The readiness of junior high school mathematics teachers in implementing Permendikbud No. 37 of 2018

N M Murdiyani, Jailani and M Susanti
Department of Mathematics Education, Universitas Negeri Yogyakarta, Indonesia
E-mail: nila_mareta@uny.ac.id

Abstract. The purpose of this study was to describe the readiness of Junior High School mathematics teachers in Yogyakarta in implementing Permendikbud no. 37 of 2018. This is because as a component as well as an executor of the curriculum, teachers need to be prepared to implement the new Permendikbud. The type of this research is a mix of quantitative and qualitative study using survey technique and interview. From the results of the questionnaire and interview sheet, data were obtained that most schools had syllabus, teacher manuals, student textbooks, assessment rubrics, and lesson plan for each Basic Competency. However, there are some schools that still lack in learning resources and learning media so it must be prepared by the teacher himself. In general, some teachers still have difficulties in several aspects when designing Lesson Plan based on The Core Competency and The Basic Competency set by the government i.e. in creating innovative learning media, in practicing various learning strategies and in carrying out holistic assessments. So, it can be concluded that there are still a number of Junior High School mathematics teachers who are not ready to implement Permendikbud no. 37 of 2018.

1. Introduction
In the 21st century, there was a rapid development of information and communication technology. In following this development, innovation in education needs to be done. One of the innovations made by the government of the Republic Indonesia through the Ministry of Education and Culture (Kemendikbud) is the evaluation of Curriculum 2013 implementation. Curriculum is the core to all processes occurring in the school [1]. Curriculum 2013 is the development of Competency based Curriculum which is started from 2004. The Competency based Curriculum is intended to prepare graduates who are competent and smart in building Indonesian cultural and national identity. It is hoped that the curriculum can give students the basics of knowledge, skills, learning experiences that build social integrity, as well as to civlize and realize the national character [2]. The curriculum is a guideline for teachers in planning, implementing, and evaluating including monitoring student learning. This is in line with the principle of lifelong learning that refers to the four pillars of universal education from UNESCO i.e. learning to know, learning to do, learning to be, and learning to live together [3].

The goverment determine The Core Competency and The Basic Competency in Permendikbud (the regulation of Ministry of Education and Culture) no. 24 of 2016 and revised the competency in Permendikbud no. 37 of 2018. The Core Competency in Curriculum 2013 is the level of ability to achieve the graduate competency standards that must be possessed by student at each grade level. Whereas The Basic Competency is the minimum ability and learning material that student must
achieve for a subject in every unit of education refers to The Core Competency [4]. Determination of
The Core Competency and The Basic Competency in the implementation of Curriculum 2013 is
needed in order to create effective and efficient learning. Effective and efficient learning is expected to
help students develop their attitudes, knowledge and skills.

In Curriculum 2013, teachers are not the only source of learning, because learning resources for
students are numerous, including the environment and the internet. Nevertheless, the teachers still
have a very important role as a resource that meets the educational element. In general, teachers rely
on textbooks as the main learning source. Textbooks are considered as a source of learning that can
support the creation of meaningful learning. With the existence of books, the teacher can manage the
learning activities effectively and efficiently, the students are also able to join the learning activities
maximally [5]. Regarding the textbooks, The Core Competency and The Basic Competency that have
been determined are used as a basis for changes in textbooks in primary and secondary education.

NCTM outlined that there are two kinds of mathematics competencies in schools, namely
Mathematics Content Competency and Mathematics Process Competency [6]. Mathematics content
competencies involve numbers and their operations, geometry, measurement, algebra, data analysis
and probability. Meanwhile, mathematics process competencies include problem solving, reasoning
and proofing, mathematical communication, mathematical connection, and mathematical
representation. The changes of Core Competency and Basic Competency in Permendikbud are closely
related to the sequence of mathematics content competencies that must be achieved by students.

As a component as well as an executor of the curriculum, teachers need to be prepared to
implement the new Permendikbud. There are four competencies that become minimum standards for
teacher competency, namely pedagogical competency, personality competency, social competency and
professional competency [7]. More specifically in dealing with the changes in Permendikbud no. 37 of
2018, a good teacher required good pedagogical competency. Pedagogy is often understood as the
knowledge of teaching, covering not only how to develop resources and instructional strategies, but
also the mathematics content and the pedagogic-mathematics knowledge [8]. Teaching needs
preparation on the learning material, media, strategies and assessment that satisfy students’ existing
knowledge to guarantee students’ understanding [9]. In accordance with the regulation of Ministry of
National Education no. 16 of 2007 [7], pedagogical competencies consist of 10 standard competencies
with the following description: (1) Mastering students’ characteristics from physical, moral, social,
cultural, emotional and intellectual aspects; (2) Mastering learning theory and learning principles; (3)
Developing curriculum related to the learning material; (4) Organizing meaningful learning; (5)
Utilizing information and communication technology; (6) Facilitating students’ potential; (7)
Communicating effectively, empathically, and politely with students; (8) Carrying out assessment and
evaluation of the process and learning outcomes; (9) Utilizing the results of assessment and evaluation
for the improvement of learning; and (10) Performing reflective actions that are used to increase the
quality of learning.

The good pedagogical competency of a teacher can be seen from how the teacher can manage
learning in the classroom. To be able to conduct a better learning, teachers need to design Lesson Plan
for each Basic Competency in Permendikbud no. 37 of 2018. Lesson plan is the keys to the education
success, where the time allocation, materials, teaching method and also evaluation method are
explained in detail [10]. Planning is the well organized process of determining what and how students
should learn to increase the teaching and learning quality [11]. The development of lesson plan can be
done by teacher independently or in a group with similar expertise and it can be supervised by the
school principal. The aspects that need more attention in designing good Lesson Plan are determining
the appropriate time allocation, describing Basic Competency into Competency Achievement
Indicators, finding varied learning resources, creating innovative learning media, practicing various
learning strategies, and carrying out holistic assessments [12]. A good Lesson Plan also needs to be
supported by adequate facilities so that it can go according to plan. Learning facilities in schools to
support the implementation of Lesson Plan in Curriculum 2013 include the availability of learning
syllabi, teachers’ manuals, students’ textbooks, learning resources, learning media and assessment rubrics.

In order to create effective and efficient learning, a teacher should be able to design Lesson Plan for each Basic Competency in Permendikbud no. 37 of 2018 well. Based on the explanation above, it is important to carry out a research to describe the readiness of Junior High School mathematics teachers in implementing Permendikbud no. 37 of 2018. The result of this study can be used as a guidance to conduct the type of training for teachers in improving their pedagogical competency. Teachers need continuous professional development in order to enhance their professional skills and construct knowledge that they need in implementing the new curriculum [13].

2. Method

The type of this research is a mix of quantitative and qualitative study using survey technique and interview. The mixed method combines quantitative and qualitative approaches so that the overall strength of the research becomes greater and more detailed [14]. The subject is 45 Junior High School Mathematics Teachers in Yogyakarta. Instruments of the research are: (1) the questionnaire which is used to determine the readiness of Junior High School Mathematics Teachers in implementing Permendikbud no. 37 of 2018; and (2) the interview sheet which is used to complete and sharpen the data of teachers’ readiness in implementing Permendikbud no. 37 of 2018.

The questionnaire consists of two parts. Part 1 contains the readiness of learning facilities in schools to support the implementation of Curriculum 2013 which include the availability of learning syllabi, teachers’ manuals, students’ textbooks, learning resources, learning media, assessment rubrics, and the availability of Lesson Plans for each Basic Competency. Part 2 contains the readiness of each teacher to implement the Curriculum 2013. The questions to explore the readiness of the teacher are how difficult is it to understand the teachers’ manuals, to teach the students’ textbooks, and to compile the Lesson Plans for each Basic Competency in Permendikbud no.37 in 2018. In preparing the Lesson Plan, the aspects asked are how difficult to determine the appropriate time allocation, describe Basic Competency in Competency Achievement Indicators, find varied learning resources, create innovative learning media, practice various learning strategies, and carry out holistic assessments. Teachers have to choose 5 options of Likert Scale, those are: very easy, easy, medium, difficult, and very difficult.

3. Result and Discussion

From the results of the questionnaire part 1 and interview sheet, data were obtained that most schools had syllabus, teacher manuals, student textbooks, assessment rubrics, and lesson plan for each Basic Competency. There are 12 Basic Competencies for grade 7 of Junior High School, 11 Basic Competencies for grade 8 of Junior High School and 7 Basic Competencies for Junior High School grade 9. However, we found that some schools still lack in learning resources and learning media so it must be prepared by the teacher himself.

From the results of the questionnaire part 2, we can get the data of teachers’ readiness in each aspect when designing Lesson Plan. Table 1 and figure 1 show the average score of Junior High School grade 7 mathematics teachers’ readiness in implementing Permendikbud no. 37 of 2018.
Table 1. The average score of grade 7 teachers’ readiness

| Aspects                        | Average Score |
|--------------------------------|---------------|
| Understanding teacher manual   | 2.73          |
| Teaching student textbook      | 2.93          |
| Determining time allocation    | 2.53          |
| Describing Basic Competency    | 2.69          |
| Finding varied learning resources | 2.76       |
| Creating innovative learning media | 3.12       |
| Practicing various learning strategies | 3.18       |
| Carrying out holistic assessments | 3.19       |

Figure 1. Grade 7 teachers’ readiness

The average score of Junior High School grade 8 mathematics teachers’ readiness in implementing Permendikbud no. 37 of 2018 can be seen in table 2 and figure 2.

Table 2. The average score of grade 8 teachers’ readiness

| Aspects                        | Average Score |
|--------------------------------|---------------|
| Understanding teacher manual   | 2.80          |
| Teaching student textbook      | 3.00          |
| Determining time allocation    | 2.56          |
| Describing Basic Competency    | 2.60          |
| Finding varied learning resources | 2.84       |
| Creating innovative learning media | 3.18       |
| Practicing various learning strategies | 3.20       |
| Carrying out holistic assessments | 3.16       |

Figure 2. Grade 8 teachers’ readiness

We can see the readiness of Junior High School grade 9 mathematics teachers in implementing Permendikbud no. 37 of 2018 from the average score in table 3 and figure 3.

Table 3. The average score of grade 9 teachers’ readiness

| Aspects                        | Average Score |
|--------------------------------|---------------|
| Understanding teacher manual   | 2.67          |
| Teaching student textbook      | 2.93          |
| Determining time allocation    | 2.83          |
| Describing Basic Competency    | 2.97          |
| Finding varied learning resources | 2.90       |
| Creating innovative learning media | 3.47       |
| Practicing various learning strategies | 3.32       |
| Carrying out holistic assessments | 3.41       |

Figure 3. Grade 9 teachers’ readiness
From the data above, we can see that Junior High School mathematics teachers grade 7, 8 and 9 have most difficulties in three aspects when designing Lesson Plan i.e. creating innovative learning media, practicing various learning strategies and carrying out holistic assessments. The average score in those aspects is more than 3. The result of this study is inline with the several previous research described below.

Mathematics is a deductive subject, so it cannot be separated from abstraction. Abstraction has been known as something that plays an important role in the success of learning mathematics when viewed from a cognitive point of view. However, abstraction is also one of the main reasons for the failure of the mathematics learning process [15]. The role of the mathematics teacher in the learning process is crucial, especially in designing media to motivate students in learning and to help students in facing mathematics abstraction. Learning media is a tool to deliver the materials in the learning process [16]. In general, the advantage of learning media is to make interaction between teacher and student become smooth so learning can be more effective and efficient [17]. The use of learning media enables the teacher to explain, describe, distribute, and deliver lectures more easily and effectively than depending only on words [18]. Therefore to create exciting, innovative and creative learning media in mathematics is not an easy task for teacher.

One of the contributing factors in the low achievement of mathematics learning is the lack of effort to practice various learning strategies and the use of rigid learning models that sometimes are outside of the students’ learning context. Because the time allocation is lacking, teacher in Indonesia prefers to use the behaviorism theory in learning. This is unfortunate because constructivism learning theory can be a framework where teacher can understand more about the capability of the students [19]. Until recently, teacher center learning still dominates in school. Teacher has the authority to describe learning material without involving students actively. Even students are not promoted to apply the mathematics concepts and principles in solving real life problems [20].

Meanwhile, teacher as educational professional has a crucial role in the learning process including how to transfer the knowledge and skills to their students [21]. Hard effort is made to make students realize about the insight provided by teacher so that students can face the contextual problems in everyday life. Regarding this, there are many learning methods/ techniques/ strategies offered by experts to be utilized by teacher in maximizing the role. Even more, there are many studies on the use of learning strategies in improving and developing students’ learning outcome. One of the skills for mathematics teacher is the skill to demonstrate various approaches and models in teaching based on the characteristic of the material taught [22].

In mathematics subjects, the holistic assessments used are the assessment of attitude, knowledge and skill [23]. Authentic assessments assess learners with an emphasis on what it should be judged, both process as well as the result of the assessment with various instruments adapted to the demands of the real competence in the Core Competencies and Basic Competencies [24]. Black et al [25] suggested some criteria to conduct holistic assessments in the classrooms, such as teacher need to discuss the learning objectives in the classroom, teacher need to ask questions that encourage students’ higher order thinking skills, and teachers need to give constructive feedback by letting the students know their progress during the lesson. Therefore, many mathematics teachers still have difficulties in carrying out holistic assessments.

From the questionnaire part 2 and more intense interview, we also can find the data of the most difficult Basic Competencies (BC) for Junior High School mathematics teachers in each grade. For Grade 7, teachers have most difficulty when designing Lesson Plan in BC 3.2 i.e. “Explaining and
performing integers and fractions operations by utilizing various properties of operation”. Many research indicated that fractions is the most complicated material in learning numbers. Even these difficulties also occur to the teacher [26]. The results of interviews and observations in schools with teacher showed that many errors are made by students in solving problems related to fractions. Some difficulties in learning fractions are caused by different representations of fractions and various forms of fractional problems [27]. The trajectory in learning fractions should begin from informal to formal or from concrete to abstract level, so that students can face all forms of problems in fractions and its operations i.e. visual, narrative and symbolic [28].

The 8th grade Junior High School mathematics teachers face most difficulty in BC 3.11 i.e. “Explaining empirical and theoretical probability of an event”. A probability problem is a problem including uncertainty. Students’ thinking in responding varied probabilistic problems is called probabilistic thinking [29]. Some experts said that there are many factors affecting students’ probabilistic knowledge i.e. belief, language, culture, daily and school experience [30]. Learning probability can be done by several models and representations such as table, pipe diagram, tree diagram, Venn diagram, formula, area model, etc. Probability concept is not only important in daily life, but also it is needed in other subjects. Probabilistic thinking plays an crucial role in improving students’ critical reasoning. Therefore, developing an awareness of probability theory and using it in solving real life problems are important for all students [31].

Some studies pointed out that problem solving in probabilistic can be very difficult for teacher and students [32]. The misconceptions about probability concepts and terms in mathematics are also commonly occured in school. This is happen because probabilistic problem solving requires a combination of conceptual, procedural, and conditional knowledge [33]. Students must think about the situation presented in the problem abstractly and then represent the situation appropriately using mathematical concepts and procedures. It is important for mathematics teacher to design learning material in probability that can promote probabilistic thinking skills of the students. Lesson plan in probability includes the selection of strategies, models and media so it can minimize errors of the students in problem solving process.

The most difficult Basic Competencies (BC) for Junior High School mathematics teachers in grade 9 is BC 3.3 i.e. “Explaining the quadratic function by using tables, equations and graphs”. It is because the topics related to symbols and notations are always difficult for students. Students often have a problem to describe mathematical situation in the form of symbols and notations. They have a difficulty to express ideas that have not been fulfilled as a whole. One of the mathematics topics when students face obstacles is functions, especially a quadratic function. The topic of quadratic function is essentially a combination of geometry and algebra topics. Many students have an obstacle in learning algebra because they do not understand the relation among the variables and the meaning of the equations [34]. Ellis and Grinstead [35] also found the students’ difficulties on quadratic function: (1) the relationship on algebra material, how to represent problems with tables and graphs; (2) how to explain graphical display as whole object; (3) how to interpret the role of the parameters correctly; and (4) how to make a false generalization of the quadratic function.

4. Conclusion

Most Junior High Schools in Yogyakarta already had syllabus, teacher manuals, student textbooks, assessment rubrics, and lesson plan for each Basic Competency. However, there are some schools that still lack in learning resources and learning media so it must be prepared by the teacher himself. In general, some teachers still have difficulties in several aspects when designing Lesson Plan based
on The Core Competency and The Basic Competency set by the government i.e. in creating innovative learning media, in practicing various learning strategies and in carrying out holistic assessments. The most difficult Basic Competencies for Junior High School mathematics teachers in each grade are explaining and performing integers and fractions operations by utilizing various properties of operation; explaining empirical and theoretical probability of an event; and explaining the quadratic function by using tables, equations and graphs. In conclusion, there are still a number of Junior High School mathematics teachers in Yogyakarta who are not ready to implement Permendikbud no. 37 of 2018. Junior High School mathematics teachers are expected to increase their competencies especially pedagogical competencies so that they can be better prepared to face curriculum changes and to implement Permendikbud no. 37 of 2018.

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