



Independent Curriculum PPG Mathematics Students' Thinking Concepts in View of Metacognitive Skills: Case Study in Indonesia

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Abstract. This case study needs to be carried out because knowledge about personal thinking awareness of the ability to solve problems can support the percentage of success in achieving goals. The learning evaluation by Polya and several problem-solving figures has not touched on the metacognitive skills of teaching profession students. Professional Teacher Education (PPG) in 2023 will be based on Lesson Study which refers to the Merdeka Belajar curriculum so that it becomes a solution in answering Indonesia's education problems. This research aims to look at the thinking concepts of PPG students in the lesson study-based independent curriculum. The research we have carried out in identifying knowledge about personal thinking awareness towards the ability to solve problems is called metacognitive, namely, providing initial information that the results of an activity can be predicted earlier. In further research to deepen metacognition using the method of formulating four metacognitive skills, namely prediction skills, planning skills, monitoring skills, and evaluation skills. The data collection method is through: 1) Selection of research targets including: students, professional teaching students, and teachers as observers; 2) Learning through implementing Lesson Study; 3) Metacognitive skills instrument; 4) Data analyst; and 5) Formulation of research conclusions. The results of this research: 1) Metacognitive skills at the prediction stage are still weak; 2) Metacognitive skills in the planning stage are visible; 3) The metacognitive skills of the monitoring stage of the two subjects show different steps, namely subject-1 with a normative flow, but subject-2 leads to a process that is already underway even though this is still in the Plan stage; and 4) The metacognitive skills in the evaluating stage are visible but their application is wrong because everyone thinks in Do, even though this is still in the Plan stage.

Keywords: Metacognitive Skills; PPG; Lesson Study; Independent Curriculum

1 Introduction

Curriculum changes that continue to grow following the growth of technology require an increase in teacher competency [1]. Increasing teacher competency can be done through workshops, training, seminars and the like, this will encourage growth in the

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quality of education. The quality of education is closely tied to the curriculum, because the curriculum is a journey of implementing learning activities which includes planning, organizing, implementing and evaluating so that educational programs can run well according to the stated objectives [2]. Quality improvement can be done by evaluating ongoing learning whether the results of the learning are in accordance with the objectives or not, this is used as information on the level of target achievement [3]. Evaluation carried out in learning can provide information on which parts that needs to be fixed, so scale problem priority will appeared and immediately handled [4]. Activities that need to be carried out in evaluation activities must include aspects of remembering, understanding, applying, analyzing, evaluating and creating [5]. These six cognitive aspects provide an illustration of how much students understand in participating in learning.

The above thinking study needs to be carried out because knowledge about awareness of personal thinking regarding the ability to solve problems can increase the percentage of success in solving a problem or an activity [6]. Many figures have carried out learning evaluations, such as Polya, in solving problems using four types of activities, namely, understanding, planning, solving and checking again [7]. Other research has emerged but there have been no researchers who have tried to research metacognitive skills on students pursuing the teaching profession. The teaching profession has an important role in education in the process, especially in positions or jobs that require expertise [8]. A profession must demonstrate behavior in accordance with permitted norms. The teaching profession cannot be held by just anyone, because teachers are role models for students. A teacher is said to be professional if he has identified as a Pancasilaist figure, a teacher who can become a role model, a teacher who is competent in accordance with his field, and a teacher who likes to develop his abilities or is a lifelong learner. The teaching profession requires preparation through education and training specifically in educating students, in accordance with the regulations of the educator law in Law no. 14 of 2005 concerning teachers and lecturers. On this occasion, Teacher Professional Education in 2023 is based on Lesson Study, where it is hoped that Teacher Professional Education students can discover new things in Field Experience Practice (PPL) because there are three activities in lesson study, namely Plan, Do, and See, which are all requires observation and review [9]. The implementation of Lesson Study-based PPG refers to the Merdeka Belajar curriculum which is currently the latest curriculum growth which requires adapting the concept of the Merdeka Belajar curriculum which was initiated by the Indonesian Minister of Education Nadiem Makarim with the hope that it can be a solution in answering Indonesian education problems [10].

This research aims to look at the thinking concepts of Teacher Professional Education students in the independent curriculum in terms of metacognitive skills, where the learning process with lesson study is in accordance with the learning strategies in the LMS (Learning Management System) used in Teacher Professional Education. The research we have carried out in identifying knowledge about personal thinking awareness towards the ability to solve problems, which is called metacognitive, provides initial information that the results of an activity can be predicted earlier. In further research to deepen metacognitive skills, we formulated four metacognitive skills, namely prediction skills, planning skills, monitoring skills, and evaluation skills [11].

This research is continuous research from previous research which wanted to see proof of the accuracy of the predicted results, whether they were in line with expectations. Apart from involving research members, this research also involved several teachers, teaching professional students, mathematics education students, and students. The data search model utilizes lesson study. The lesson study learning process is a very effective lesson in exploring data, because the Do stage is the stage of collecting data from information provided by observers [12], which can be an initial diagnostic for making predictions for implementing subsequent learning activities. This is part of metacognitive skills [13]. The data collected analyzed in this research is initial data during teacher preparation, namely at the Plan stage, because the researcher wants to see in detail each stage of the lesson study.

Problem solving in this research uses a basic problem-solving approach based on the background and problem formulation with several stages, namely: 1) Preparing metacognitive skills instruments; 2) Learning is carried out by implementing lesson study; 3) Data collection is taken during the plan, namely during learning preparation; and 4) Research targets include: students, students of the teaching profession. Previous similar research still focuses on the implementation of lesson study to improve teacher competence [14–16], and there are still many researchers who discuss the influence of metacognition on problem solving, increasing learning motivation [17–20]. This research emphasizes the researcher's curiosity about PPG students' metacognition towards the PPG program at the learning preparation stage in Plan lesson study in the Merdeka Belajar curriculum.

2 Method

2.1 Approach and Subject Study

The research approach used to achieve the objectives of this research is qualitative research, namely: 1) focusing on process, understanding and meaning; 2) the researcher is the main instrument in data collection and analysis; 3) the research process takes place inductively; and 4) presenting data in descriptive form [21]. The characteristics of the qualitative approach of this research are as follows: 1) the research design is natural. The data source is the lesson study model teacher who has prepared the material to be taught, there is no special treatment to the research subjects before being interviewed ; 2) the main instrument in this research is the researcher, who acts as an interviewer ; 3) this research places more emphasis on "what is thought" and "why that is what is thought" by the research subjects rather than the product they produce ; 4) the data collected from this research is in the form of information provided by the research subjects, in the form of metacognitive skills material presented.

The subjects in this research are lesson study model teachers, who are capable and who prepare themselves. Subject selection was carried out through Plan meeting activities as the first step in lesson study where the meeting members were: all researchers, all PPG students, and all observers from teachers involved in the school research place.

2.2 Implementation and Instruments Data collection

This research was conducted in a school in Wonogiri Regency, data was collected through observation, writing and interviews conducted with research subjects through lesson study model teachers. The instruments in this research are divided into two, namely the main instrument is the researcher and the supporting instrument is the interview guide [22].

2.3 Data analysis technique

The data analysis technique in this research was carried out using an interactive model [23] (Fig. 1). Implementation of data analysis starts from the data collection process and continues continuously at each stage of the research until completion. Miles proposed three stages of data analysis, namely, data condensation, data presentation, and verification [24]. In verification, researchers carry out five specific stages, namely: 1) Examining data from observations, subject answers and interviews; 2) Condensing data through: selecting, focusing, simplifying, abstracting and transforming data; 3) Data presentation is directed so that the data resulting from reduction is organized, arranged in a relationship pattern, so that it will be easier to understand; 4) Data interpretation is carried out by interpreting the data that has been obtained; and 5) drawing conclusions based on findings from data analysis results [21].

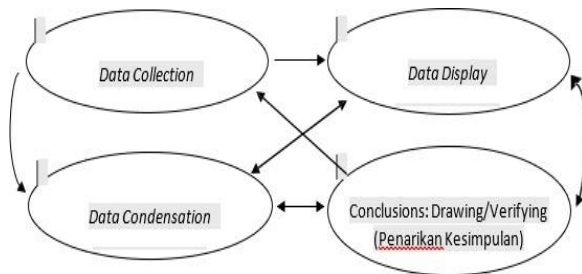


Fig. 1. Components Interactive Model Data Analysis

3 Results and Discussion

3.1 Results

The subjects in this research were lesson study model teachers, subject selection was carried out through Plan meeting activities as the first step in lesson study where the members of the meeting were all researchers, all PPG students at PPL-2 totaling 6 students under the guidance of 37 students, and all observers from teachers involved in the research school. Data were collected through observations, written answers, and interviews conducted with research subjects, namely lesson study model teachers, along with data on selected research subjects based on the results of the plan between the

researcher, all PPG students in PPL-2 in the second semester under the guidance of the researcher, and all observers from teachers involved in the research school (Table 1).

Table 1. Research subject

No.	Name	Code
1	Mira Swasti	S1
2	Ida Nur Istiqomah	S2

The instruments in this research are divided into two, namely the main instrument and supporting instruments. The main instrument in this research is the researcher himself and the supporting instrument is the interview guide. The instruments in this research are depicted in Table 2.

Table 2. Research Instrument

No	Metacognitive Skills	Indicator	Code
1	Prediction Skills	1. Understand and know the readiness of solutions to selected problems.	KPrP1
		2. Prepare learning tools.	KPrP2
2	Planning Skills	1. Determine the goal of solving the problem.	KPcP1
		2. Plan the implementation of learning.	KPcP2
3	Monitoring Skills	1. Determine the stages of problem solving.	KMP1
		2. Check the correctness of the problem solving steps.	KMP2
4	Evaluation Skills	1. Review the completeness of the documents that will be used for teaching.	KEP1
		2. Evaluate the correctness of the learning objectives.	KEP2

The answers to both subjects will be displayed on Table 3 below:

Table 3. Answer Subject Study

No	Code	S1	S2
	KPrP1	1. Saya memprediksi masalah ya adalah dengan cara observasi dahulu, Observasi pada saat Pembelajaran dan kolaborasi wali kelas yang bersangkutan	Masalah yang muncul saat melakukan Plan (Perencanaan) adalah letak yang berdekatan dengan jalan raya. Sehingga saat melakukan proses di kelas sedikit terganggu dan menjadikan proses pembelajaran lu

1	<p>2. Perangkat saya susun tentunya setelah memahami masalah & limbud dalam kelas tersebut. dengan cara menyiapkan pera Pembelajaran seperti RPP /m ajar, media, serta model /st pembelajaran yang cocok untu terapkan dalam kelas terseb</p>	<p>b. Perangkat untuk mendukung agar pelaksanaan pembelajaran dengan baik adalah dengan menyusun perangkat pembelajaran ajar, media pembelajaran. LkPd dan soal evaluasi. Selain itu harus dipersiapkan sebagai pendukung proses pembelajaran yaitu Laptop dan sound / pengeras suara.</p>
2	<p>1. Tentunya dalam merumuskan tujuan pembelajaran, mengacu masalah yang di temukan. Agar mengarah pada media pembelajaran yang di gunakan, maka dalam pembelajaran fokus pada media di gunakan guna meningkatkan pembelajaran.</p>	<p>a. Menentukan tujuan penyelesaian masalah dengan cara melakukan proses pembelajaran. Kemudian melakukan rencana tindak lanjut pelajaran selanjutnya yang disesuaikan dengan karakteristik dan k didik sehingga dapat tercapai tujuan pembelajaran dengan baik.</p>
	<p>2. Untuk mencapai tujuan tentunya saya berkolaborasi dengan gur kelas & guru pamong, agar tujuan pembelajaran yang saya rancang berjalan sesuai dengan apa yang diharapkan.</p>	<p>b. Rencana untuk mencapai tujuan yang diharapkan dengan cara noan pembelajaran yang disesuaikan dengan karakteristik dan peserta didik, menyusun bahan ajar, LKPD, media pembelajaran pembelajaran. Dengan adanya perencanaan tersebut sehingga diharapkan dapat terpenuhi dengan maksimal dan proses pembelajaran terlaksana dengan baik.</p>
3	<p>1. Yang pertama tentunya koordinasi dengan guru kelas dan guru yang pastinya sudah paham & bagaimana kondisi dan faral siswa di kelas tersebut. Apabila di temukan solusinya, maka yang dilakukan adalah dengan memilih perangkat pembelajaran, media dan model pembelajaran yang dengan kondisi dan kemampu</p>	<p>3 a. Cara menetapkan tahapan penyelesaian masalah adalah dengan media pembelajaran dan kalimat pemantik, dari situah peserta menyelesaikan sebuah permasalahan dalam proses pembelajaran memberikan kesempatan peserta didik berpikir kritis</p>

	<p>KMP 2</p> <p>2. Setelah saya menyelesaikan yang saya siapkan, saya berhasi lagi dengan guru kelas guru pamong, apakah langkah yang saya lakukan sudah atau belum, jika sudah tinggal praktikkan dalam kelas.</p>	<p>b. Cara mengecek kebenaran langkah penyelesaian masalah dan melakukan evaluasi dari proses pembelajaran yang sudah diambil lembar merahnya untuk dijadikan rencana tindak proses pembelajaran selanjutnya.</p>
<p>4</p>	<p>KEP1</p> <p>1. Ya. Cuna memastikan perencanaan pembelajaran yang saya sudah lengkap.</p>	<p>4.a. Iya, saya melihat kembali kelengkapan dokumen sebelum pembelajaran diantaranya RPP, bahan ajar, media pembelajaran evaluasi pembelajaran agar pelaksanaan proses pembelajaran dan tercapai tujuan pembelajaran.</p>
	<p>KEP 2</p> <p>2. Dengan cara saat saya mempraktikkannya dalam kegiatan belajar. Apabila saat pelaksanaan siswa aktif dan antusias, berarti tujuan pembelajaran yang saya sudah benar.</p>	<p>b. Cara melihat kebenaran tujuan pembelajaran ialah dari indikator kemudian diakhir pembelajaran terdapat lembar evaluasi pembelajaran tersebut bisa dijadikan sebagai pemenuh keberhasilan pembelajaran dan hasil belajar peserta didik.</p>

4 Discussion

This research explores what is in the minds of PPG students in preparation for teaching in classes in the independent curriculum. The research was carried out when preparation for lesson study-based learning entered the Plan stage. The initial number of prospective subjects was 37, the narrowing down of the prospective subjects remained at 6, namely the prospective subjects for guidance of researchers who carried out lecturing practice in Wonogiri Regency in table-2, placement was determined by the Director General of Teachers and Education Personnel based on domicile and the detection of school teachers who were about to retire. The second narrowing of potential subjects was based on random sampling from six potential subjects under the guidance of researchers, this corresponds to what is contained in table-1 and became research subjects.

The following is a discussion of data in Table 3 from the results of two research subjects to see the metacognitive skills of PPG students towards the lesson study-based PPG program in the Merdeka Belajar curriculum.

1. KPrP1. How can you predict what problems will arise, and what could be the solution during the Plan stage of lesson study?

Subject 1 answered with observations and discussions to come up with predictions, but did not yet come up with a solution. Meanwhile, subject 2 answered that the school's

location close to the main road interfered with focus in studying, and also did not come up with a solution.

Both of them have identified the causes of problems but are not yet perfect in making accurate predictions because they have not yet provided solutions to the problems that arise, and this will of course affect the learning objectives, so that predictions of success will be weak.

2. KPrP2. To support the above, what tools must be prepared during the Plan stage of lesson study?

Subject 1 answered by preparing learning tools such as lesson plans/teaching modules, media, and learning models that were suitable to be applied.

Subject 2 answered similarly to subject 1, he would prepare a set of learning devices with supporting equipment, LCD projector, laptop and loudspeakers.

The answers to both of them already imply that the preparation needed for learning is correct, but there is something odd about the answer to the first question. So it can be concluded that in teaching they have memorized what must be prepared but are weak in preparing what is needed to overcome existing problems because the aim in the plan is only a formality without case accuracy.

3. KPcP1. How do you determine problem solving goals during the Plan stage of lesson study?

Subject 1 answered of course in formulating learning objectives referring to the problems found. If it focuses on the learning media used, the learning objectives focus on the media used to improve the quality of learning.

Subject 2 answered by determining the goal of solving the problem by conducting an evaluation and learning process. Then carry out a follow-up plan for further learning that is tailored to the characteristics and abilities of students so that learning objectives can be achieved well.

Both give similar but different answers. Subject 1 has been organized to lead to appropriate planning based on the problems found, but Subject 2 is more theoretical, namely that there needs to be an evaluation first so that decisions are correct in making decisions. Both of them have shown maturity in taking a stance when building a learning plan.

4. KPcP2. What do you plan to achieve when planning the lesson study?

Subject 1 answered that to achieve the goal, of course I collaborate with the class teacher and tutor, so that the learning goals that I have set can run as expected.

Subject 2 answered making learning plans that suit the characteristics and abilities of students by arranging teaching materials, learning media, LKPD, and evaluation tools. With this planning, learning will be carried out well.

Subject 1 focuses on discussion, while subject 2 is confident that the instruments created will achieve the learning objectives. This shows that the same goal is visible, only the way to do it is different, this is good for finding exploratory solutions.

5. KMP1. How do you determine the stages of problem solving when planning lesson study?

Subject 1 answered that first, of course coordinating with the class teacher and tutor who already understand the characteristics of the students in that class. If a solution has been found, I create learning tools, media, strategies and learning models that suit the students' abilities, meanwhile.

Subject 2 answered by providing learning videos and trigger sentences, from which students can solve problems in the learning process, thus giving students the opportunity to think critically.

This gives the conclusion that S1 answered with a flow that could be said to be correct, but S2 was wrong because the answer pointed to a process that was already underway even though it would determine what would be done if the learning process was ongoing.

6. KMP2. How do you check the correctness of the problem-solving steps during the lesson study plan?

Subject 1 answered after completing what needed to be prepared, continuing to coordinate the results with the class teacher and tutor to check the validity of the steps taken, if they were correct then just implement them during the lesson.

Subject 2 answered to check the correctness of the problem-solving steps by evaluating the learning process that had been carried out and then taking the red thread to make a follow-up plan for the next learning process. Subject 1 was correct in checking the correctness of the steps, namely coordinating with the class teacher and tutor to see the validity of the steps taken, but Subject 2 had not yet carried out the lesson and had stated that he had carried out a learning evaluation, so Subject 2 needed an understanding of the questions.

7. KEP1. Will you review the completeness of the documents that will be used in teaching when planning lesson study?

Subject 1 answered yes to ensure the learning tools I prepared were complete, and subject 2 answered yes. I reviewed the completeness of the documents before implementing the learning process, including lesson plans, teaching materials, learning media, LKPD, and learning evaluations so that the implementation of the learning process could be optimal and the learning objectives achieved.

Both subjects stated yes to check the completeness of the documents that will be used in teaching, this shows that their metacognitive evaluation skills have been embedded.

8. KEP2. How do you see the truth of the learning objectives when planning lesson study?

Subject 1 answered by practicing it in learning activities. If during implementation it is active and enthusiastic, it means that the learning objectives I have taken are correct.

Subject 2 answered from the learning indicators then at the end of the lesson there was a learning evaluation sheet. The results of this evaluation are used as determinants of success in implementing learning and student learning outcomes.

The evaluation questions are still focused on checking the correctness of the goal during Plan, but the answers are already directed at evaluation skills during Do so that in this section it still seems loose in the control of checking the correctness of the goal.

5 Conclusion

From the research data obtained and through a series of discussions, it can be concluded that, PPG students' metacognitive skills towards the lesson study-based PPG program in the independent learning curriculum during the Plan show: 1) Metacognitive skills at the predicting stage have brought out the causes of problems but are not yet perfect in making accurate predictions, because it has not yet come up with a solution, and this will of course affect the learning objectives so that predictions of success will be weak; 2) Metacognitive skills in the planning stage have shown maturity in taking a stance when building a learning plan and showing variations in plans in achieving learning goals; 3) The metacognitive skills of the monitoring stage of the two subjects here show differences in monitoring the steps that have been determined, subject-1 with a flow that can be said to be correct because it is conscious of being in the Plan position and always refers to experts, but subject-2 leads to a process that is already underway even though this still in the Plan stage in lesson study, so subject-2 needs to increase understanding of the situation and conditions; and 4) The metacognitive skills in the evaluating stage seem to be attached to the subject but are misapplied because everyone is thinking about Do, even though this is still at the Plan stage in the study lesson.

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