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# Application Of Guided Journal In Cooperative Learning In *Team Assisted Individualization* (Tai) Type To Support Mathematical Communication Capability Of Class Viii-A Students At Smp Negeri 2 Malang

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***Abstract:*** *This study aimed to describe the learning steps using the application of guided journal in cooperative learning in the type of Team Assisted Individualization (TAI) that could support the mathematical communication ability. The research subjects were the students of class VIII-A SMPN 2 Malang. The type of this research was a classroom action research. The data collected in this study included: (1) observation result during the learning process which was based on the observation sheet, (2) the results of field notes, (3) guided journals, (4) quiz, and (5) the results of the test at the end of cycle. The steps of the Implementation of guided journal in cooperative learning in type of Team Assisted Individualization (TAI) to support the communication skills of mathematical students were as follows: (1) placement test, (2) teams, (3) student creative, (4) team study method, (5) teaching groups, (6) whole-class units, (7) fact test. The steps could support the mathematical communication capability as seen at the end of the second cycle. The research had met the success criteria. The observation result of students' activity indicated the category of "very good". The observation result of teacher's activity was categorized "very good". The quiz score of 100% was got from the students' scores with an average of 75 or more. The test score at the end of cycle showed that 82.4% of students gained the average of 75 or more, and the guided journal score indicated that 100% of the students got the average score of 75 or more.*
***Keywords:*** *Team Assisted Individualization, Mathematical Communication*

## I. introduction

According to Mulyasa (2013: 13) education at any educational institution whether formal, non-formal or informal should be a basis for forming the learners' personality. The learning method is a method used by teachers to interact with students during the learning process to achieve the learning objectives (Hamdani, 2011: 80-81). This is in line with the opinion of Ginting (2008: 117) that the two-way communication between teachers and students is an important means to improve the communication success in achieving learning goals. Through communication, teachers deliver material to students both verbally and non-verbally, and the students will respond to the teachers as a result of the communication.

Based on the observation on September 22nd, 2014 in class VIII-A, in the material outlining the algebra into the factors, several facts were found in the learning process. Some of them were: the teacher provided explanation briefly, gave the assignment, and asked for some students to do it in front of the class. The application of 5M learning method was not seen yet. Several facts were also found, among others, (1) when the students were faced with a story problem, they were not accustomed to write down what was known and what was being asked of the matter before finishing it. Therefore, the students often misinterpreted the intent of the question, (2) the students still lacked of understanding on a mathematical concept. It showed that most students still had a difficulty in using the concept of algebra in solving the problem, (3) the lack of precision of the students in mentioning symbol or mathematical notation. It showed that the majority of students were still not properly in writing function notation, and (4) the reluctant and hesitant attitude of students to occasionally express or communicate mathematical ideas through images, tables, charts, or diagrams.

In addition they said that there was no order from the teacher to make the record book. The teacher only required students to have a workbook so that they felt it was not an obligation for them to record it. That situation would certainly affect the achievement of learning objectives including the decline of motivation to learn mathematics and the lack of students' understanding which were visible when they verbally communicated the idea namely the activeness of students during class discussions and communication in writing that was visible from the record made by the students.

Cooperative learning has several types, one of which is *Teams Assisted Individualization* (TAI). According to Slavin (2005: 189) *Teams Assisted Individualization* (TAI) is a type of cooperative learning with the aid among students by using regular inspections. According to Abidin (2014: 251) cooperative learning of

TAI type has eight stages, among others: (1) *placement test,* (2) *teams,* (3) *student creative,* (4) *team study method,* (5) *teaching groups,* (6) *fact test,* (7) *whole-class units,* and (8) *team scores and team recognition.*

The use of cooperative learning of TAI type is expected to increase the students' active role in learning process. The active role can be seen from the students' enthusiastic in communicating their understanding orally and in writing that can be seen at the ability of students in asking and answering session in class discussions and at students' ability in expressing their understanding in writing in the form of notes.

According to Suprijono (2011: 104) it would be more meaningful if the students' understanding is delivered not only orally, but also in written form. In other words it is expressed in note form. It is supported by Mahmudi (2006: 178) who states that the assignment of writing the form of organizing, summarizing, and communicating their ideas in writing help students in mathematical communication skill. So giving the task of writing is able to support students' mathematical communication skill.

The record technique of guided journal is that a teacher provides handouts of the material discussed by emptying the key points, and students are asked to complete the blank points of by using their own sentences in accordance with the understanding of the learning process. Guided Journal is intentionally made so that students keep concentrating to follow the learning process, and students can express their understanding in writing form in order to support their written mathematical communication.

In addition, the result of the study (Kumar, 2006) entitled the effectiveness of the task of making mathematics journal in learning the concept of square shows that the learning outcomes of a group of students who are taught by the strategy of giving the task of writing mathematics journal is better than in the group of students who are taught without involving the making of mathematics journal. Therefore, in this study the researcher chose to integrate guided mathematics journal in a cooperative learning model of TAI type to solve the issues that have been presented. The aim of this study was to describe the application of guided journal in cooperative learning of *Team Assisted Individualization* (TAI) type to support the communication capability mathematical of the students in class VIII -A SMP N 2 Malang.

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## II. method

This study uses classroom action research (CAR). In one cycle, there were 4 stages in the implementation of the CAR activities: (1) planning, (2) actions, (3) observation, (4) reflection (Arikunto, 2010: 20). The research was conducted at SMP N 2 Malang, and the research subjects were the students of class VIII-A. This class had 34 students. The data used in this study were observation data, field notes, guided journal, quiz, and test at the end of the cycle. The research instruments needed were guided journal, quiz questions, test at the end of the cycle, observation sheet, field notes form, and the validation sheet.

Data obtained from the observation sheet was calculated by counting guideline as the following:

$$p = \frac{S_p}{S_{max}} x100\%$$

With $p$ = percentage of observer rating

$S_p$ = the total score obtained from observer

$S_{max}$ = the maximum score

Based on that percentage, the level of enforcement was set as follows:

| interval | Category |
|---|---|
| $85 \leq p \leq 100$ | Very good |
| $70 \leq p < 85$ | Good |
| $55 \leq p < 70$ | Enough |
| $0 \leq p < 55$ | Very less |

(Adopted from Arikunto with modification 2009: 245)

The data of students' mathematical communication skill was seen from result data of guided journal, quiz, and test which were calculated based on the scoring rubric by using formula (Purwanto, 2012: 102) as follows

$$N = \frac{R}{SM} \times 100$$

Description: N = sought or expected score

R = raw score obtained by the students

SM = ideal maximum score from the respective scoring technique

This study was successful if the observation data of student activity reached the criteria of "good" or "very good", the guided journal score data indicated that students obtained the average score more than or equal to 75, and if quiz score data and test score at the end of a cycle indicated that at least 75% students achieved SKM ($\geq 75$) ,

## III. Result And Discussion

Cooperative learning model of TAI type is a model of cooperative learning involving 4 to 5 students formed based on the heterogeneity of the students who worked in groups to discuss the problem given by the teacher. TAI consists of eight components of the learning activities, namely: (1) *placement test,* (2) *teams,* (3) *student creative,* (4) *team study method,* (5) *teaching groups,* (6) *whole-class units,* (7) *fact test,* and (8) *team scores and team recognition.* The researcher also established indicators of mathematical communication which would be assessed in this study: (1) providing answers by using their own language, and constructing an argument, (2) reflecting the real problems into mathematical ideas, or from mathematics ideas into real problems, (3) expressing mathematical concepts in the language or mathematical symbols.

Following will be presented the results of the data collected

### 1. Observation Result of students' activity

Here is the observation result of students' activity in the first cycle:

| Meeting | Observer | The analysis result of the students' activity | |
|---|---|---|---|
| | | Percentage | Category |
| 1 | 1 | 64% | Enough |
| | 2 | 70% | Good |
| 2 | 1 | 61% | Enough |
| | 2 | 73% | Good |
| 3 | 1 | 70% | Good |
| | 2 | 80% | Good |
| **Average** | | **70%** | **Good** |

Here is the observation result of students' activity on the second cycle:

| Meeting | Observer | The analysis result of the students' activity | |
|---|---|---|---|
| | | Percentage | Category |
| 1 | 1 | 86% | Very good |
| | 2 | 89% | Very good |
| 2 | 1 | 86% | Very good |
| | 2 | 89% | Very good |
| **Average** | | **87.5%** | **very Good** |

The table of observation result of students' activity in the first cycle showed that the activity of students in carrying out the implementation of guided journal in *team assisted individualization* learning generated percentage of average score 70% and it included in the category of "good" and then the second cycle had percentage of average score 87, 5% and it included in the category of "very good".

### 2. Result of the assessment of students' guided journal

Here is the assessment result of guided journal in the first cycle:

| Information/explanation | Number of Students | Percentage |
|---|---|---|
| Students who completed meeting I (score $\geq 75$) | 31 | 91.2% |
| Students who did not complete meeting I (score $< 75$) | 3 | 8.8% |
| Students who completed meeting II (score $\geq 75$) | 34 | 100% |
| Students who did not complete meeting II (score $< 75$) | 0 | 0% |
| Students who completed meeting III (score $\geq 75$) | 26 | 76.5% |
| Students who did not complete meeting III (value $< 75$) | 8 | 23.5% |
| Students who completed the first cycle (the average score of the guided journal $\geq 75$) | 32 | 94.1% |
| Students who did not complete the first cycle (the average score of the guided journal $< 75$) | 2 | 5.9% |

Here is the assessment result of guided journal in the second cycle:

| Information | Number of Students | Percentage |
|---|---|---|
| Students who completed meeting I (score $\geq 75$) | 34 | 100% |
| Students who did not complete meeting I (score $< 75$) | 0 | 0% |
| Students who completed meeting II (score $\geq 75$) | 32 | 100% |
| Students who did not complete meeting II (score $< 75$) | 0 | 0% |
| Students who completed the first cycle (the average score of the guided journal $\geq 75$) | 34 | 100% |
| Students who did not complete the first cycle (the average score of the guided journal $< 75$) | 0 | 0% |

The assessment result table of guided journal in the first cycle showed that 5.9% of the total number of students had not yet obtained the journal score ≤ 75 while in the second cycle, 100% of students had gained the guided journal score ≤ 75.

**3. The result of students' quiz assessment**

Here is the result of quiz assessment in cycle I:

| Information | Number of Students | Percentage |
|---|---|---|
| Students who completed the study | 18 | 52.9% |
| Students who did not complete the study | 16 | 47.1% |
| Percentage of learning completeness | 52.9% | |
| Average score of the class | 70.4 | |

Here is the result of quiz assessment in cycle II:

| Information | number of Students | Percentage |
|---|---|---|
| Students who completed the study | 34 | 100% |
| Students who did not complete the study | 0 | 0% |
| Percentage of learning completeness | 100% | |
| Average score of the class | 83 | |

The table of quiz assessment result in cycle I showed that 52.9% of the overall students' journals gained ≤ 75. I n cycle II, 100% of the overall students' journals gained ≤ 75.

**4. The final test result of cycle**

Here is the result of test at the end of cycle I:

| Information | number of Students | Percentage |
|---|---|---|
| Students who completed the study | 14 | 41.2% |
| Students who did not complete the study | 20 | 58.8% |
| Percentage of learning completeness | 41.2% | |
| Average score of the class | 65 | |

Here is the result of test at the end of cycle II:

| Information | number of Students | Percentage |
|---|---|---|
| Students who completed the study | 28 | 82,4% |
| Students who did not complete the study | 6 | 17.6% |
| Percentage of learning completeness | 82,4% | |
| Average score of the class | 80 | |

The table of final test assessment result in cycle I showed that 41.2% of the overall students' journals gained score ≤ 75. At the final test in cycle II there were 82.4% of the overall students' journals gained score ≤ 75.

The implementation of this research applied guided journal in cooperative learning type Team Assisted Individualization consisting of eight components, namely: (1) placement test, (2) teams, (3) student creative, (4) team study method, (5) teaching groups , (6) fact test, (7) whole-class units, and (8) team scores and team recognition.

**1. *Placement Test***

The teacher gave a test as the basis for the formation of study group. The placement test for students in cycle I was the initial test with prerequisites material matters namely PLSV while the placement test in cycle II was in accordance with the placement test in cycle I.

The result of placement test in VIII-A was 12 students got scores ≥ 75 and 22 students got scores <75. Based on the scores, the students were grouped into 3: high, medium, and low. This grouping was based on the

analysis of standard deviation. Based on the standard deviation analysis, it was gained that the high group was the students with scores> 82.7, the medium group was the students with scores between 48.7 and 82.7 and the low group was the students with scores <48.7. There were 8 students in lower group, 21 students in medium group, and 5 students in low group.

**2. *Teams***

The teacher divided the students into groups in which each group consisted of 4-5 students. The groups were formed based on the placement test. When studying in groups, students worked as a team in accomplishing something to achieve a common goal. It was in accordance with the opinion of Huda (2012: 31) who states that cooperative learning includes a small group of students who work as a team to accomplish a task or do something for other common goal. Students are required to work together and help each other to get a high score. According to Slavin (2005: 9) on TAI, the students support each other and help each other to achieve the success of the group.

**3. *Student Creative***

Students were asked to work individually in doing guided journal. At this stage, the students were required to recall the material that had been acquired, and the students constructed their own knowledge. At the first meeting, the students learned about PLSV as the introduction of PLDV. The students did not need much time to determine the completion of PLSV so that learning could take directly to PLDV material. The prerequisite material was already attached to the guided journal and students were required to work individually. Some students used to learn individually, but there were also some students discussing with their friends. But after the first meeting, the students were more likely to work on the prerequisite material individually.

**4. *Team Study Method***

Students discussed with their own groups to enhance or complete the understanding of each member on the material being studied. The teacher read the rules of the group and divided the students into pairs or triads as a checking friend. Students with low academic ability could be assisted by the students with medium or high academic ability. Students with high academic ability could get benefit by helping or teaching students who had problems. As stated by Anita Lie (2005: 43) by teaching what someone just learned, he will master more or internalize the knowledge and new skill. In addition, according to Slavin (2005: 195) interaction among peers can help children who have not been able to be able to. Interaction of learning each other will arise and higher quality understanding will emerge.

At this stage, the students demonstrated the ability to write mathematical communication individually. They tried to do a guided journal systematically and completely. They were required to explore the potential of their writing mathematical communication.

The students who felt less suited to the group tended not conduct checking. They were less responsible to their groups. However, after the teacher told the score and group award, each student was motivated to compete to gain the group award. Sardiman (2008: 93) also states that the individual or group competition can enhance students' understanding.

**5. *Teaching Groups***

The teacher did not explain the material as a whole. The teacher only helped students by giving inducement questions so that students will think themselves to build the new knowledge. Students seemed enthusiastic to answer questions when they were given inducement to review the prerequisite material before learning the material being studied. According to Qohar (2013: 60) to train mathematical communication, students must have the courage to ask the teacher or the other students when experiencing difficulties in understanding mathematical concepts. Therefore, the teacher need to help by visiting each group and approached the students who have problems in understanding mathematical concepts.

**6. *Whole-Class Units***

Representatives of the group presented the work of their group. The results of group presentations were discussed by the whole class. For the presenter, this discussion could train students in communication. When they presented, the students were encouraged to not only read the result of the group discussion, but also explain the result of group discussion. The students were required to explore the verbal mathematical communication skill. Students were required to not only explain their work, but also give comment on the work of other groups. Mathematical communication verbally could be trained optimally at this stage.

After presentation activity, the teacher provided reinforcement and *review* on the material. The teacher provided the inducement questions so that students could receive the material explained by the teacher. At the end of the lesson, the teacher guided the students to formulate conclusions on the learning that had been done.

The teacher provided time for students to understand the material or to take notes. It was done to obtain the whole description of the main points of the material that had been learned by the students.

**7. *Fact Test***

After that the students did a quiz given by the teacher. The given quiz was in connection with the materials that had been studied. The quiz was done individually. At the last meeting of cycle I and II, *fact tests* were done as the final test in the cycles. Although it had been warned to work individually, there were still some students who tried to cheat. It made the teacher go around the classroom to prevent it. The students were motivated to do *fact test* in earnest because there were assessment and group award.

**8. *Team Scores And Team Recognition***

The teacher calculated the scores of the students, announced them, and gave group award. Mulyasa (2013: 199) states award and gift could fulfill the students' positive psychological needs. Actually, the appreciation should not be goods, but it could be a compliment, a smile, or other actions. This is in line with the opinion of Slameto (2003: 96) that teachers should give praise to motivate students in learning more than criticizing and denouncing.

Supporting mathematical communication on PLDV material after the implementation of guided journal of TAI type in cooperative learning in class VIII-A SMPN 2 Malang was influenced by several factors such as the application of guided journal. The teacher gave handout of guided journal of learning materials by emptying the key points to the students of class VIII-A during the learning activities by explaining the parts and instructions for completing guided journal handout as the assignment of students to complete the blanks. In addition, the guided journal handout also provided a record sheet that instructed the students to make notes as the teacher taught. The activity was in line with the opinion of Silberman (2006: 123) who states that one of the ways of active learning is to make a record with the guidance.

## IV. Conclusion And Suggestion

Based on the exposure of data, research findings, and the discussion, it can be concluded that the application of guided journal in cooperative learning in Team Assisted Individualization type can support the mathematical communication capabilities of the students class VIII-A SMPN 2 Malang with steps, namely: (1) students complete the guided journal handout given by the teacher based on their understanding. The guided journal handout consists of four lines which contains the identity of student, students' activity, problems faced by the students, students' reflection, and record sheet, (2) the teacher gives an introduction in the form of prerequisite material such as PLSV and algebra operation, (3) the teacher implements the learning components of TAI learning namely: (a) placement test, (b) teams, (c) student creative, (d) team study method, (e) teaching groups, (f) fact test, (g) whole- class units, and (h) team scores and team recognition.

The application of guided journal on cooperative learning of *Team Assisted Individualization* type can support the mathematical communication ability of students class VIII-A SMP N 2 Malang. It can be seen at the end of cycle II. The research has met the success criteria. The observation result of student activity indicates the category of "very good", the observation result of the teacher's activities are categorized "very good", quiz score shows 100% of the students get 75 or more, the final test score of the cycle is that 82.4% of the students get 75 or more, and the guided journal score shows that 100% of students get 75 or more.

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