Trigger Questions in Mathematics Learning Simulation on Micro Teaching Course: Students Ability in Instructional Preliminary Activities

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**Abstract**. One of the student competencies developed in the micro teaching course is the ability to asking questions. The ability to asking questions which is important to develop is a trigger question in preliminary activities. In this qualitative descriptive study conducted on 40 mathematics education students, the analysis was carried out from the learning videos that had been compiled by students. Question identification based on eight types of questions are interpretation, gathering information, hypothesis and reflection with open ended and closed question types. The results of this study describe the results of identifying the types of questions in suggesting triggers in open activities, which indicate that the type of question used is the closed type of interpretation.

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1. **Introduction**

The micro teaching subject is a course that aims to train students at an early stage in the formation of teaching competencies through limited practice to actualize basic teaching abilities (UNY, 2011). The Microteaching experience provides benefits for students to show the reality of teaching, introduce their role as teachers, help them see the importance of planning, decision making, and teaching implementation, develop and improve teaching skills, build confidence for teaching (Subramaniam, 2006).

Micro teaching lecture activities are dominated by practicing the basic components of teaching in the learning process so that prospective teacher students are truly able to master each component separately and / or several components in an integrated manner in a simplified or minimized learning situation seen from the aspect of learning components, student material , as well as time. Through this study program, it is expected to provide mastery of teaching competencies from prospective teachers so that they are able to create quality learning. A number of educational studies conducted have shown a relationship between the quality of teaching and teacher education on the one hand and student achievement on the other (European Commission, 2011).

In general, there are two models of implementation of teaching practices in micro teaching subjects that peer teaching models and real models of teaching. n the implementation of the micro teaching carried out in the Mathematics Education Department of the Faculty of Mathematics and Natural Sciences, UNY and generally in the LPTKs, the peer teaching model is used. The situation in the peer teaching model is very different when compared to real teaching, this is because the students faced are peers so that the responses obtained during the learning interaction between the model teacher and students do not match the real conditions. To overcome this weakness, micro teaching lectures begin with the observation of mathematics learning in schools or institutions which will be used in guided practice activities after the end of micro teaching.

The implementation of micro teaching in the Department of Mathematics Education, Faculty of Mathematics and Natural Sciences, YSU and generally on several LPTK campuses in DIY is guided by 1 to 2 supervisors in the form of peer teaching, limited in terms of the number of students between 9-12 people, teaching materials / materials, presentation time between 20- 30 minutes, and the skills that are trained. There are pandemic constraints, shifting the implementation of micro teaching in face-to-face form into online activities. The basic micro teaching competencies that students must master in a pandemic are still achieved. In brief, the basic competencies in teaching micro teaching are compiling lesson plans, demonstrating basic teaching skills, and practicing basic teaching skills in an integrated manner. Micro teaching learning activities during the pandemic were carried out as usual, starting with the study of learning plans, implementing learning, giving constructive criticism and reflection. Learning is carried out in smaller classes and video recording of learning is carried out. This learning video is used to provide criticism and reflection activities in the micro teaching class. The procedure for implementing the practice of micro teaching learning is carried out as shown in the following chart.

Planning

Teaching

Critiziting

Reflecting

One indicator of a very important basic teaching skill is the skill in asking question techniques. Effective asking question skills are one of the basic skills related to achievement in mathematics (Shahril, 2013). Asking question skills will appear in preliminary activities, core activities, and at closing activities. The asking question techniques used in each of these activities are of course different from one another.

Asking questions by the teacher in preliminary activities is generally done for the first time to determine the readiness of students both physically and psychologically. In preliminary activities, the delivery strategy is by asking questions to equip them with class discourse so that learning can run effectively (Russell, 1983). The technique of asking questions in preliminary activities aims to motivate students and provide direction to activities in core activities. Another question that was asked in the introductory activity was a trigger question. Through giving trigger questions in preliminary activities, it will provide challenges to students, and that creates a culture of student curiosity (Boaler & Brodie, 2004). The construction of the trigger questions must be interesting and make students 'curiosity increase, one of the construction techniques that can be interesting is to relate to contexts that are close to students, and the development of students' thinking skills. Therefore it is necessary to have high-level thinking questions in order to instill students' higher order thinking skills (Saaeed, et al, 2012).

In order to asking questions, it requires sufficient knowledge related to the material in question. Judging from the scientific provisions in the previous semester students have been provided with mathematics-related material in the form of numbers, algebra, geometry, statistics and odds as well as trigonometry and calculus, as well as knowledge related to pedagogy. Generally, student teacher candidates have a deep understanding of mathematical knowledge but it is not sufficient to teach mathematics (Turnuklu & Sibel Yesildere, 2007). It takes the integration of math content and pedagogical skills known as PCK. Teaching experience can drive PCK development, providing structured opportunities for reflection on the relationship between subject matter knowledge and classroom practice is also important to facilitate the development of PCK for prospective teachers (VanDril 2010). One aspect of PCK is questioning skills. The importance of asking question skills is one of the abilities developed in micro teaching course. Research shows that 93% of teacher questions are "low level" knowledge-based questions that focus on remembering facts (Daines, 1986). It needs to be studied how the ability to ask prospective teachers at universities.

In preliminary activities, generally the asking questions are carried out orally, which are conveyed clearly and concisely, in order to stimulate students' thinking (Ralph, 1999). The teacher's verbal question and answer encourages all students to participate in class discussions. Class interaction takes place between students, other classmates, and the teacher. Students will share their views, thoughts and procedures for either low or high problem solving tasks (Sahrill, 2013).

There are interactions when asking questions and answers to students to deepen students' mathematical understanding (Brendefur & Frykholm, 2000). The asking questions by the teacher in the classroom play an important role in developing conversation and mathematical thinking in mathematics learning, and thus this ability becomes one of the important things as the main competency developed in micro teaching activities.

Many studies have identified and categorized the types of questions based on question construction and instructional size. One type of question construction of mathematical problems uses a dichotomy, such as open or closed questions (Streitlien, 2009). Various different definitions are found regarding open questions, in general open questions are non-routine problems for various processes or, methods of working, or open end results, while closed questions have very clear beginnings and goals and do not allow the possibility of different thoughts. (Nohda, 2000). In this type of question it stimulates students to be more creative, but there is no further activity that is expected from learning. One of the grouping types of questions with learning power is to divide the types of questions into four types, that are interpretation questions, asking students to fill in missing information ; inferential questions, transfer inquiries that focus on the consequences of gathering information to go beyond the information that is immediately available; Hypothesis questions that ask students to think about what could be predicted and tested and reflective questions that ask students to ponder about how they know what they know (Wolf, 1987). The questions posed in the introduction are of course learning in nature, if there are four types of questions that have a learning power and as well as an assessment of the construction of dichotomous questions, it will produce eight types of questions. The following study is related to the eight types of questions developed by prospective mathematics teachers in the micro teaching activity.

1. **Method**

This researcher is a descriptive quantitative research. Researchers have worked with forty mathematics education students who are currently taking micro teaching courses. Generally, each student carries out 4 learning practices by presenting different topics. The instruments used in this study were observation sheets and document studies in the form of instructional videos. Identification of the construction of the trigger question was observed using the type of questions given by Wolf (1987), namely: interpretation questions, information gathering; Hypothetical questions reflective questions, as well as categories of orientation intent and continuous intent, as well as open and closed questions.

Other question constructions are divided into eight types, namely interpretation questions which focus on the consequences of gathering information; inferential questions that ask students to go beyond the available information transfer questions; hypothetical questions that ask students to think about what can be predicted and tested; and reflective questions that ask students to reflect on how they know what they know, and each question is viewed in an open and closed form. In detail, the components of each question are presented in Table 1

Tabel 1. Tipe Soal Trigger

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| --- | --- | --- | --- | --- |
| Type | Intepretasi | Inference | Hipotesis | Reflektif |
| Open-ended | open-ended question that asking students to fill in missing information | open-ended question that transfer inquiries to focus on the consequences of gathering information to go beyond the information that is immediately available | open-ended questions that ask students to think about what could be predicted and tested | open-ended questions that ask students to ponder about how they know what they know |
| Closed | closed question that asking students to fill in missing information | closed question that transfer inquiries to focus on the consequences of gathering information to go beyond the information that is immediately available | closed questions that ask students to think about what could be predicted and tested | closed questions that ask students to ponder about how they know what they know |

1. Results and Discussion

The results of observations at the beginning of micro teaching learning, in the preliminary activities are generally dominated by questions related to students' readiness from a physical perspective, or light questions related to emotional situations and have not yet raised questions that stimulate students to be able to link the previous material to the new material to be studied. . Questions that arise in preliminary activities related to mathematics material are questions that are asked to remind the prerequisite material that will be used as a basis for learning new material. The existence of critiziting activities in the procedure of micro teaching activities is used so that students are able to develop themselves better, and cause trigger questions to appear in the 3rd week of learning practice.

The construction of trigger questions that are used by students during micro teaching practice are more questions that aim to find and complete certain information, or in other words, the type of question that is mostly used by students is the type of interpretation question with the closed type. More than 50 percent of the questions presented in the introductory activity to enter this activity were interpretation type. The percentage of each type of observation result question is presented in table 1. Very rarely do students ask questions of a reflective type to initiate learning activities.

The following are some of the trigger question constructs that are raised during micro teaching learning. Observations on one of the AA students who carried out learning practices by taking the topic of social arithmetic, it was found that the preliminary activities began with a phenomenon according to daily needs according to the material discussed, namely discounts at food stores, clothing stores or installments from banks, this phenomenon is used. as a context in the construction of trigger questions. The assumption used is that students recognize the meaning of discount and interest in everyday life, so the question asked is to identify the information contained in this phenomenon by asking questions: "which one is a single interest? How to calculate the interest rate? How much discount does store A give? ”. The questions posed are in the form of a closed interpretation question. This question aims to identify terms that exist in everyday life that will be used in learning. Teacher questions in mathematics are an important diagnostic tool for teaching (Carty, 2000).

Figure 1

In contrast to the construction of questions presented by FA students, the phenomenon is complemented by illustrations as in Figure 2. The questions in Figure 2 can be solved by students in various ways using previous knowledge, the construction of trigger questions that are open will open up the development of students' thinking skills. The identification of the desired can be done in various ways. Therefore, the construction given is an open interpretation.

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Figure 2 Figure 3

In presentation in Figure 3, the collection of information requested does not only interpret or collect information in the table, because the construction of the questions compiled is: "What can you get by comparing columns 1, 2 and column 3?" The developed construction asks students to use existing information to compare the values ​​in the table.

The construction of trigger questions with open question types and inference types is a question conducted by the US. The context set is as follows "Rani will give a present to her friend who is having a birthday. Because she doesn't have a gift box, Rani plans to turn the used food cartons into gift boxes. So Rani needs to buy wrapping paper to attach it to all sides of the used cardboard to make it more beautiful. The gift paper sold beside Rani's house has 3 sizes, namely 50 yaitu × 40 𝑐𝑚, 60 𝑐𝑚 × 50 𝑐𝑚, and 70 𝑐𝑚 × 60 𝑐𝑚. What size wrapping paper should Rani buy so that there is as little wrapping paper as possible? ”. This question will open the thinking process of students to make comparisons, the solution to the question can not only be solved by gathering information. The means that can be used to resolve the problem are varied or open in nature.

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Figure 4 Figure 5

The construction of the hypothetical and open-type trigger questions was prepared by FA. The topic that was taken was the sequence of geometric numbers, the problem that was taken was related to the scientific context, namely viruses. The question posed is how many of the virus cleavage results in the 5th and 15th cleavages. This question will open the student's thought process to make predictions of determining rules, predictions can be proven by using patterns and generalizations.

Another example of constructing a hypothetical type of trigger question with a closed type was presented by the CA when carrying out a learning practice by taking the topic arc and juring. The apperception activity is carried out by asking questions reminding the area and circumference of the circle. The trigger question asked is "if you want to calculate a part of the circumference of the circle or part of the area of ​​the circle?" The exploration is continued by presenting a table that connects a part of the area of ​​the circle, the size of the central angle, and the length of the arc, followed by questions. From the filling in the table above, can you guess the relationship between the center angle and the arc length? ”. This trigger question invites students to hypothesize the phenomena presented. Teachers are required to be aware of this questioning strategy to equip them to deal with classroom discourse in mathematics effectively (McCarty, et.al 2016)

The construction of the trigger question was a hypothetical type of open type which was prepared by IA students. The topic that was taken during the practice of micro teaching was the smallest multiple of fellowship. The context of the questions taken is related to the schedule of activities of two people who have different periods with different beginnings. Participants can predict answers through a calendar presentation in addition to questions. This assumption can be verified by using the help of multiples of least common. The question presentation is shown in Figure 5 below. The ideas raised by students allow students to make assumptions their own so that solutions and learning become knowledge that must be theirs (Mueller, 2014).

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Figure 6 Figure 7

Through trigger questions will help students to internalize useful questions that they can use to help them engage in effective and productive mathematical thinking. The following construction of trigger questions forces students to reflect on how they know and what they know. One example is presented through the following illustration in Figure 8. The context presented is related to the personal problem of the phenomenon presented is the distance between two children, then the problem arises related to one of the balloons flying to the ceiling of the house. The construction question is reflective type with a closed type, is what is meant by the distance between the two balloons?

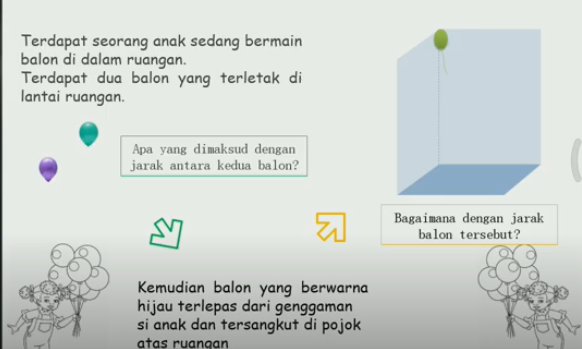


Figure 8

One of the constructs of the reflective and open type problem is presented as follows: "A teacher says the math score of a class is in the range 60-90. What does this sentence mean?". The answer to this question is very diverse, which is why one type is included in an open question. This question requires students to understand the meaning of ranges that have been previously studied at the previous level.

1. **Conclusion**

Micro teaching course is a technique in teacher education that provides a transition from theory to real teaching situations. Students' knowledge regarding material content, pedagogical knowledge and the integration between material content and pedagogy in their use in learning can be directly felt by students when attending micro teaching lectures.

Students' technical ability to asking questions must be supported by mastery of mathematical content. Trigger question formation requires the ability of students to predict the learning process that will occur after asking questions is presented in the preliminary activity. Trigger questioning techniques that are expected to encourage learning activities must be practiced and tried more frequently in micro teaching course.

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