

ANALYSIS OF TEACHERS' PEDAGOGIC AND PROFESSIONAL COMPETENCE IN UTILIZING TPACK

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Abstract

This study aims to analyze the pedagogical and professional competencies of teachers in utilizing TPACK in science learning, as well as the supporting and inhibiting factors of teacher pedagogical and professional competencies in utilizing TPACK which were carried out at MIN Krandon and MI Wonorejo, Guntur District, Demak Regency. This type of research uses descriptive qualitative research. The subjects of this study were class V teachers. The data were obtained through interviews, observation and documentation. Data analysis techniques through data reduction, data presentation and drawing conclusions. The results of the study show that teachers carry out pedagogic competencies in science learning, teachers can understand the different characters of students well, teachers can develop learning materials and educational learning activities, teachers are able to develop teaching materials through digital technology, and create learning media IT-based, teachers can use the internet for media needs for their duties as educators and utilize TPACK, in professional competence, teachers deliver structured material, determine strategies and learning models that are tailored to students, in utilizing TPACK teachers are able to operate technology in preparing learning designs, teachers are able to access the internet to convey science material that is used as a learning media in class.

Keywords : Pedagogic Competence; Professional Competence; TPACK

INTRODUCTION

Education is a learning process with the aim of developing a talent that exists in children, both in terms of personality, intelligence, spiritual and religion. According to (Juliya, M., & Herlambang, 2022). education can also be interpreted as a conscious, systematic effort to achieve a better life. Directly, education is valuable learning for

children to change into human beings who can think well so that they can create character values that the teacher wants through competency according to Law no. 20 of 2003 concerning the national education system.

In the process of life Competence is needed, especially in the learning process so that everything can be done effectively. The teacher is no exception, where the teacher in carrying out the learning process always plans, implements and evaluates learning and guides students. Therefore competence is the most important element used to improve performance (work results) for teachers. Teacher competence in PP No. 74 of 2008 explained that competence is a set of knowledge, skills and behaviors that must be possessed, mastered and actualized by educators in carrying out their professional duties.

From some of the definitions above, it can be concluded that competence is the expertise or ability possessed by teachers in carrying out their duties as educators which include professional, pedagogic, personality and social competence. These competencies must always be developed by the teacher in order to always create effective learning. Teachers become supporters of values in society, create good learning conditions and guarantee success in education, therefore teachers must improve their competencies, namely pedagogical and professional competencies.

Pedagogic competence is one of the abilities of a teacher with regard to theoretical and practical mastery in a lesson, such as abilities in the learning process, planning and implementation in the learning evaluation process and learning outcomes to actualize the various potentials of a teacher (Susanto, 2016). Pedagogic competence is a competency that exists in teachers related to the teacher's ability to manage learning, mastery of material, understanding of students, use of information technology, use of learning models, curriculum development in the learning process, evaluation of learning and development of students' potential in learning process activities in school. Meanwhile, the teacher's professional competence is the ability to convey knowledge, skills in interacting with students which aims to develop all aspects of the students' personality.

Professional competencies that must be met are teachers able to master effective learning methods, able to make models of lesson units, able to understand the curriculum well, able to teach in class, able to be role models for students, provide useful instructions, master techniques, provide guidance and counseling, compiling and implementing procedures for assessing learning outcomes. Therefore professional competence must be

possessed by every teacher in order to be able to improve student learning outcomes.

In improving professional competence, the teacher as an educator should naturally carry it out, but a teacher himself must also have a strong will to be more professional so that national education goals can be achieved, as stated in the teacher and lecturer law that teachers are professional educators. with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in the formal education pathway, as well as in basic education and secondary education including early childhood education.

Teacher competency knowledge has become an integral part of education programs in Indonesia, to prepare teachers where they teach using technological means in the learning process (Feladi, & Puspitasari, 2018). The Technological Pedagogical Content Knowledge (TPACK) approach is a promising framework for understanding how teachers can integrate technological tools into classroom learning (Wong, L., Chai, C. S., Zhang, X., & King, 2015). TPACK apart from being a new type of knowledge, TPACK is also a framework that can be used to analyze teacher knowledge related to integration into learning. TPACK is currently starting to be seen since the Covid-19 pandemic, where TPACK is used in various schools and madrasah education starting from early childhood, kindergarten, elementary/MI, junior high school to high school and tertiary institutions in Indonesia.

Based on the description above, Madrasah Ibtidaiyah (MI) in Guntur Subdistrict, Demak Regency which have used TPACK-based learning, namely Krandon and MI Wonorejo State Madrasahs (MIN) obtained from some similar information that in TPACK-based learning that has been used in the two Madrasahs aim to build teacher competence and develop ongoing learning facilities in the classroom, meanwhile

These competencies include pedagogic and professional competencies which are important keys for an educator that must always be developed in the current era. Teachers as the frontline in education in this country should have good competence and be able to provide learning experiences for their students.

MIN Krandon and MI Wonorejo are one of several formal educational institutions in Guntur District, Demak Regency, teachers play an important role in educating the nation's children and improving the quality of learning in order to achieve the desired learning goals. Facilities and infrastructure for learning activities are very supportive, as well as the learning media used in Madrasahs are also interesting and adequate. Teachers in

carrying out the teaching and learning process have different competency abilities, so researchers want to analyze a pedagogic and professional competence in teachers at MIN Krandon and MI Wonorejo, especially in class V science learning using TPACK utilization.

Therefore, the current quality of education that is so influenced and must be owned by a teacher is a competency, teacher competence as an element that determines the learning process and builds a stronger competency to create a great and dignified Madrasah.

In addition, several opinions state that teacher competence can be described in technology-based learning in the 4.0 era (Andrian, Y., & Agustina, 2019). In addition, professional competence also supports the success of education. Furthermore, there is an increase in pedagogical competence, teachers can develop a specific TPACK-based thematic pedagogic subject, in which the practice of making learning tools in the form of TPACK-based lesson plans and digital teaching materials and interactive media as a support for TPACK-based thematic learning.

The purpose of analyzing teacher pedagogic and professional competencies in utilizing TPACK in MI Guntur District, Demak Regency can provide guidelines for determining factors that provide recommendations to school principals and other educators on issues of pedagogical and professional competence teachers in utilizing TPACK.

METHODS

The approach used by researchers in this study is a qualitative approach. This qualitative approach is used to obtain detailed and meaningful research data. Through this research the author will conduct an in-depth study of the research object. Qualitative research itself aims to present a detailed, detailed and thorough description of Teacher Pedagogic and Professional Competency Analysis in Utilizing TPACK in fifth grade science learning.

This research was conducted for 1 month, from 1 to 30 March 2022 at the elementary school of Guntur District, Demak Regency. Respondents involved as data sources were 6 teachers from MI Wonorejo and MIN Krandon, with details of 2 madrasa heads and 4 class V teachers as interview respondents from each madrasa.

Furthermore, data collection methods using interviews, observation and documentation. The interview method used is the type of guided interview, namely conducting interviews by following the researcher. Furthermore, through observation techniques the author will collect data relating to the pedagogical competence and professional competence of teachers in utilizing TPACK. In addition to observation techniques, the authors also use documentation techniques. Documentation techniques are used by researchers to collect documents such as school documents, teacher profiles and pieces of images that can be used as sources of information.

In this study, the validity of the data uses source triangulation which is used to check data and compare the degree of trust in information obtained through different times and tools in qualitative research (Sugiyono, 2010).

Qualitative data analysis from interviews is based on theory (Moleong, 2011), with the stages of analyzing data, data reduction, categorizing data, interpreting data, and drawing conclusions.

RESULTS

This research was conducted at Islamic elementary schools in Guntur District, namely Demak MI Wonorejo and MIN Krandon. The results of this study state that the performance of teachers at MI Wonorejo and MIN Krandon in carrying out their duties has competence so that their performance is as expected. The competencies possessed by teachers at MI Wonorejo and MIN Krandon are pedagogic competence, professional competence, personal competence and social competence.

The pedagogic competence of teachers at MI Wonorejo and MIN Krandon, Guntur Sub-District, Demak Regency, was analyzed to have essential indicators which include: understanding students, designing and implementing lessons, carrying out learning evaluations, actualizing the various potentials of students.

Meanwhile, the professional competence of teachers at MI Wonorejo and MIN Krandon includes the abilities, skills and behaviors that must be possessed and mastered by a teacher who performs teacher duties as a teacher who requires expertise and proficiency in meeting quality education standards. Furthermore, the professional competence of teachers is the ability of personal skills, as well as technological, social and spiritual

knowledge which broadly forms the standard competence of the teaching profession to carry out their profession and duties to the fullest as educators.

Pedagogic and professional competence must be supported by adequate mastery of information technology, in order to produce educational cadres who have broad knowledge and are able to face the digital world which uses all technology. Because teachers must have those who are able to unite a knowledge of content, pedagogic, and technology which is commonly called. TPACK (Technological Pedagogical Content Knowledge).

The TPACK framework consists of several interrelated variables, including Technology Knowledge (TK), Pedagogy Knowledge (PK), Content Knowledge (CK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), Pedagogical Content Knowledge (PCK). These variables are mastered and applied in MI Wonorejo and MIN Krandon, the information is explained in the following table:

Table 1. TPACK di MI Wonorejo dan MIN Krandon

No.	Variable	Implementation at MIN Krandon and MI Wonorejo
1	<i>Technology Knowledge</i> (TK)	It was found that teachers applying this technology had almost mastered operating computers/laptops in a lesson such as designing lesson plans and using IT-based learning media.
2	<i>Pedagogy Knowledge</i> (PK)	Develop learning models to reduce misconceptions in ongoing learning and be able to apply thematic learning to achieve learning objectives.
3	<i>Content Knowledge</i> (CK)	Teachers are able to explain abstract concepts by using visual aids to understand students in learning science
4	<i>Technological Content Knowledge</i> (TCK),	Teacher knowledge of technology for specific content learning
5	<i>Technological Pedagogical Knowledge</i> (TPK)	The two madrasas already understand how to use ICT media such as laptops to develop lesson plans and also use it as a medium to facilitate teaching in class.
6	<i>Pedagogical Content Knowledge</i> (PCK)	The teacher determines a strategy or method that is adapted to the conditions of the students, the choice of this strategy can link the material to the knowledge or pedagogic reasoning of the students.

Based on the table, teachers at MIN Krandon and MI Wonorejo have presented concepts in a technological assistance, as well as techniques for applying pedagogy using

technology which can help student learning, as well as building knowledge by utilizing existing technology to understand students' learning.

DISCUSSION

Based on the discussion above, in analyzing the pedagogic and professional competencies of teachers in utilizing TPACK in science learning at MI Guntur District, Demak Regency, researchers used indicators of pedagogical competence in utilizing TPACK, indicators of teacher professional competence in utilizing TPACK, as well as supporting and inhibiting factors in carrying out teacher pedagogic and professional competencies in utilizing TPACK in science learning class V. The findings of the specification of each indicator can be seen in the discussion description below.

Teacher Pedagogic Competence in Class V Science Learning

Pedagogic competence is the teacher's ability to manage student learning which includes student understanding, design and implementation of learning, as well as evaluation of learning outcomes to actualize their potential (Rahman, M, 2013). Based on the results of interviews with four class teachers, related to pedagogic competence, in detail the substance of the pedagogic competencies of MI Wonorejo and MIN Krandon, Guntur District, Demak Regency can be broken down into essential indicators as follows:

Understanding Learners

Understanding of students where a teacher must have the ability to understand his students. At MIN Krandon and MI Wonorejo in carrying out the learning process teachers are required to understand the character of their students, either through observing students at school or by conducting direct questions and answers to parents of students.

Planning and Implementing Learning

Planning includes setting goals in learning, that teachers at MIN Krandon and MI Wonorejo before carrying out learning have set goals first, these learning objectives are used to measure learning to be carried out in order to limit the assessment to be carried out.

Implementation, in the implementation the teacher always adjusts the conditions of the students, which is included in the preparation of the lesson plan to determine the

learning model and media used and also determines the evaluation of learning outcomes.

Carry out Learning Evaluation

Some of the evaluation methods used by MIN Krandon and MI Wonorejo teachers in science learning are using knowledge assessment techniques that are includes written tests, quizzes with visual media and also questions and answers. Whereas in skills assessment, students perform work or create works that produce products. In addition to social assessment or the attitude of students in respect, honest behavior, discipline and responsibility.

Actualizing Various Potentials of Students

From several sources, respondents related to students that students certainly have academic and non-academic talents. As a teacher, you can find out the academic talents of your students by observing their daily activities in learning and their learning outcomes in class. When conducting questions and answers, the teacher's oral questions can observe or know the child at that time. Through evaluation of students and questionnaires, the teacher knows the abilities of each student. The teacher also organizes extracurricular guidance which can be found out from the selection of the KSN (National Science Competency) competition which all students can participate in.

Teacher Professional Competence in Class V Science Learning

Professional competence is one of mastery in broad and in-depth learning materials that allows guiding students to fulfill the competency standards set out in the National Education Standards (Law No. 14 of 2005). Atmuji & Sukung (2015) argues that teacher professional competence includes abilities, skills and behaviors that must be possessed and mastered by a teacher who carries out teacher duties as a teacher who requires expertise and proficiency in meeting quality education standards. Furthermore, the professional competence of teachers is the ability of personal skills, as well as technological, social and spiritual knowledge which broadly forms the standard competence of the teaching profession to carry out their profession and duties to the fullest as educators (Haryanti, 2010).

Teacher professional competence in science learning class V MIN Krandon and MIS Wonorejo Kec. Guntur Kab. Demak with five formulation components in Permendiknas No. 16 of 2007, among others:

Mastery of Material, Structure and Concepts and Scientific Mindset in Subjects

In mastering material, concepts or scientific mindsets that support science subjects taught by teachers are very good, in guiding students according to competency standards. Starting from the way the teacher understands science learning material to students with different characters and mindsets and also explains the material repeatedly and can be understood by students delivered by the teacher. As for using learning methods and media, they are also adapted to the conditions of the students.

Mastery of Competency Standards and Basic Competence in Subjects

Before carrying out the learning takes place the teacher applies a teaching skill that is in accordance with the character of the students, to provide knowledge and skills so that at least students have mastered the competency standards that have been applied. This shows that mastery of competency standards and basic competencies becomes a reference for teachers in preparing lesson plans from the material selection stage, determining suitable methods and strategies or media to convey the material and up to the evaluation stage at the end of learning.

Development of Learning Materials Creatively

From the results of observations, teachers have high insight into science, especially in learning science material. Teachers in preparing learning are very creative and innovative and can also convey varied learning and are of interest to their students. In learning, they have utilized several facilities such as the internet and facilities and infrastructure in each Madrasah by integrating into technology.

Continuously Develop Professionalism.

This continuous professional development is the development of teacher competence which is carried out according to the needs or in stages to increase their professionalism. Teachers at MIN Krandon and MI Wonorejo in developing their professionalism include self-development which is to improve individual and group performance skills. Here teachers are demanded and treated as innovative teachers in concrete tasks such as teaching, assessment and observation.

Utilization of Information and Communication Technology for Self-Development

Teachers in both Madrasahs have implemented IT-based learning or by using learning media that is integrated with technology. In the current era, information

technology has become a competency requirement for a teacher today to support the implementation of their duties so that every teacher must be ready to keep up with the times by learning ICT to fulfill these competencies.

Teacher Pedagogic and Professional Competence in Utilizing TPACK in Class V Science Learning

TPACK is a framework that integrates technology, pedagogic and content knowledge in the field of study (Koehler, M. J., Mishra, P., & Cain, 2013). Meanwhile, the TPACK framework consists of six interrelated variables, including: *Technology Knowledge* (TK), knowledge about what the teacher has to carry out the learning process. At MIN Krandon and MI Wonorejo it was found that teachers applying this technology had almost mastered operating computers/laptops in a lesson such as designing lesson plans and using IT-based learning media. *Pedagogy Knowledge* (PK) is in-depth knowledge possessed by educators about strategies, methods and processes of conveying learning to students able to understand learning models, can even develop learning models to reduce misconceptions in ongoing learning and be able to apply thematic learning to achieve learning goals (Kanuka, 2006) (Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, 2009); (Mishra, P., & Koehler, 2008). *Content Knowledge* (CK) is a knowledge of material and theory as well as conceptual approaches to developing knowledge such as teachers being able to explain abstract concepts using visual aids to understand students in learning science. *Technological Content Knowledge* (TCK) that is, the teacher's knowledge of technology for specific content learning (Niess, 2005); (Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, 2009). *Technological Pedagogical Knowledge* (TPK) is an understanding of knowing the amount of technology that can be used and understanding that using technology can change the way of learning. In this aspect the teachers in both madrasas already understand how to use ICT media such as laptops to develop lesson plans and also use it as a medium to facilitate teaching in class (Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, 2009). *Pedagogical Content Knowledge* (PCK) is one that becomes the professional knowledge of teachers to choose suitable strategies in learning materials. In this PCK, what was obtained from the results of interviews from the two Madrasahs, that before carrying out the learning takes place, the teacher determines a strategy or method that is adapted to the conditions of the students, the selection of this strategy can link the material to the knowledge or pedagogical reasoning of the students. *Technological Pedagogical Content*

Knowledge (TPACK) is a collection of knowledge possessed by teachers to integrate three components namely, content, pedagogic and technology (Mishra, P., & Koehler, 2008). Judging from the results of observations and interviews, teachers at MIN Krandon and MI Wonorejo have presented concepts in a technological assistance, as well as techniques for applying pedagogy using technology which can help student learning, as well as building knowledge by utilizing existing technology to understand participants. educate them in learning.

CONCLUSION

The results of the research and discussion conducted at MIN Krandon and MI Wonorejo, Guntur District, Demak Regency, show that the pedagogic and professional competencies of teachers in utilizing TPACK in class V science learning are as follows. teachers can understand the different characters of students well, teachers master theory in learning and teachers can develop learning materials in educational learning activities, and teachers have the goal of developing potential and communication with students, seen from the way the teacher makes observations in learning, evaluating and communicating with students.

Through pedagogical and professional competencies, teachers in utilizing TPACK can convey science learning easily, are able to develop teaching materials through digital technology, are able to create digital technology-based learning media and integrate science learning materials into IT-based learning, as well as instill character in learning, teachers able to carry out learning and determine learning methods related to management planning and development up to evaluation. Based on

From these conclusions, the findings of this study can have implications for teacher competence and develop TPACK in future MI.

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