DPJPM
Delta-Phi: Jurnal Pendidikan Matematika
https://www.journal.assyfa.com/dpjpm

Delta-Phi: Jurnal Pendidikan Matematika, vol. 1 (3), pp. 181-188, 2023
Received 01 August 2023/published 17 September 2023
https://doi.org/10.61650/dpjpm.v1i3.205

MICROTEACHING: Analysis of the Readiness of Prospective Mathematics Teacher Students in Teaching Function Material

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Abstract

In today's era of globalisation, teacher professionalism is inevitable and cannot be postponed as competition becomes increasingly fierce. We need people who are indeed experts in their field, according to their abilities, so that everyone can play their role optimally. This study aims to describe the ability of students in a mathematics teaching research program to prepare to become professional teachers based on the teaching skill standards needed in the future to become teachers. In microteaching courses. Through micro-teaching, teachers gain knowledge and skills on how to plan and practice learning activities that will be provided to students so that learning becomes meaningful and they can become professional teachers. The type of research is qualitative, with the research subjects being three students conducting research in preparation for a micro-teaching course in semester odd of the 2023/2024 academic year. The tools used are learning planning rubrics, teaching practice observation sheets, practical skills assessment sheets, and helpful activity notes—data collection techniques by observation, interviews and documents. Based on the analysis results, it was found insight and concluded that students of the study program Teaching Mathematics in Micro-teaching course have the potential to become professional teachers based on the skills education, specifically educational, personal, professional and social skills.

Keywords: Composition Function; Mathematics Learning; Microteaching; Professional; Prospective Teachers.

Introduction

Education is essential because it gives students knowledge and skills that influence their behaviour (Kesäläinen, 2022; Reisoğlu, 2022; Tomljenovic, 2021). The task of professional teachers to achieve educational goals significantly impacts sound and quality education (Hu, 2018; Shelton, 2018; Tang, 2020). Teachers support and motivate students to participate in learning activities because learning aims to prepare students to become knowledgeable and skilled workers who will succeed (Carpenter, 2019; Richard, 2021), especially in a globalised world.

Teachers must be professional when competition increases globally (Flores, 2020; Gegenfurtner, 2020). So that everyone can perform well, true experts are needed according to their expertise. Being a teacher is difficult. Everyone can teach, but today's teachers must be competent to improve education. Teachers and lecturers are professional educators who educate, teach, guide, direct, train, assess and evaluate students from an early age to secondary education (Losano, 2018; Sandilos, 2018; Santiago et al., 2023; R. et al., 2021). Teachers are critical in student development. Teachers are generally considered educational leaders. Professional teachers have academic skills.

Professional teachers must know material sources, teaching strategies, and student characteristics (Cheetham, 2013; Cheong et al., 2021; R. Sugianto et al., 2023). Experienced teachers must master scientific disciplines as a source of teaching materials, student characteristics, educational philosophy and goals, learning methods and models, principles of learning technology, student assessment, and class planning and control to carry out education (Day, 2017; Instefjord, 2017; Lima, 2013; Ventura, 2018). Process smoothly. A professional teacher must have standardised competency abilities and demonstrate their quality as an experienced teacher because competency is mastery of each individual's work abilities, including knowledge, skills and work attitudes that meet standards.

The academic qualification standards and teacher competencies are based on four main competencies: pedagogical, personality, social and professional (Adami, 2012; Bubnova, 2022; Chai, 2019; Priddey, 1996). Professional teachers combine these four skills. Teachers' professional achievements usually measure good education. Instructor competency requirements enhance learning by ensuring instructor quality. Learning objectives can be implemented according to expectations with the instructor's competency criteria (Juuti, 2021; Zhumash, 2021). Teachers must obtain these four competency requirements through professional education. Deep and extensive learning is necessary for professionalism. Mastering the material means knowing the topic's content, curriculum, scientific concepts and structure, educational obstacles, and relevant material.

Based on Mathematics Teacher Educator Competency Standards. Mathematics teaches students to think critically, logically, systematically, creatively and efficiently, developing discipline, responsibility, self-confidence, openness and curiosity (Ahmed et al., 2021; Choirudin et al., 2021; Darmayanti et al., 2022). Minister of National Education regulations requires secondary school mathematics teachers to use measurement and estimation to understand numbers, number relationships, number systems, and number theory (Anhar & Darmayanti, 2023; S. Sugianto et al., 2023; Usmiyatun, Sah, et al., 2023). Mathematical reasoning, geometry, statistics, probability, patterns, and functions Algebra, calculus, analytical geometry, discrete mathematics Trigonometry, vectors, matrices Teaching history and philosophy of mathematics, Calculators, software, mathematical models, statistical models, and visuals.

The job of a math teacher is ideal and helps many people. The study of mathematics education prepares instructors for careers. Teachers need skills beyond mathematics. Teachers must be skilled at designing junior high school mathematics teaching materials, above and equivalent, using secondary education mathematics learning methodologies and implementing and producing in-depth mathematics teaching materials and Islamic learning (da Silva Santiago et al., 2023; Häkkinen, 2017; Nel, 2012; Vidyastuti et al., 2018; Zahroh et al., 2023). Supporting skills indicators require science and mathematics education courses. The Mathematics Education Study Program helps students build educational professional values, attitudes, knowledge and abilities to become mathematics teachers. Microteaching courses are required.

Microteaching learning prepares students to become teachers (Stavros et al., 2023; Zaidi, 2015). Practice teaching basics with microteaching. Learning is fast and controlled. Every item is done carefully and correctly to optimise capabilities. Students or learners can be taught micro-teaching. Microteaching allows prospective teachers to practice basic teaching methods in a positive, supportive, and friendly atmosphere with their peers to develop mental readiness, skills, and integrated performance abilities for school (Karlsson, 2020; Otsupius, 2014; YU & HUANG, 2018). Microteaching prepares students to teach. Teaching requires preparation to reduce errors. The preparation of future teachers determines the quality of education—the better the qualifications. The student's preparation for professional teaching indicates capabilities.

Professional teacher readiness depends on many aspects. Teacher readiness is divided into internal elements, including teaching interest, motivation, intellectual talent, knowledge, and ability (Arslan, 2021; Dayal & Alpana, 2020; Harun & ..., 2015). Family, school, and peers influence professional knowledge, as do field experiences. Practice helps teachers prepare. You will benefit from educational readiness with maximum capabilities to fulfil your main tasks. Teachers must master the subject matter and physical and mental skills (Banerjee et al., 2015; Darwish, 2015). Applicants for teaching positions must prepare early and work effectively. This training begins with a university seminar for prospective instructors.

Several studies have been conducted on microteaching, with variations in the subject, location, materials, grade level, curriculum, and teaching resources employed. The participants in this study consisted of mathematics education students at PGRI Wiranegara University who were in the 7th semester of their program. This research served as a preparatory measure to ensure that students were adequately equipped and prepared for the PPL. The location for this activity is a school different from the one where the students will perform PPL. This is mainly true since the selected school differs from the one the student attended for high school. The content utilised consists of functional resources specifically tailored to the subject matter taught at the school. The curriculum employed is the most up-to-date, specifically the self-directed learning curriculum. The teaching materials used adhere to prior research, relying on a needs analysis in mathematics education, utilising the Pizzaluv media.

Based on the context above, research is needed to identify student readiness as prospective professional teachers, with a problem formulation that describes student readiness based on educational competency criteria. The preparation of mathematics education students at PGRI Wiranegara University, Pasuruan, based on competency standards for microteaching educators, was only studied in this research.

Research Method

A qualitative descriptive study describes students' readiness to pursue microteaching courses as potential professional teachers based on educator competency standards. Figure 1 depicts the procedure used in this study (Usmiyatun, Mustafa, et al., 2023).

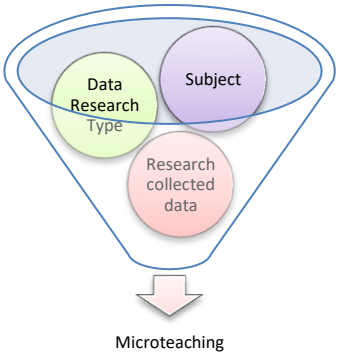

Figure 1. depicts the initial step utilized

Figure 1 illustrates that this study included PGRI Wiranegara University, Pasuruan mathematics education students. 3 students were chosen. Then, in Figure 1, you can see that the research uses two types of data: primary data, which is data collected firsthand from the source, such as practical observations of students' microteaching learning activities, student teaching tool assessment results, student competency assessment results, and interview results. Secondary data comes from images taken during practical learning activities and interviews by many researchers. This research collected data through empirical observation of learning activities, documentation of student-prepared teaching tools for learning activities and competencies, and student interviews. The tools and analytical methods are shown in Figure 2.

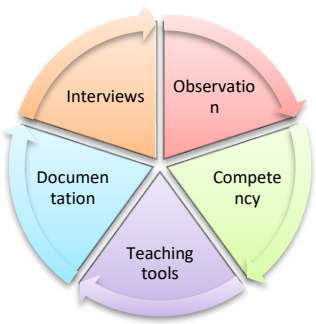

Figure 2. tools and analytical methods

Figure 2 indicates that practical observation sheets, competency evaluation sheets, assessment sheets for teaching tools prepared by students for practice, and notes on all activities are employed as research instruments. (Cholily et al., 2023) Use a three-stage research analysis technique: Reduce and sort data by research emphasis. The data comes from observations, documentation, and student interviews. Attaching research results organises them by research problem. Research results lead to conclusions. The researcher triangulated all primary and secondary data sources.

Results and Discussion

The microteaching course requires students to have finished and taken prerequisite courses, including Strategic Learning and Teaching Mathematics, Learning Media, and Learning Evaluation. These courses are necessary but not required. Before preparing for teaching simulations in microteaching systems, students are required to attend several preparatory classes. These classes aim to ensure that students have the fundamental abilities to conduct simulations.

To understand effective teaching strategies and procedures, students in microteaching courses are provided with knowledge about fundamental teaching approaches and simulations before engaging in teaching practice. Middle school students must develop teaching practice material appropriate for the middle school level, specifically middle school and high school. It is a requirement that students do not have the same material as their friends to enrich students' experience in all mathematics subjects at the junior and senior high school levels. Students are given the freedom to choose the material they have mastered to enable them to be better prepared when practising teaching.

If students make fatal mistakes during practical teaching activities, such as being anxious, unable to speak, not being able to master the content, or not being able to master the class, then students are permitted to repeat the activity once. This ensures that students can honestly communicate their capabilities fully during practice. It has been determined, based on the analysis that has been carried out, that:

1. ***An Analysis of the Educational Resources***

Students continue to use the K13 curriculum tools, including the annual program, to evaluate the teaching tools they have produced before engaging in microteaching practice inside the independent curriculum. Plans for Learning Implementation (RPP) include the following components: Identity, Core Competencies, Basic Competencies, Indicators of achieving essential competencies, and Semester program (there are odd or even semesters based on the subject matter that will be taught by students in odd or even semesters) (Fatra & Maryati, 2018; Sah et al., 2022; Utaminingsih et al., 2023). It is well known that SMA Negeri 4 Pasuruan, which already employs the independent learning curriculum, is the instructional institution that serves as a venue for implementing microteaching.

The Merdeka Curriculum includes various teaching materials teachers can utilise to accomplish the Pancasila Student Profile and Learning Achievements (CP). These materials are referred to as the teaching tools. Instructional materials consist of various formats, such as learning videos, textbooks, and teaching modules (Darmayanti et al., 2023; Susanto et al., 2022).

Next, the learning objectives, methods, models, and strategies were utilised. Activities such as introduction, core, and conclusion are included in the learning stages. Learning resources and media are also employed. Students' evaluations of their performance. These components are incorporated into the competency achievement indicators for designing learning and evaluation activities. Consequently, it is anticipated that the learning objectives of the independent curriculum will assist students in developing the knowledge, abilities, and attitudes necessary to become responsible citizens.

Materials for instruction: Various kinds of instructional materials can be used. Reference materials and gadgets have been developed to assist in explaining particular materials or subjects. This package includes Student Worksheets (LKS), which include Identity, essential competencies, markers of achieving critical competencies, and phases of question solution; Electronic and manual teaching aids; and electronic learning material (Dezuanni, 2014; Hasanah et al., 2022; Wulandari et al., 2020). Teaching Materials are also supporting materials for Teaching Modules on the Merdeka Mengajar Platform. These modules are centred on particular learning outcomes and objectives.

Evaluation tool for students, independent curriculum assessment instrument The first type of assessment is called a summative assessment, and it is an evaluation that requires qualitative data and is carried out regularly after meeting one or more learning objectives. These learning outcomes are reported on report cards, which are the findings of the summative assessment. These are the four attributes found in the results of the summative evaluation given to the students: 1) requires direction, 2) is sufficient, 3) is good, and 4) is very good.

In the second type of evaluation, formative assessment, the extent to which students have attained their learning objectives is evaluated through this activity. This evaluation occurs both at the beginning of the learning process and while the learning is taking place. Utilising the formative assessment outcomes, the description of Competency Achievements included in the report card is considered. To put it another way, the Merdeka Unik Curriculum Assessment Method, used to evaluate students' learning outcomes in the autonomous curriculum, consists of several processes that must be completed correctly. The method of independent curricular assessment that is presented here is one that educators need to become familiar with.

The following are examples of assessment tools: checklists, anecdotal notes, progress charts, and rubric lists. Observation, performance, projects, portfolios, written tests, oral tests, and assignments are all assessment instruments based on assessment methodologies (Aktaş, 2013; Deng, 2019; Gadušová, 2019). The summative assessment, quantitative data, formative assessment, and qualitative data are the forms from which learning outcome reports are derived. The final summative score for the material's scope has been combined with the final summative score for the semester to arrive at the score displayed on the report card. Regarding the calculation of report card grades, the Education Unit is the one that decides the weighting. The grades are compared with the learning achievement objectives, and an asterisk is placed next to the steps if they do not fulfil the completeness of the learning objectives (KKM is another term for this). Regarding the description of Competency Achievements in the report card, the purpose of formative assessment is to take into consideration.

The study's findings on the teaching tools that students developed before carrying out teaching practice demonstrated that, in general, students were able to prepare teaching tools. Nevertheless, those created were typically used as instructional aids in the K-13 curriculum. A single student has taken the necessary steps to ensure that the instructional materials for the independent

learning program are in order. Only 33.33 per cent of the three students were able to achieve the outstanding category, while the remaining pupils demonstrated that they were able to achieve the poor class. Students' failure to bring the complete set of requested gadgets is the root cause of those classified as capable or economically disadvantaged. To be more specific, students are still required to modify their devices according to the curriculum of SMA Negeri 4 Pasuruan.

Furthermore, students are required to make the LKPD one of the teaching resources. This includes the questions included in the LKPD, which are not based on the topic that will be taught, and the LKPD is not prepared based on the provisions that have been set. In particular, there is no identity, basic competencies, signs of reaching essential competencies, or stages of problem-solving. Nor is there any problem-solving process. It is necessary to have LKPD as a tool to support ongoing learning and teaching activities. LKPD also determines whether the student's worksheet is the source of the information being taught and whether the stages of problem-solving are organised hierarchically according to the fundamental laws of mathematics. The LKPD is required. Another reason is that students cannot access textbooks when taught mathematics. Teachers are increasingly utilising Google Classroom activities within the context of all of their teaching and learning activities. Because students are not teachers at the school, it is impossible to carry out learning activities by doing the same thing in Google Classroom. Therefore, students are required to create LKPD for their teaching activities.

The students do not develop learning models or approaches based on the syntax of the learning phases in the teaching module. As an illustration, the game-based learning (GBL) technique does not use the syntax that applies to the GBL learning method when it is in its learning stages. It is essential to understand the function of learning stages to determine which phases will be carried out while teaching in the future by the learning model that is utilised in the RPP/teaching module.

In light of the findings shown above, it is still necessary for students to understand the significance of teachers' role in teaching and learning in the classroom. Regarding learning activities, teachers are not the only ones who require learning equipment. These devices are equally significant for students because they serve as objects that receive and absorb the information presented by the instructor. In light of this, the learning tools are also a significant factor in determining the success of an activity involving teaching and learning (Kokkinos, 2022; Kroeger, 2022; Thangaraju, 2023). Learning tools are not only an indicator of achievement in each subject taught by each instructor, but they are also a goal for teachers and students in learning and teaching activities. Learning tools make it easier for students to re-study the material delivered in the lesson. Ideally, the preparation of each learning aid should consist of four primary instruments. This ensures that the goal of applying learning is achieved optimally, effectively, and efficiently (Hoor, 2023; Lewis, 2019; Tolliver, 2022).

2. ***Evaluation of Instructional Methods***

The evaluation of teaching practises encompasses the aspect of Appearance, which includes the requirement of dressing in a professional and presentable manner, such as wearing a batik, a blazer, or a shirt. Students continue to be observed wearing athletic attire, including standard training trousers. This demonstrates the necessity for pupils to acquire knowledge on the appropriateness of clothing in the school setting. Students who are wearing loafers are still observed wearing trainers. Some individuals choose sandals in hues other than black. Female pupils should apply minimal makeup. Under these circumstances, students can still readily adjust. The preliminary exercises consist of greeting, prayer, and attendance. During this stage, pupils frequently inquire about the identities of their absent classmates and the reasons behind their absence. Students often neglect this stage when presenting motivation. It was discovered that pupils lacked enthusiasm for participation and desired to acquire knowledge in mathematics. The communication of the fundamental skills and benchmarks to be attained was also lacking. Despite attempting to elucidate the advantages and establish a correlation with practical situations, it proved unfeasible to establish the relationship. The core activities, including the learning activities outlined in the RPP, remain unsuitable. Closure activities encompass the completion of confirmation tasks, whereas final assessments of pupils are exclusively conducted within core activities. Students are not assigned any homework.

Overall, the analytical results of the students' assessment of teaching practice indicated that, on the whole, students demonstrated proficiency in carrying out instruction practice. Within this particular category, students' stiffness and inflexibility during teaching sessions can be attributed to their lack of mastery of the subject matter (Imaniah, 2019; Setyawati, 2018; Wong, 2018). They must enhance their communication skills and engage in active interaction with students. Classroom proficiency is of utmost significance for an educator, as it facilitates interactive communication between students and their teachers. Students, being dynamic entities, can actively engage in touch during the learning process. Students are required to adhere to the suitable model/method/strategy/learning approach sequentially. They modify the learning activities described in the RPP to deviate from the original plan (Nugraheni, 2019; Sunra, 2020; Wakimoto, 2019). The model/method/strategy/process incorporated in the RPP is an instructional phase that serves as the primary content for pupils. Failure to adhere to the guidelines outlined in the RPP will result in the learning objectives not being met as anticipated. The learning activities are not being conducted optimally, resulting in the final assessment of student learning outcomes falling short of expectations. The inability to effectively engage students in learning activities, particularly the inability to utilise time for providing feedback through student interaction.

3. ***Evaluation of Skills and Abilities***

Evaluating competency involves assessing educators against established standards of competence, namely in pedagogy, personality, social skills, and professionalism. The following are the overall analysis results of students who possess competencies aligned with the requirements set for educators:

a. Proficiency in teaching methods and strategies

Pedagogical competence encompasses the capacity to instruct effectively and direct students, efficiently handle classroom management, proficiently utilise media and technology, skillfully develop teaching materials based on curriculum principles, maintain a positive perception of students, and adeptly prepare assessment tools for student evaluation. The research revealed that only one student attained the excellent category, while merely two pupils fell into the low class.

Students categorised as weak or capable in pedagogical competence still struggled to fully grasp the grammar of the model/method/strategy/learning approach employed during the self-reflection stage. The utilisation of scientific principles and technological tools in acquiring mathematical knowledge. The research revealed that the overall data from three students indicated a learning rate of 33.33%. Consequently, it was determined that the steps incorporated in the model were unsuitable and required further consideration.

Acquiring knowledge about the stages that must be considered in the model is inadequate. A solid syntax command during the learning phase is crucial to understanding the sequential steps involved in the learning process (Göçer, 2016; Zahroh, 2014). This enables you to assess the effectiveness and efficiency of the model, technique, strategy, or approach utilised in teaching the subject matter.

b. Personality Competencies

Personality competencies encompass self-discipline, politeness, effective communication, authoritative demeanour, sound decision-making skills, becoming an exemplar for others, and self-control. The study results indicated that 67.3% of students attained the "perfect" classification, while the rest achieved the "good" category. Personality competency means pupils possess the necessary skills and qualities related to their personality (von Suchodoletz, 2018; Wu, 2020).

c. Social Competence

Social competence encompasses the capacity to articulate viewpoints, adeptness in adapting and fostering harmonious relationships, a high level of tolerance, cooperative behaviour, openness to receiving criticism, recommendations, and others' perspectives, and practical communication skills. The research revealed that 54.3% of students were classified in the excellent group, while the remainder of pupils were ranked in the superb category. Students who exhibit social competence demonstrate their ability to navigate social interactions effectively (Feng, 2020; Waller, 1996).

d. Professional Competency

Professional competency encompasses a thorough command of mathematical concepts, a broad understanding of scientific principles, applying mathematics to real-world situations, and staying up-to-date with scientific advancements. Additionally, a high percentage of students achieved an outstanding category, while a smaller percentage obtained a suitable type, and the majority received a poor variety.

The pupils who were categorised as weak in professional competence could not master the subject matter of mathematics. Despite being informed about the topic that will be taught, students persist in using their cell phones. It is crucial to prioritise the task and attend the class. Additionally, concise explanations (textbooks) are provided during instruction that contain incorrect concepts and lack a logical progression of fundamental mathematical principles. The mathematical content supplied is incongruent with the material, elucidating instances of intricate inquiries. The volume should be increased. The articulation of the intonation could be more distinct. Students frequently express uncertainty by stating, "If I am not mistaken, this is the answer," when confronted with an unanswerable question. As an aspiring educator, you must refrain from fostering uncertainty in students through such assertions. This assertion stems from the fact that students have not attained a high level of proficiency in the subject matter (Gleason & Gillern, 2018; Kelleci, 2018; Moral, 2021). Ability in the subject matter is crucial in teaching as any erroneous concepts conveyed to students can perpetuate their faults in subsequent levels. Assistance will be required for students to comprehend the content at the next academic stage.

The following documentation of the microteaching activities that have been carried out can be seen in Figure 3.

Figure 3. Documentation of the microteaching activities

Conclusion

The research findings and subsequent debate have concluded that students require additional support and training in order to meet the educational competency standards necessary for becoming qualified teacher candidates. The prerequisites encompass educational, personality, social, and professional aptitudes. Thus, it is anticipated that this exercise will be a significant asset for students to enhance their proficiency in PPL, enabling it to operate as an evaluative instrument for individual students.

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