning outcomes and motivation, encouraging creativity and independence in producing a product, providing experiences in building their own knowledge, improving communication skills, and making them able to solve problems and emotional intelligence.

There is a relationship between project-based learning models with metacognitive abilities, critical thinking, and the ability to think. The research results done by Rahmawati & Haryani (2015) can be written if the involvement of students in the PjBL-based learning process increases so that it affects the increase in students' understanding and metacognitive levels. The application of the project-learning model allows students to control their learning process and organize their thinking in solving a problem, so that the project-learning model can improve students' metacognitive abilities. (Desimah et al., 2019). The similar research findings were also obtained by Rumahlatu & Sangur (2019), that the application of project-based learning strategies can improve metacognitive skills.

The research also integrates literacy activities in project learning syntax, namely problem recognition, planning design, scheduling, implementation and monitoring, testing results, evaluation and reflection. Literacy interest has a relationship with metacognitive ability. Students' metacognitive abilities can be achieved through science activities (Sukowati & Rusilowati, 2016). This is in accordance with the results of the study done by Setiawan & Dores (2019), that there is a significant relationship between metacognitive skills and literacy because literacy can improve predicting, planning, monitoring, and evaluation skills. Literacy has the benefit of being able to improve skills so that students are able to receive information and process it well, and are able to convey it verbally (Chasovy & Asrizal, 2019). This is supported by Chasovy & Asrizal (2019), that Scientific literacy is related to the understanding of science and the process of its application in life.

Research results done by Fajar & Putri (2020) found that the experimental class which has high scientific literacy has a high effect on metacognitive ability. This shows that there is a relationship between students' scientific literacy abilities and metacognitive abilities (Sukowati & Rusilowati, 2016). The Li-Pro-GP learning model is a project-based literacy-learning model integrated with SLM and SCE.

In addition to scientific literacy, the Li-Pro-GP learning model is also integrated with student character-building activities. Through the Li-Pro learning model, it is hoped that students are not only good and smart, but also have good character (Pantiwati et al., 2020; Sari et al., 2021). SCE is the process of forming, transforming, transmitting, and developing the potential of students to think well, have a good heart, and behave well according to the philosophy of life. Children's character can be formed naturally and by the environment (Khalamah, 2017). Schools develop character education processes through learning processes, habituation, extra-curricular activities, and collaboration with families and communities in their development (Komara, 2018).

Model Li-Pro-GP improve students' creativity, learning which in its syntax contains project-based learning that encourages students to be more critical and creative. This is in accordance with the results of the study done by Mulhayatiah (2015). Project-based learning can improve students' creative thinking skills. Project-based learning has a number of advantages; (1) increasing students' learning motivation; (2) improving problem solving ability; (3) making students more active; (4) enhancing collaboration: (5) letting learners to develop and practice communication skills; and (6) improving managing resources (Anita, 2017; Nurfitriyanti, 2016).

Conclusion

The Li-Pro-GP learning model is a project-based literacy-learning model that is integrated with SLM and SCE. The learning model developed with the project learning model syntax is a step in project learning activities. There was an increase in students metacognitive abilities after the application of the LI-Pro-GP learning model.

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