Development Of Devices In Learning Based On Realistic Approaches To Improve Emotional Intelligence Of First Middle Students

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Abstract. This study aims to see how valid, practical and effective realistic approach-based learning device are developed to improve students' emotional intelligence. Learning device that are developed are learning implementation plans, student worksheets and student books. By conducting two stages of trial, phase I by examining the validity and practicality of the devices assessed by five validator experts in their field. Then phase II by conducting a device test in class research to see the effectiveness of the device. The research model refers to the 4-D thiagarajan Model (define, design, develop, disseminate) with the flow of student character data collection, design learning device based on realistic approaches that suit the needs of students, conduct validation and trial stages and disseminate learning devices to become teacher references in teaching. The results of phase I explained: 1) the device was declared valid based on the assessment of five expert validators with a slight revision, 2) the device fulfilled the practical criteria which was reviewed from the implementation of the equipment in trial I (3,49) and trial II (3,97) reached high category. The results of Phase II explained: 1) The effectiveness of realistic approach-based learning devices in terms of classical learning completeness, which reached 86.11% of students who participated in learning were able to achieve a score of ≥75, 2) Increased students' emotional intelligence using realistic approach-based learning device on the material Fractions are the results of the average emotional intelligence questionnaire of students in the first trial of 75.33 to 75.87 in the second trial, increasing the average emotional intelligence of students by 0.51. In addition, the average of each indicator of emotional intelligence increased from trial I to trial II.

1. Introduction

The high and low learning outcomes of mathematics are caused by several factors, one of which is the internal and personal factors of students. The success of student learning is determined from the external and internal elements in him [1]. Therefore, the education needed in the current era of reciprocity is not only total and muscle, but the most important is the attitude or character. as educators, it is natural to respond and find effective solutions in the field of education and teaching to overcome the global impacts that occur in the present and the future.

IQ is not the only measure for success but emotional intelligence, social intelligence, and luck also play a big role in success. Emotional intelligence is considered as important as intellectual intelligence [2]. Intellectual intelligence only contributes 20% to success, while 80% is the contribution of other forces, including emotional intelligence. In the learning process, these two intelligences are needed. IQ
cannot function properly without the participation of emotional appreciation of subjects in school, especially mathematics. However, usually these two intelligences complete each other.

IQ balance and emotional intelligence are the key to successful student learning in school. Emotion is an urge to act with an immediate plan to overcome problems that have been instilled gradually related to experience. Therefore, mathematics is the development of a rational mind, as we can reflect in everyday life. Emotional intelligence is the ability of a person to manage his emotional life with intelligence.

Then emotional intelligence is a person's ability to control his emotions intelligently based on indicators of emotional intelligence such as: recognizing one's emotions, managing and controlling emotions, motivating oneself, recognizing others' emotions (empathy), and the ability to foster relationships (collaboration) with others [3], so that they can use emotions well and manage them into an intelligence that is useful for positive things.

Therefore, to be able to develop emotional intelligence of students need innovation and alternatives. One of them is by using good learning device. That is a device that begins by exposing students to contextual problems can make students challenged to solve these contextual problems. One approach that starts learning from contextual problems is a realistic approach [4]. In the framework of Realistic Mathematics Education, Freudenthal stated that "mathematics is human activity", therefore mathematics learning is recommended to depart from human activities. Basically a realistic approach is not seen as knowledge of "ready to use", but "mathematics is human activity". A knowledge will be meaningful for students if the learning process is carried out in a context or learning using realistic problems. A realistic problem does not always have to be in the real world problem and can be found in students' daily lives. A problem is called "realistic" if the problem can be imagined (imaginable) or real in students' minds [5]. However, most educators only provide learning based on a handbook that is not interactive and does not support an increase in students' emotional intelligence.

2. Methods
The type of research that will be carried out is development research. With the model that will be used is the Thiagarajan 4-D development model and the product in this study is a realistic approach-based learning tool. Learning device that will be developed are Learning Implementation Plans, Student Books, and Student Worksheets. This research was carried out at state of Junior High School 17 Medan class VII on fractional material.

This research is divided into two stages, the first stage is the development of learning device. Development of learning device which include (1) validity of Learning Implementation Plans; (2) validity of Student Books; and (3) validity of Student Worksheets. The second stage is the implementation of learning device that are considered appropriate based on the results of trials in the research class.

3. Discussion
The study was conducted in two trials, where the second trial was conducted because there were still criteria that had not been met in the first trial. Before the device and the research instrument (draft I) were tested, first the draft I was validated to five validators. The validation results of the devices developed by five validators are valid and can be used with "minor revisions". The results of validation by five validators are presented in the following table.

| No | Learning device          | Total of validation averages | Category |
|----|--------------------------|-----------------------------|----------|
| 1. | Lesson Plan              | 4.42                        | Valid    |
| 2. | Students' Worksheet      | 4.38                        | Valid    |
| 3. | Students' Book           | 4.38                        | Valid    |
After fulfilling the criteria of validity and having made a minor revision, then the next device in the form of draft II will be tested in this study for students of class VII-2 of SMPN 17 Medan. The results of research on the developed devices are declared to be valid, practical, and effective. The results of this study are:

3.1. Test I Practicality
Realistic approach based learning device developed are considered practical in terms of two indicators. First, the expert / practitioner assessment of the device developed can be used with a slight revision or without revision. The analysis obtained states that realistic approach-based learning device that can be developed in general are good and can be used with a little revision. This assessment is given to experts / practitioners at the same time with the provision of a device validation sheet. And secondly, the results of observing the feasibility of learning devices in the class are included in the minimum high category (3 ≤ P <4). The results of the feasibility analysis of the learning device are presented in the following table.

| No | Aspects Observed and Assessed | Meetings | Average |
|----|-----------------------------|----------|---------|
|    |                             | I    | II    | III   |          |
| 1  | Lesson plan                 | 3,13 | 3,38  | 3,75  | 3,42     |
| 2  | Students’ Work Sheet        | 3,38 | 3,63  | 3,75  | 3,58     |
| 3  | Students’ book              | 3,38 | 3,38  | 3,63  | 3,46     |
|    | Average of Implementation   | 3,29 | 3,46  | 3,71  |          |
|    | Percentage of Implementation| 65,83| 69,17 | 74,17 |          |
|    | Average                     |       |       |       | 3,49     |

The implementation of the learning device as a whole for three meetings in the first trial had an average of 3.49 in the implementation of the learning device which was in the high category.

3.2. Test I Effectiveness
Realistic approach-based learning device developed are considered effective in terms of classical student learning completeness, achievement of learning objectives, and student responses to learning devices to the components of learning devices developed. All of these criteria can be seen in the following table.

Overall, the results of the data analysis of trial I on the learning device developed did not meet all the criteria of effectiveness that were set, because there were still indicators of effectiveness that had not been fulfilled. The results of classical completeness of student learning outcomes in trial 1 can be seen in Table 3.

| Category     | The number of students | Percentage |
|--------------|------------------------|------------|
| Complete     | 29                     | 80,56 %    |
| Un-complete  | 7                      | 19,44 %    |
| Total        | 36                     | 100 %      |
The achievement of learning objectives on indicator 1 was obtained at 74.44%, the achievement of the learning objective of indicator 2 was 80%, and the achievement of the learning objective of indicator 3 was 86.11%. In accordance with the criteria for the achievement of learning objectives, learning objectives are considered to be achieved with the criteria of \( \geq 75\% \) of the maximum score of each item, thus the achievement of learning objectives in test I that is on the post-test results have been reached for indicators 2 and 3. But indicator 1 has not been achieved.

Then the response of students who responded to a realistic approach-based learning device was developed, the percentage of students who expressed pleasure in the subject matter reached 94.44%, students who were happy with the student book 91.67%, then students who were happy with the student worksheet component were 97.22%, while students who were happy with the learning atmosphere in the classroom were 88.89% and the percentage of students who were happy with the way the teacher managed the learning ware 97.22%.

Overall, the results of the data analysis show that the realistic approach-based learning device developed in trial II have met all the criteria for effectiveness. Each criterion is, 1) the achievement of completeness of student learning outcomes classically has exceeded the minimum threshold of 75%, as shown in the table below.

| Category          | The number of students | Percentage |
|-------------------|------------------------|------------|
| Complete          | 31                     | 86.11%     |
| Un-complete       | 5                      | 13.89%     |
| Total             | 36                     | 100%       |

Then the achievement of learning objectives in question number 1 was obtained at 78.33%, the achievement of learning objectives in question number 2 was 80.28%, and the achievement of the learning objective of question number 3 was 86.67%. In accordance with the criteria for the achievement of learning objectives, said learning objectives are achieved with criteria \( \geq 75\% \) of the maximum score of each item. Thus the achievement of learning objectives in trial II, namely on the results of problem solving abilities have been achieved.

Based on the results of student response questionnaire analysis, it can be seen that the percentage results from the first aspect of the percentage of students who expressed pleasure in the subject matter reached 97.22%, students who were happy with the student book 94.44%, then students who were happy with the student worksheet component were 97.22%, while students who were happy with the learning atmosphere in the classroom were 97.22% and the percentage of students who were happy with the way the teacher managed the learning ware 100%. Based on the results of trial II, it can be concluded that the learning device developed have met all the practical and effective criteria that have been set.

3.3. Description of Improved Learning Outcomes for Tests I and II

Description of the improvement of students' mathematical learning outcomes by using realistic approach-based learning device in trial II is shown as follows.

| Description     | Final test results |
|-----------------|--------------------|
| The highest score | 96.7               |
| The lowest Score | 60                 |
| Average         | 86.1               |
The results of the analysis of students' mathematical learning results in the second trial showed that the average ability of students in the posttest results of the first trial was 86.1. This is in accordance with the improved data analysis, namely the increase in learning outcomes seen from the average posttest results of trials I and II, and thus it is known that an increase in the average value of student learning outcomes is 1.36.

3.4. Description of Increased Students' Emotional Intelligence in Trials I and II

The data obtained from the results of students' emotional intelligence questionnaires that were tested I were analysed to determine the increase in students' emotional intelligence by comparing the average student scores obtained from the results of questionnaire I and trial II, the results are presented in the table.

Table 6. Description of Questionnaire Results on Student Emotional Intelligence in Trial I.

| No | Aspect                                      | The average score for Emotional Intelligence |
|----|---------------------------------------------|---------------------------------------------|
| 1  | Identifying Self Emotions                   | 24,6                                        |
| 2  | Managing Self Emotions                      | 24,3                                        |
| 3  | Motivating Yourself                         | 24,4                                        |
| 4  | Recognizing the Emotions of Others          | 22,9                                        |
| 5  | Fostering Relationships with Other People   | 24,3                                        |

The average score of the results of the questionnaire emotional intelligence trial I was 75.33. To see the improvement of students' emotional intelligence abilities, trial II was conducted.

The description of the improvement of students' emotional intelligence using realistic learning-based learning device in trials I and II is shown in Table 7.

Table 7. Description of Results of Student Emotional Intelligence Questionnaire in Trial II.

| No | Aspect                                      | Average score of Emotional Intelligence |
|----|---------------------------------------------|----------------------------------------|
| 1  | Identifying Self Emotions                   | 24,9                                    |
| 2  | Managing Self Emotions                      | 24,5                                    |
| 3  | Motivating Yourself                         | 24,5                                    |
| 4  | Recognizing the Emotions of Others          | 23,1                                    |
| 5  | Fostering Relationships with other People   | 24,4                                    |
|    | AVERAGE                                     | 75,87                                   |

The improvement of students' emotional intelligence seen from the average results of the questionnaire I and II, thus it is known that an increase in the average value of students' emotional intelligence questionnaires in trial I to trial II was 0.51. While the increase in the average value of the indicator recognizes self-emotions by 0.3, the indicator of managing emotions themselves by 0.2, the indicators motivate themselves by 0.1, the indicators recognize the emotions of others by 0.2 and the indicators build up relationship with others is 0.1.
Furthermore, a description of the increase in the average scores of students' emotional intelligence using realistic approach-based learning devices in trials I and II. From the average score of students' emotional intelligence using learning device developed based on a realistic approach has increased from trial I to trial II. So it can be concluded that a realistic approach-based learning device can improve students' emotional intelligence.

4. Conclusion
Based on the results of the analysis and discussion in this study, some conclusions are presented as follows:

1. Validity of a realistic approach-based learning tool in enhancing mathematical problem solving skills is valid for use in learning in terms of expert / practitioner assessment stating that the realistic approach-based learning device developed can be used with little revision.
2. Learning device developed based on a realistic approach have met the practical criteria in terms of the feasibility of learning device have reached a high category, namely in the first trial of 3.49 and in the second trial of 3.97,
3. The effectiveness of a realistic approach-based learning device in improving mathematical learning outcomes has been effective to be used in learning, in terms of classical learning completeness, which is reaching 86.11% of students who take learning can achieve a score of ≥75
4. Increasing students' emotional intelligence using realistic approach-based learning device in fraction material is the result of the average emotional intelligence questionnaire of students in the first trial of 75.33 to 75.87 in the second trial, an increase in the average emotional intelligence of students by 0.51. In addition, the average of each indicator of emotional intelligence increased from trial I to trial II.

5. Reference
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