A professional learning community model: a case study of primary teachers community in west Bandung

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Abstract. The purpose of this study is to provide an alternative model of professional learning community for primary school teachers in improving the knowledge and professional skills. This study is a qualitative research with case study method with data collection is an interview, observation and document and triangulation technique for validation data that focuses on thirteen people 5th grade elementary school teacher. The results showed that by joining a professional learning community, teachers can share both experience and knowledge to other colleagues so that they can be able to continue to improve and enhance the quality of their learning. This happens because of the reflection done together before, during and after the learning activities. It was also revealed that by learning in a professional learning community, teachers can learn in their own way, according to need, and can collaborate with their colleagues in improving the effectiveness of learning. Based on the implementation of professional learning community primary school teachers can be concluded that teachers can develop the curriculum, the students understand the development, overcome learning difficulties faced by students and can make learning design more effective and efficient.

1. Introduction

Teachers are professionals in charge of planning and implementing the learning process, assessing the results of learning, coaching and training, and conduct research and community service. As professionals, teachers must continue to learn in order to improve their knowledge and skills so that they can bring their students to face the challenges of the 21st century.

It has been a lot of research on the development of professional teachers, change in cognition teacher, orientation to students, professional attitude and identity, subject knowledge and pedagogical knowledge and skills [1-3] describes the results of their study that teachers learn through a variety of learning activities to experiment, to reflect, to learn from others without interaction and collaboration. It is necessary for teachers to facilitate the learning community to share experiences and to overcome the difficulties they face every day and can continue to improve their knowledge and skills. Knowledge and skills are getting better from teachers will bring a positive change in the attitudes and behavior of teachers that will impact on student achievement [4,5] and school achievement.
Through the teacher community, teachers are expected to learn a variety of knowledge and skills so as to improve their competence. Teachers are also expected to continue to improve the instructional design to improve the quality of learning in class. Based on these descriptions, the main focus of this study on a model for teacher professional learning through teacher community. Teacher learning activities conducted by reflection together which consists of three stages, namely before, during and after the study. The results of this reflection in the form of empirical didactic design.

2. Methods
This study is a qualitative case study method. All data is displayed in the form of descriptive. The study involved 13 teachers from 7th Grade 5 elementary school located in West Bandung regency. The study starts from an assessment of the ability of teachers, creation of learning materials design angle, discussion and reflection carried on working groups of teachers, a reflection of the students' work, and revision of instructional design and learning strategies.

Before, during, and after learning, all activity is logged and recorded teachers through interviews, classroom observations, video recordings, and document research. Open interviews conducted to determine the learning activities conducted by teachers and instructional quality development activities for reflection for action and reflection of the action. Classroom observations conducted to observe the reflection in action. Video recording and document research carried out at the time of reflection for action, reflection in action and reflection of the action. This is done to see the development of teacher learning through a community.

Results of interviews transcribed and analyzed to describe the activities carried out by teachers. The results were analyzed observation sheet to get a general idea of the interactions that occur in the classroom that can be used as material for discussion in improving the quality of teachers in the classroom learning. This is also done to confirm the answers to the interview conducted on the teachers.

3. Results and Discussion

3.1. Professional learning community primary school teachers
In this study, teachers' professional learning community is a group of primary school teachers who interact with a discussion, see the practice of learning, decision-making and improve the design of learning through reflection. Reflection of the teachers consists of three stages, namely reflection for action, reflection in action, and reflection of the action [6].

Teacher learning community activities begins with the same teachers working group level is grade 5. Meetings are held alternately every two weeks in each school and the teachers do after finished teaching. Professional learning activities in the community primary school teachers held for 3 hours.

First, teachers determine what topics will be discussed, namely the extensive searching trapezoid. This topic was chosen because there are many students who are struggling in this material. Second, create a comprehensive learning trapezoid design that includes: learning objectives, instructional materials, instructional media, the methods used, the learning steps up to the vote. The selected learning goals is to form a trapezoid wake, said the definition of a trapezoid, describe the properties of a trapezoid, explain the types trapezoid, draw a trapezoid, find the formula for the area trapezoid and calculate the area of a trapezoid. Learning media selected is a wide range of flat wake.

3.2. Professional Learning teacher
At this stage of reflection for action, each teacher preparing instructional design by analyzing the instructional design trapezoidal last year then brings it to the teacher community. Based on the study of the documentation, the teacher immediately provide material trapezium, trapezoid properties, the type of trapezoid, trapezoid area formula and how to calculate the area of a trapezoid with a triangular approach. Based on interviews with teachers, students were passive during the teaching and learning results obtained are less satisfactory. Teachers then discuss and take decisions that instructional design should be modified to be more efficient and effective.
Taken together, the teacher makes learning trajectory trapezoidal and make decisions that: in a trapezoidal shape, students can choose from a variety of flat wake as square, rectangle, triangle, and parallelogram as Figure 1.

![Figure 1. Types of trapezoidal.](image)

Then the students are directed to be able to mention the definition of a trapezoid, describe the properties of a trapezoid, explain the types trapezoid, and draw a trapezoid. Teachers then analyze student learning obstacles and predict the response of the students and create anticipation didactic and pedagogic. Furthermore, the students use a flat wake formula used to find the formula for the area trapezoid. For example, by using the following triangular approach.

![Figure 2. Area of trapezoid using triangle.](image)

\[
A = A_1 + A_2 \\
= \frac{1}{2} \cdot b_1 \cdot h + \frac{1}{2} \cdot b_2 \cdot h \\
= \frac{1}{2} (b_1 + b_2) \cdot h
\]

Or by using a rectangular following approach.

![Figure 3. Area of trapezoid using rectangle.](image)

Trapezoid equally spacious with quadrilateral ABCD EEAD with area \( l \cdot w \).

\[
l = b_1 + b_2, \quad w = \frac{t}{2}, \quad A = l \cdot w, \quad \text{So Area of trapezoid} = \frac{(b_1 + b_2) \cdot t}{2}
\]

after finding the formula trapezoid so student can calculate the area of a trapezoid. Results of reflection for this action in the form of a hypothetical didactic design (DDH).

At this stage of reflection in action, teachers need to implement DDH by holding open class simulated by a model teacher, other teachers observe learning activities. First of all the students looked a little stiff because of the unusual learning with other teachers observed by many. But then students can attend classes with active, especially when they are given a variety of Flat and trapezoidal shape. In presenting the subject matter, the teacher gives students a variety of Flat and trapezoidal shape is based on the wake.

Students can quickly mention the definition of a trapezoid, the properties of a trapezoid and trapezoidal types based on the image. In drawing a trapezoid some students have not been able to draw correctly because there are difficulties in using a ruler. Students are guided to be able to find and...
calculate the area of a trapezoid together with the group. Students find the formula for the area trapezoid based formula wake uses. In calculating the area of a trapezoid there is an understanding of the different groups, they not calculate the area of a trapezoid instead calculate its circumference. Teachers guide students who have difficulty with the questions that guide. At the end of the lesson, the teacher rectifying students’ understanding is wrong.

After the open class activities, teachers carry out reflection of the action. They analyzed the activity and student responses, learning path, learning media, collaboration and efficiency. Observations show that the students are actively involved during the lesson, the teacher models have been doing the learning according to the learning path that has been prepared, as well as instructional media used is also contextual. The results of the data obtained following the interview.

T: Teachers can direct students to be active in the learning process. While there are some students who look passive but the teachers can lead students to be active learning.
T: Master models have been able to present learning according to the learning design is created.
T: The use of the media is an effective and attractive. Teachers provide various Flat with colors that attract and because the students have mastered the material flat wake.
T: There are students who work on the problems alone but the teacher is able to direct the student to learn to share along with a group of their friends. Teachers give attention to the whole class so that all the groups were active learning.
T: Time used quite effectively and efficiently according to plan.

3.3. The link between professional learning and professional learning communities.

In carrying out a duty everyday, teachers often get into trouble. To overcome difficulties and increase their knowledge, teachers need to learn in a professional learning community [3, 7]. Professional learning of teachers is an activity that develops the skills, knowledge, individual skills and other characteristics as a teacher [8]. Professional learning of teachers carried out in accordance with the needs of teachers [9], gradually that from time to time [10], and held on an ongoing basis to build a professional culture with collaborative learning [11, 12]. By learning in the community, teachers can share experiences and knowledge so as to improve the quality of learning [13]. Thus, teachers can maintain, improve, and expand their knowledge and skills to implement the learning process in a professional manner.

Professional learning communities undertaken by teachers is very useful in helping learn. One material that needs to be learned teachers and help teachers carry out teaching duties is to make the learning design together so that teachers can find out how students learn, what their learning difficulties, and how instruction teachers can improve their learning [14]. Instructional design supports the two main objectives of learning, namely improving the quality of teaching and facilitating the integration of technology into teaching and learning. In addition, teachers can conduct research and analyze all activities that have been done [15]. Research and analysis conducted teacher conducted through reflection, either by teachers themselves or also together with other teachers in a community.

The professional learning of teachers affects student achievement through three steps [16]. First, learn the professional skills and knowledge of teachers. Second, knowledge and skills for better enhance classroom teaching. Third, improve the teaching raises student achievement. Thus, professional development for teachers through the learning community is a key mechanism to enhance classroom instruction and student achievement [17] also later be able to develop the quality of the school.

Teachers design learning in accordance with the conditions and needs of students in the classroom. Teachers need to be trained to be ‘critical instructional design experts’ [18]. Instructional design was created through a process of reflection on the concepts to be taught [19]. In addition, the reflection activities undertaken will make teachers more effective because they have the knowledge and skills to teach deeper [20, 21].
In this study, teachers' professional learning community is a group of primary school teachers who interact with a discussion, see the practice of learning, decision-making and improve the design of learning through reflection. Reflection involves taking past experience as a starting point for learning. Reflection done by teachers consists of three stages, namely: reflection for action, reflection in action and reflection of the action.

At this stage of reflection for action, teachers develop guesses about student responses may occur over the situation didactic developed in purpose and learning materials [22, 23], the need and potential students in learning [24], how to create a situation didactic conducive, how to convey the lesson material that is supported by textbooks, objects manipulative or with the help of technologies [25, 26], a task that will be given, to how to design the assessment of learning and enrichment [27] and remedial for students. The research activities will help teachers to build a conceptual framework of learning, can also find out where the teacher can perform checkpoints in the learning process. This conceptual framework will help teachers design learning better [28]. In addition, teachers also important to reflect on learning obstacles experienced by students. Based on these allegations further developed possible course of student learning is generally called as a learning groove conjecture or hypothetical learning trajectory (HLT). Based on the allegations about the range of possible responses as well as the flow of students' learning, it can also be developed antisipasinya include didactic and pedagogical anticipation.

At this stage of reflection in action, teachers reflection during the learning activities. Reflection is done by developing millieu to create didactic and pedagogical situations which correspond to the needs of students. At this stage, the teacher should be able to anticipate and consider the response and the flow of student learning, thus avoiding the possibility of Jourdain effect or effects Topaze. Teachers should also be able to develop course material is structurally and anticipate students' learning experience and knowledge [6]. Teachers can use the questions that guide students in solving problems.

Teachers do not directly provide a trapezoidal shape but invites students to identify known problems one by one, manipulate objects and provide questions that guide. In finding a trapezoidal area formula, students use the formula for the area Flat knew that the way in which students vary.

In the reflection phase of action, the teacher models analyzing the activity of teachers and students, teaching materials and student learning outcomes shortly after the open class activities. Through this analysis, the teacher should be able to give students the widest possible opportunity to learn and implement the knowledge mastered. The results are compared with the previously created instructional design and instructional design in order to revise the design of learning can provide the widest possible space for students to have independent thinking through a design facility design didactic teacher.

The series of activities of reflection in action, reflection in action, and reflection of the action was filmed using video. Video recordings were analyzed as consideration for effectiveness and learning activities teachers [29] and DDH revise instructional design created so that teachers can bring students to think critically so as to solve the problems they face. Analysis of the video footage and community learning activities of teachers in professional learning of teachers is a useful tool for teachers to examine and improve the teaching challenges, structural and relational them that no one can have an impact on how effective the tool is being used. The results of the analysis in the form of instructional design called Empirical Didactic Design [30].

4. Conclusion
The series of professional learning activities that teachers in the teacher community, seen a change of mindset and attitudes of teachers. Competencies required of teachers is also seen to increase, this can be seen from the way teachers design learning and teaching. Student-centered learning approaches, measures designed learning activities can already provides ample opportunity for students to think and actualize himself. Selection of instructional media and learning resources be varied and the problems that made the problem solving. This happens because teachers learn from other teachers. Senior teachers can share experiences with junior teachers, junior teachers who can share their knowledge with the senior teacher. Instructional design which made teachers become rich in anticipation of didactic and pedagogical so that confidence of teachers in developing instructional design and implement, increases.
In addition, teachers who initially not directly involved in making teaching materials become increasingly active and able to work together to design instructional design. They seemed enthusiastic in every reflection, criticized the textbooks used in primary schools and create problems that lead to high-level thinking in grade 5. It is very important for teachers to be able to design appropriate learning to student characteristics, needs student learning, and can overcome learning difficulties experienced by students so as to make the design more effective learning and efficient. In particular, the analysis and discussion of the teachers in professional learning activities with the community of teachers giving them the opportunity to pengembangkan knowledge and skills, especially in the pedagogical, professional, personal and social.

5. References
[1] Borko H, Koellner K, and Jacobs J 2014 *The Journal of Mathematical Behavior* Examining novice teacher leaders’ facilitation of mathematics professional development 33 149–67
[2] Lee C, Hayes K N, Seitz J, Connor D O and Distefano R 2016 *A coding tool for examining the substance of teacher professional learning and change with example cases from middle school science lesson study* 60 164–78
[3] Grosemans I, Boon A, Verclairen C, Dochy F and Kyndt E 2015 *Informal learning of primary school teachers: Considering the role of teaching experience and school culture* 47 151–61
[4] Lieberman J and Lieberman J 2009 *Professional Development in Education and identities: the role of lesson study and learning communities* Reinventing teacher professional norms and identities: the role of 37–41
[5] Darling-hammond L 2005 *How teacher education matters* 51 3 166–73.
[6] Suryadi D 2010 *Penelitian Pembelajaran Matematika Untuk Pembentukan Karakter Bangsa* 1
[7] Eaker, Robert; DuFour, Ricard and Burnette R 2002 *Getting Started: Reculturing Schools to Become Professional Learning Communities* (Bloomington: National Education Service)
[8] The Professional Development of Teachers 2009 47-86
[9] Chambers JG, Lam I and Mahitivanichcha K 2008 Examining context and challenges in measuring investment in professional development: A case study of six school districts in the Southwest region *Regional Educational Laboratory Southwest* 37
[10] Adams CM, Lo JC, Goodell A and Nachtigal S 2017 *Shifting pedagogy in an AP US government &amp; politics classroom: A DBIR exploration of teacher growth* 64 79–92
[11] Dunne K A *Teachers as Learners: Elements of Effective Professional Development*
[12] Creating and Managing Powerful Professional Learning Teams.
[13] Guskey T R Closing the Knowledge Gap on Effective Professional Development 224–33.
[14] Mizell H 2010 *Why Professional Development Matters* Learning Forward (Oxford)
[15] Lockyer L, Heathcote E and Dawson S 2013 Informing pedagogical action: Aligning learning analytics with learning design *American Behavioral Scientist* 57 10 1439-1459
[16] Yoon K S, Duncan T, Lee S W Y, Scarloss B and Shapley K L 2007 Reviewing the Evidence on How Teacher Professional Development Affects Student Achievement Issues & Answers
[17] Guskey T R 2010 *Teachers and Teaching: Theory and Practice Teacher Change Professional Development and Teacher Change* 37–41
[18] Bekerman Z and Zembylas M 2014 *Some reflections on the links between teacher education and peace education: Interrogating the ontology of normative epistemological premises* 41 52–9
[19] Zwozdiak-myers P *An analysis of the concept reflective practice and an investigation into the development of student teachers’ reflective practice within the context of action research* (Brunei: Brunei University)
[20] Santrock J 2011 *Educational Psychology. 5 th.* (New York, Boston, Dordrecht, London, Moscow: Mc. Graw Hill)
[21] Nevgi A and Löfström E 2015 The development of academics’ teacher identity: Enhancing reflection and task perception through a university teacher development programme *Studies*
in educational evaluation 46 53–60
[22] Clements D H and Sarama J 2007 Effects of a Preschool Mathematics Curriculum: Summative Research on the Building Blocks Project 38 2 136–63.
[23] Clements D H and Sarama J 2013 Rethinking Early Mathematics: What Is Research-Based Curriculum for Young.
[24] Timperley H, Wilson A, Barar H and Fung I 2007 Teacher Professional Learning and Development: Best Evidence Synthesis Iteration (Wellington, New Zealand: Ministry of Education)
[25] Media E Media E 2003 A didactical framework for the design of blended learning arrangements
[26] Mårell-olsson E, Lars H, Jahnke I and Bergstr P 2017 Computers & Education Digital Didactical Designs as research framework: iPad integration in Nordic schools 113 1–15
[27] Smart A M 2011 Designing and teaching an elementary school enrichment program: What the students were taught and what I learned 8 1
[28] Roberts N and Stylianides A J 2013 Telling and illustrating stories of parity: a classroom-based design experiment on young children’s use of narrative in mathematics ZDM 45 3 453-467
[29] Vrikki M, Warwick P, Vermunt J D, Mercer N, and Halem N V 2017 Teacher learning in the context of Lesson Study: A video-based analysis of teacher discussions 61 211–24
[30] Suryadi D 2015 Disain Didaktis Pengenalan Bilangan Bulat: Kreasi Guru-Guru Gagasceria Bandung Ditinjau dari Perspektif DDR

Acknowledgments
The author acknowledges the thoughtful comments and advice on Earlier drafts from Professor Didi Suryadi, Doctor Ernawulan Syaodih, West Bandung District Education Office, and the anonymous reviewers are. My gratitude is to all of the of participants and Reviews those who have supported me.