

# REALISTIC APPROACH THROUGH THE COOPERATIVE LEARNING IN THINK-PAIR SQUARE TYPE TO TEACH 'SECTOR AREA OF A CIRCLE'

## I. RATIONAL

An instructional approach is a matter of how students are able to adapt the concept. One of the instructional approaches in mathematics learning is the realistic approach. Hans Freudenthal's theory stating that mathematics is a form of human activity, has a great influence to the realistic Mathematics (Freudenthal, 1973 dan 1991). Based on the mentioned theory, daily activity concept is employed to support the understanding on mathematical concept and its application. There are five characteristics of realistic mathematics, namely:

1. *Phenomenological exploration*
2. *Using models and symbols for progressive mathematization*
3. *Using students' own construction*
4. *Interactivity*
5. *Intertwinement*

In addition, in mathematics realistic approach, there are three principles to design and develop mathematics education (Bakker, 2004). They are:

1. *Guided reinvention*
2. *Didactical phenomenology*
3. *Emergent model*

One of the 5 realistic approach characteristics correlates with the learning setting is the interactivity that employs *students' own construction*. To gain this aspect, the learning model should emphasize the students' collaboration (cooperative learning) in achieving the learning goal. In a cooperative learning, a group of peers in a team are interacting each other to solve a problem. Arends (1997), states that there are some characteristics of cooperative learning. Those are:

1. Students are cooperatively working in group to learn the learning material
2. The group is formed heterogeneously, consisting of high, moderate and low performers.  
In addition, they might be from different race, culture, ethnic and sex.
3. Any appreciation will go to the group, instead of individual within the group.

Some steps in cooperative learning are included in the following table:

Tabel 1. Some steps in cooperative learning model.

| Step | Indicator                                            | Teacher's activity                                                                                                          |
|------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1    | Explaining the learning goal and motivating students | Teacher explains all of the learning goal to be achieved in the learning process to the students and motivating them.       |
| 2    | Giving information                                   | Teacher informs students using a demonstration or reading material.                                                         |
| 3    | Organising the students in the learning groups.      | Teacher explains the students on how to form a learning group, and to help each group to do the transition efficiently      |
| 4    | Guiding each group to work and to learn.             | Teacher guides the learning groups in finishing their task.                                                                 |
| 5    | Evaluating                                           | Teacher evaluates the learning result, or each group presents its learning result.                                          |
| 6    | Giving appreciation                                  | Teachers find the appropriate way to appreciate students' effort and their learning result, either in group or individually |

One of the cooperative learning strategies is *think-pair-square* strategy developed by Kagan (1994). This strategy consists of three steps:

Step 1: Thinking. The teacher asks question on the certain issues related to the learning material. After that, the students are required to think about the issues individually.

Step 2: Pairing. The students are grouped in pair to discuss what they have been thinking on the first step. In this step, students share their answer on the proposed question, or share the idea on the identified problem. Teacher usually allocates 4 or 5 minutes to work in pair.

Step 3: Sharing. To share what they have learnt, in this step, teacher asks one student of the pairs to form a bigger group. In this way, all the students in the class are expected to be able to share the idea.

The procedures in Think-Pair-Square type of cooperative learning are as follows:

- a. Teacher raises an issue on the contextual topic relating to the material (it is expected to be able to motivate students). Then, the teacher gives a worksheet to connect the main problem with the material to be understood by the students.
- b. In a few minutes, students are required to think about the material being discussed individually (students are to write in a small note to see their idea)
- c. Teacher organises the students into a group of 4 people heterogeneously, based on their academic performance and sex.
- d. Students are required to discuss the issue in pair within their group, after that the discussion is brought into the entire member within the group. Then, the students present the result in a poster.
- e. Teacher asks one of the groups or their representative to come forward, in front of the class and presents the conclusion of the group's answer. The other students give respond to this, so that the last conclusion is found.

## References

Arends Ricard, I. (2004). *Learning To Teach*. New Yrk : McGraw Hill Companies

Freudenthal, H. (1973). *Mathematics as an Educational Task*. Dordrecht: Reidel Publishing Company.

Freudenthal, H. (1991). *Revisiting Mathematics Education: China Lectures*. Dordrecht, The Netherlands: Kluwer Academics Publisher

Gravemeijer, K.P.E. (1994). *Developing Realistic Mathematics Education*. Utrecht: CD-β Press / Freudenthal Institute.

Van den Heuvel-Panhuizen. M. (2000). *Mathematics Education in the Netherlands: A Guided Tour*. Freudenthal Institute CD-rom for ICME9. Utrecht: Utrecht University

<http://www.kaganonline.com/AboutKaganFrame.html>