

# Prosiding The Implementation of Teacher Leadership in Mathematic Learning Trough a Series of Productive Question

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**THE IMPLEMENTATION OF TEACHER LEADERSHIP IN MATHEMATIC LEARNING  
THROUGH A SERIES OF PRODUCTIVE QUESTIONS**

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**ABSTRACT**

The implementation of the 2013 curriculum (the new curriculum) in Indonesia requires that the learning should run scientific approach, instill attitude and knowledge. This research aims to describe the achievement of media (teaching aid)-assisted learning with a series of productive questions. This research used experiment method in the grade four of elementary school. The researcher used basic competence of mathematics in thematic learning. The learning used teaching aid and students' worksheet. The worksheet is one of the written forms of productive question series given by teachers in order to influence students to do physical and mental activities (thinking). The instruments used in this research are students' questionnaire, teachers' questionnaire, and learning observation sheet. The result shows that the average of students' activities percentage of attitude aspect is 80.20%, the knowledge aspect is 80.64%, and the skill aspect is 69.38%. This phenomenon suggests that teacher was successful in influencing students to do the desired activities. The researcher found that the improvement of teacher's leadership ability is still needed in order to influence students to do the desired activities based on the learning designed by teacher.

Keywords: teacher leadership, series of productive questions

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**INTRODUCTION**

The education quality improvement program in Indonesia is signed by the implementation of the new curriculum called the 2013 Curriculum. This curriculum is actually the improvement of the previous curriculum. In the curriculum, all subjects shall contribute toward the formation of attitude, skill, and knowledge. The standard of process which previously focused on exploration, elaboration, and confirmation is now improved by observing, asking, analyzing, presenting, drawing conclusion, and creating. These activities are well known as the scientific approach. It also promotes discovery learning which requires students to find out and not only to receive information. The implementation of the 2013 Curriculum demands teachers to make innovation in their learning. The mathematics learning in elementary school, for instance, is conducted in a form of integrated thematic learning. However, the fact is that the mathematics concepts could not be steadily internalized to the students within this thematic learning.

An innovation of thematic learning of mathematics basic competence in elementary school can be implemented by using media (teaching aid) and a series of productive question. It helps teacher to give stimulus to the students which demand them to find mathematics concepts or principles. The use of media with a series of productive question is expected to be reinforcement for teachers to influence and to direct students to do series of learning activities in order to achieve the purposes of learning that have been formulated by teachers. The reinforcement is actually in a form of teacher leadership reinforcement in the learning. The learning would be suitable with the characteristics of mathematics learning and students' need. The internalization process would happen seriously, which means that the learning process occurred optimally, if the knowledge learned within three steps model, namely the enactive, the iconic, and the symbolic (Sugiarto, 2010). The presence of high qualified teacher is the absolute provision of the presence of high quality education system and practice (Jalal, 2007).

Knowledge or capability could be gained if and only if ones actively construct them within their mind. The learning assisted by student worksheet containing a series of question or instruction which demand students to answer or to do activities enable them to construct the knowledge they learn. There are two main traditions of constructivism, namely the psychological constructivism and the sociological constructivism. The psychological constructivism departs from the children psychological development in constructing their knowledge, while the sociological constructivism departs from the paradigm that society constructs the knowledge. Constructivism recognises that mathematics must make sense to students if they are to retain and learn mathematics (Zevenbergen & Wright, 2004).

According to learning theories by Piaget, Brunner, and Ausubel, mathematics learning is recommended to be implemented based on the students' mental development. Mathematics is an abstract science, while the students of elementary school generally are still in the operational concrete thinking stage. In this stage, students could think if they are assisted by concrete objects or manipulative teaching aids. Besides, the learning could be meaningful if the students experience thinking pattern from concrete to abstract. The thinking pattern, according to Brunner, is called the enactive-*iconic-symbolic* stage. The enactive stage is a stage of presentation conducted by involving students to manipulate objects. The iconic stage is a stage of learning such that the knowledge is represented in a form of visual imagery, pictures, or diagram showing the concrete activities or situation in enactive stage. The symbolic stage is that students are able to manipulate certain symbol of objects. In this stage, language is considered as the basic pattern of symbolic stage. The students are no more bounded by the objects as happens in the previous stages.

A study conducted by Booth R.D.L. and Thomas M.O.J. (1999) suggests that among two groups of individual who were given by arithmetic problems to be solved in three different presentations, namely oral, picture, and diagram, the result shows that the group with high visio-spatial capability significantly performed better in solving the problem. The research supports the idea that if students have been used to experiencing the enactive-*iconic-symbolic* stage earlier, then it can be predicted that they will possess better visio-spatial capability that in the end it enable them to solve the word arithmetic problems better.

Brunner concerns toward the learning process more than the result. Thus, according to Brunner, learning method is the determining factor in learning. The method which he mostly supports is discovery. In discovery learning, students are encouraged to learn independently. Students learn through their active involvement toward concepts and principles in solving problem. Teacher also encourages students to get learning experience by doing activities which enable

them to reinvent concepts or principles that they learn by themselves. For elementary school students, the guided discovery learning strategy is more suitable, considering that the students will be able to think assisted by concrete objects, semiabstract, and the abstract ones. Teacher does not tell the students, but teacher gives chances or conducts dialog using a series of question. In this learning, teacher could raise the students' curiosity and motivate them to work until finding the answer (Hawa, 2007). The success of teacher's effort to drive students doing physical and mental (thinking) activities is considered as the teacher's capability in leading the learning.

The teacher leadership within learning is important, because the capability to lead the class will enable teacher to influence students to learn not only the cognitive, but also the attitude and the skill. It also suits the 2013 Curriculum message. The teacher leadership is basically a process to influence the others through particular actions and behavior toward the individual influenced. One of the foci of the teacher leadership development is the individual development. Teachers are demanded to show their leadership skill to help students in developing the students' potential along with the development stages and tasks. Through the teachers' leadership skill, it is expected that numerous learning innovation will be produced, and in the end, the quality of students' achievement can be improved (Sudrajat, 2013).

The questioning activity is the important activity in implementing the inquiry based learning. It enable teacher to earn information from students, informing what have been known by students, and driving the students' attention toward what they have not known yet. The importance of good questions is also asserted by Orton (1991) by saying that good questions are important in facilitating learning. Knowledge possessed by somebody is always started by questioning. Questioning in the learning is regarded as teacher activity to encourage, to guide, and to assess students' thinking skill.

A research conducted by Webster-Stratton et al (2004) explains that the capability of youth to manage their emotion and behavior and to create meaningful friendship is the important requirement for school readiness and academic success. The current program has been adapted to be used by kindergarten and elementary school teachers which is designed to improve the social, emotional, and academic competences, as well as to reduce the problem of students' behavior in the classes. The mathematics learning which is implemented based on the students' need will be able to involve students' emotion and in the end it makes the learning become meaningful.

## METHODS

In this research, before implementing the learning, we identified the alternative media (teaching aid) which can be used in the mathematics basic competence in theme of grade 4. The next step was developing the learning devices. One of them is the written series of productive question in a form of student worksheet as the learning media. The worksheet is the manifestation of how teacher influence the students to do a series of activity (mental and physical) so that students can find the mathematics concepts or principles. Besides, the learning also used visual media and manipulative teaching aid. The implementation of the learning was imposed toward mathematics material running at school, namely the material with basic competences as follows: (1) understanding the rule of rounding in determining the result of measurement using tool, (2) collecting and organizing the discrete data and presenting the data using diagram and chart (bar chart, line diagram, and pie diagram), (3) drawing the conclusion based on table or chart of data. The learning was implemented in the thematic learning with the theme My Meal is Healthy and Nutritious, subtheme My Eating Habit.

The research instrument included student questionnaire, observation sheet of learning implementation, and, teacher questionnaire. The observation of learning implementation involved 3 observers, while the teacher questionnaire was also used by teacher as the reflection of the learning. We also used camera to record the learning process.

## RESULTS AND DISCUSSION

The result suggests that the percentage average of students activity in the attitude component is 80.20%, in the knowledge component is 80.64%, and in the skill component is 69.38%. The achievement of skill basic competence was done both individually and within

group. The low percentage of students doing skill activity might because some students did not optimally do their group tasks. Based on the result of observation, there were group of students working together (Figure 1a), organizing tasks (Figure 1b), and there were some students did not involve in the group tasks (Figure 1c). Teacher should inform the purpose of the group tasks and what activities they were expected to do during the group tasks in the beginning of the class. Teacher should also become the facilitator during the students doing their tasks, particularly pay attention toward the students who do not optimally work or do not engage with the tasks. This thing requires teacher's accuracy.

In general, students liked to join the learning (90,60%); the learning was easy to be understood (87,50%); the learning guided the students to find the concept (96,90%). However, based on the students activity related to their skill capability as shown in their responses toward the questionnaire, the low percentage of students activity comes from solving the tasks accurately (62,50%); observing (65,60%); thinking/associating (53,10%); and creating (65,60%) (Hidayah, 2014). The teacher capability which demands and leads the students to do various activities consciously like observing, asking, doing the tasks optimally, thinking, and creating is a teacher's capability to use strategy which can influence and lead the students to do the desired activities leading to the students invention by themselves. This capability is teacher's capability as a leader. Teacher should be clear, firm, and loud in delivering the questions and/or instructions so that the students understand what they should do. A series of productive question which is written in student worksheet is helpful for teacher and students. Based on the result of this research, however, worksheet only is not enough, it should be supported by oral questions and instructions and it should consider the students' condition during the learning.



a b c

Figure 1 (a) Work in group by organizing tasks, (b) Working in group together, (c) Work in group without cooperation

The following picture and questions are simple examples in the student worksheet.

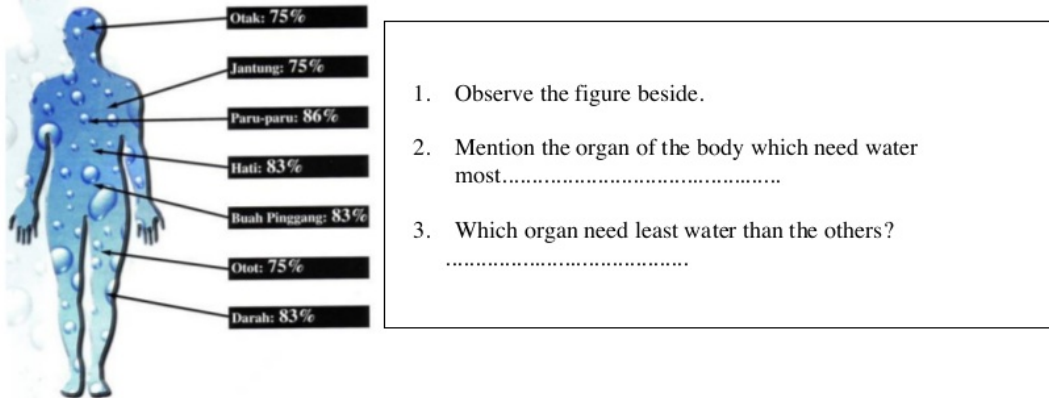


Figure 2. The need of water of the human organ  
The other examples of student worksheet can be found in the appendix.

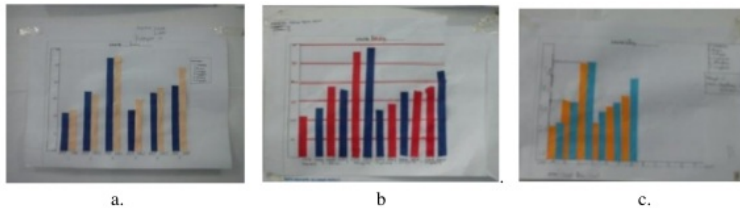


Figure3 (a) Students work which is the same with the teacher example, (b) Students work with their creativity, there are mistakes in the color placement, (c) Students work with mistakes of bar placement in the inappropriate scale

By using visual media in a form of power point, teacher can help students to achieve the learning purposes, namely “students are able to present the multiple bar chart from the table of fish consumption through data analysis activity”. Figure3(a) is picture of multiple bar chart as exemplified by teacher. Figure3(b) is seems like a form of student’s creativity by making the horizontal line from the vertical quantity scale, but when we pay attention, there are inconsistencies in using the color, thus it suggests a different meaning.. In the figure 3(c), the placement of the multiple bar chart seems appropriate, but the bars stand on the inappropriate scale. This condition might because there are some missing oral statements or questions of the teacher or they were not

caught by the students. It can be anticipated if the teacher take role as the facilitator during the students do their group tasks. Though the words “LETS OBSERVE”, “PLEASE ASK”, “LETS TRY”, “LETS THINK”, “PLEASE SPEAK UP”, “LETS MAKE A CREATION” have been written in the students book and in the teacher visual media presentation, they should be spoken every time at the right moment. Those are the words which can influence and lead the students to do the desired activities as demanded by teacher and curriculum so that the learning purposes can be achieved.

## CONCLUSION

The thematic learning with the theme My Meal is Healthy and Nutritious, subtheme My Eating Habit, with the basic competences: (1) understanding the rule of rounding in determining the result of measurement using tool, (2) collecting and organizing the discrete data and presenting the data using diagram and chart (bar chart, line diagram, and pie diagram), (3) drawing the conclusion based on table or chart of data, and assisted with visual media and student worksheet with a series of productive question can create the learning which is loved by students (90,60%); is easily understood (87,50%); and guides the students to find the concept (96,90%).

The percentage of scientific approach activities as the characteristics of the 2013 Curriculum in thematic learning assisted with visual media and student worksheet with a series of productive question is not yet optimal, the activity of students to accurately do their tasks is only 62,50%; observing (65,60%); thinking/associating (53,10%); and creating (65,60%).

### Suggestions that can be recommended from the results of this study are:

In order to optimize the students' activities, teacher can use a series of productive question (written and oral) to influence and to lead students to find the mathematics concepts and principles during the learning according to the students need.

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