

The Competency of Pedagogic and Professional Mathematics Teachers Relevant with Curriculum

Ehda Farlina, Wati Susilawati, Asep Jihad and Rahayu Kariadinata

Program Studi Pendidikan Matematika, UIN Sunan Gunung Djati Bandung, Jl. AH. Nasution No. 105, Bandung 40614, Indonesia

{ehda.farlina, rahayu.kariadinata}@uinsgd.ac.id

Keywords: Pedagogic, Curriculum, Competence.

Abstract: The implementation of the curriculum in schools should be supported by teacher competencies. There are four competencies that must a teacher have, it should be pedagogic, professional, social, and personality. The purpose of this study is to determine the relevance of pedagogic competence and professional high school mathematic teachers with curriculum. The method used is a descriptive-qualitative. The random sampling technique is used to take a sample of 30 High School. The instruments used were questionnaires, interviews, and observations. The results of data analysis shown that 1) teacher pedagogic competence in planning, process, and evaluation is not maximal in accordance with the demand of curriculum, 2) professional competence of teacher in explanation of concept on some high school level material still difficult enough to be taught and lesson using technology that has not developed optimally. Based on the results of this study it can be concluded that pedagogic and professional competencies of high school mathematics teachers are not in accordance with the expectations and objectives of the curriculum. Teacher is a designer in classroom, who can make an effort for student.

1 INTRODUCTION

Teachers are a major factor in the educational process (Ibrahim, 2004; Fasli and Dedi, 2001; Syaiful, 2000). So is the teacher of mathematics, which is the main factor and the key to success in learning mathematics. Regulation of the Minister of National Education No. 16 of 2007 states that teachers must have competencies such as pedagogical, professional, personality, and social competence. The competence of a teacher can determine the quality of education and the characteristics of a teacher can affect student achievement (Alqiawi and Ezzeldin, 2015; Renol, 2015). One of the primary keys of effective teachers is knowing the students and how they learn, as well as knowing the learning materials and how to teach them (Celik, 2011). Teachers must understand the content and context of teaching to help successful students understand contextual learning (Johnson, 2002).

Leinhard and Smith (1984) mentioned that teachers should understand the classroom management system and the subject matter. The

classroom management system is similar to pedagogic competence. Pedagogic competence is the ability to manage learning that includes understanding students, planning, implementation and evaluation of learning and development of students to apply various potentials (Inám, 2011). Minister of National Education Regulation No. 70 of 2013 states that pedagogical competence consists of understanding the characteristics of students, mastering the theory of learning, developing curricula relevant to the subjects, utilizing information and communication technology, facilitating the development of students' potentials, being able to communicate effectively with students, and evaluation, performing a reflection action. Akhyak (2013) asserts that pedagogical competence consists of lesson plans, processes, assessment and evaluation.

Meanwhile, professional competence is the teacher's knowledge of the subject matter. A teacher should pay attention and understand the content (Good and Brophy, 1987). Professional competence is the ability to comprehend the content of learning materials in depth (Akhyak, 2013). Professional competence includes: a) mastering learning materials

and scientific methodology; b) mastering the structure and curriculum of learning materials; c) mastering and utilizing information technology to improve the quality of learning.

The competencies of a teacher must be in accordance with the curriculum being used. The curriculum is a structured sequence to generate learning outcomes (Johnson, 1969). Law No. 20 of 2003 on the National Education System states that the curriculum is a set of plans and arrangements concerning objectives, content, and lesson materials and ways used as guidelines for the implementation of learning activities to achieve certain educational goals.

Based on the above description, a review of the competence of mathematics teachers especially pedagogic and professional needs to be studied whether it is relevant to the curriculum used or not.

2 METHOD

This study used descriptive-qualitative method involving 30 math teachers from 30 high schools. The participants were selected using random sampling, and the instruments were questionnaire, observation and interview.

There are three pedagogical competency indicators (Akhyak, 2013) namely planning, process, and evaluation. Meanwhile, professional competence is divided into mastery of material, mastery of structure and material curriculum, and the utilization of technology.

3 RESULTS AND DISCUSSION

3.1 Pedagogic Competence of Mathematics Teacher

Based on the results of questionnaires, observations, and interviews, the pedagogic competence of 30 math teachers in high schools can be identified as in Table 1.

Table 1: The results of pedagogic competence of mathematics teacher.

| Indicator | Results |
|------------|---|
| Planning | <ul style="list-style-type: none"> • 50% of teachers prepare lesson plans in mid-semester • 80% of teachers apply lecture and discussion methods • 20% of teachers use inquiry, problem based learning, constructivism |
| Process | <ul style="list-style-type: none"> • 40% of teachers use media or teaching aids in learning • 40% of teachers cannot pay attention to the overall condition of the students |
| Evaluation | <ul style="list-style-type: none"> • 80% of teachers use procedural questions in their tests. The rest uses contextual questions. • For students who do not understand, teachers do repetition of the material by providing additional questions. |

The latest curriculum used today requires teachers to use a scientific approach in learning. The scientific approach has the learning characteristics of the student-centered learning, so the students discover their own concepts and formulas that will be used. Based on Table 1, teachers have not prepared the learning tools before the teaching and learning activities begin. Sumarno (2014) and Partin (2009) state that the teacher must arrange learning tools well so that the learning outcomes were in line with the expected outcomes. However, teachers still do not understand the learning tools that are suggested in the curriculum. The method is still teacher-centered. In process indicators, teachers have not used learning aids. This is because high school math materials are very difficult to use learning aids. In the evaluation indicator, teachers are still using procedural problems so that students have not been able to develop math skills entirely. From these results, it can be argued that the pedagogical competence of mathematics teachers has not been fully in accordance with the demands of the curriculum used.

3.2 Professional Competence

A description of the results of professional competence of 30 math teachers at senior high schools can be seen in table 2.

Table 2: The results of professional competence among mathematics teachers.

| Indicator | Results |
|---|---|
| Mastering learning materials and scientific methodology | 80% of teachers master learning materials, but 30% still have difficulty in delivering them. |
| Mastering the structure and curriculum of learning materials | 60% of teachers master the curriculum used. On the other hand, teachers have difficulty in meeting the administrative demands of the curriculum and applying contextual problems in mathematics learning. |
| Mastering and utilizing information technology to improve the quality of learning | 80% of teachers know the application or props used in learning mathematics but only 20% of teachers already use information technology in learning. |

Table 2 shows that high school math teachers still need additional knowledge of interactive learning models, the way they make contextual questions and the use of mathematical applications in learning. Contextual questions are needed because procedural questions without concepts are just rules that will bring misunderstandings and make students dislike mathematics (Van de Walle, 2007).

4 CONCLUSIONS

Competencies that must be possessed by teachers of mathematics are pedagogic and professional competence. The pedagogic competencies of the teacher must be in accordance with the curriculum used in the school. Professional teacher competence shows the teacher's ability to master the material content to be given. Teachers have a major role in learning. If the pedagogic and professional competence of teachers is not maximized, then the ability of students cannot be developed maximally.

ACKNOWLEDGEMENTS

The author would like to thank the Institute of Research and Community Service (LP2M) UIN Sunan Gunung Djati Bandung which has provided financial support to this research.

REFERENCES

Akhyak, I., Abu Bakar, 2013. Implementation of Teachers Pedagogy Competence to Optimizing Learners Development in Public Primary School in Indonesia. *International Journal of Education and Research* 1 (9).

Alqiawi., Ezzeldin., 2015. A Suggested Model for Developing and Assessing Competence of Prospective Teachers in Faculties of Education. *World Journal of Education* 5 (6), 65-73.

Celik, S., 2011. Characteristics and Competencies for Teacher Educators: Addressing the Need for Improved Professional Standards in Turkey. *Australian Journal of Teacher Education* 36 (2), 18-32.

Good, T.L., Brophy, J.E., 1987. *Looking in Classrooms*. Harper and Row, Publisher. New York.

Ibrahim B., 2004. *Peningkatan Profesionalisme Guru Sekolah Dasar*. Bumi Aksara. Jakarta.

Johnson, E.B., 2002. *Contextual Teaching and Learning: What is and why it's here to stay*. Corwin Press. California.

Leinhardt, G., Smith, D., 1984. *Expertise In Mathematic Instruction: Subject Matter Knowledge*. Eric (ED 247137).

Partin, R., 2009. *The Classroom Teacher's Survival Guide*. John Wiley and Sons. San Fransisco, 3th edition.

Permendikbud RI, 2003. Peraturan Menteri Pendidikan dan kebudayaan (Permendikbud) Republik Indonesia No 70 Tahun 2013 Tentang Kerangka Dasar dan Struktur Kurikulum Sekolah Menengah Kejuruan/Madrasah Aliyah Kejuruan. Departemen Pendidikan dan Kebudayaan. Jakarta.

Permendiknas RI, 2007. Peraturan Menteri Pendidikan Nasional (Permendiknas) Republik Indonesia No 16 Tahun 2007 Tentang Standar Kualifikasi Akademik dan Kompetensi Guru. Departemen Pendidikan Nasional. Jakarta.

Renol, S., 2015. *Pengaruh kompetensi guru dan motivasi belajar siswa terhadap prestasi belajar siswa kelas XI IPS SMA Negeri 17 Medan*. Prosiding Seminar Nasional Pendidikan Ekonomi and Bisnis Fakultas Keguruan dan Ilmu Pendidikan Universitas Sebelas Maret Surakarta. Surakarta.

Shulman, L.S., 1986. Those who understand: knowledge growth in teaching. *Educational Researcher* 15, 4-14.

Shulman, L.S., 1987. Knowledge and teaching: foundations of the new reform. *Harvard Educational Review* 57(1), 1-22.

Sumarno, W., Dhariva, U., 2014. Pengembangan Perangkat Pembelajaran pada Materi Pokok Kalkulus SMA Kelas XI Semester 2. *Jurnal Riset Pendidikan Matematika* 1(2), 257-267.

Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional. 2003. Departemen Pendidikan Nasional. Jakarta.

Van de Walle, J., 2007. *Elementary and Middle School Mathematics* 2nd Edition. Pearson Education. Canada.