Development of Mathematics Learning Tools Based on Coaching Technique to Create Accelerated Learning Revolution

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Abstract. One of the efforts to create Accelerated learning revolution of XXI century is the importance of innovation in mathematics learning by developing learning device based on Coaching Technique. The learning devices are in the form of lesson plan (LP) and student worksheet (SW) designed as the substitute coach for both teacher and student, hence the purpose and the target of learning can be achieved. Coaching provides steps that are systematic, practical, and in line with the learning purpose. Coaching technique can be implemented in the classroom by providing opportunity for teacher to conduct improvisation in teaching, to facilitate teacher to uncover students characteristics, as to provide opportunity for students to develop their own learning style based on their individual ability. The development model employed in this research is plomp model. This model consist of three phases, first, preliminary research, second development or prototyping phase and third assessment phase.

1. Introduction
Development of the 21st century demanding and requiring a faster learning ability. This is supported by Nichol [1] individuality success in a more recent century depending on how far this individual can develop appropriate skills to master the power of speed, complexity, and uncertainty of one another. The more increasing complexity of the world requires also appropriate skill or ability to be able to analyze every situation logically and to able to solve problem in a creative way. Low education achievement, poor analysis skill, and poor decision making ability would only add up to economic dependency.

The progress of Information and Communication Technology has positive and negative impacts for human life especially in education. Therefore, on this tight competitive era, thorough preparation of the concept and its application is of vital importance in order to create excellent human resources. This has caused educational institutions placed teacher as the main dominant to improve human resources.

According research results reveal that teacher at the 21st century as for the next other centuries are challenged to accelerate classroom learning and classroom management. Teacher also required indirectly being able to adjust with the advancement standard of information and communication technology. The adjustments are including method, learning technique, learning
device, and resource book. The same thing was stated by Vos [2], Samples [3] and Meier [4],[5] on the importance of Accelerated Learning of 21st century for both teacher and student are to put aside the assumption that prevent mindset from improving in the previous century, but rather to stick on the appropriate assumption to achieve success in real life and education. Accelerated learning is an effort conducted in order to facilitate concept comprehension in a faster and a more fun ways.

In fact, school system still focuses on how to decide what must be learned, and how to think, without necessarily think about how a concept can be really appropriate and well comprehended by student. In a nowadays fast changing world, the main priority is to teach student how to learn and how to think. Learning is not merely to find answers, also not to only hinge on piece and part of knowledge. As stated by U. K Prime Minister Tony Blair in [1], he reveals that education is not a once in a lifetime even for people under 18 years old. New consensus has to be based on large access toward higher education and continual opportunity for adult learner to experience a lifelong learning.

It can be seen in the students’ low achievement of first semester Mid Term Test on mathematics subject on Table 1.

| Class | Percentage |
|-------|------------|
|       | Incompleteness | Completeness |
| VIII 1 | 56,19 | 43,81 |
| VIII 2 | 61,45 | 38,55 |
| VIII 3 | 61,09 | 38,91 |

(source :Mathematics teacher of class VII SMP Muhammadiyah 7 padang)

Based on the regulation of minister of national education No. 58 year 2014 [6], the purpose of mathematics learning are including several aspects as follow: concept understanding, reasoning, and problem solving, communication; solving the problem by using problem solving strategy and the other aspects.Cause of mathematics is one of subject that has to be delivered in every education level, started from early education up to higher education, therefore we need a learning device that can improve students' mathematical learning abilities.

Based on the explanation above, one of the effort to create an accelerated learning revolution of XXI century on mathematics learning is through coaching technique[7]-[22]. The learning devices employed are lesson plan and student worksheet. Those are designed to substitute Trainer Teacher in coaching technique; hence the purpose and goal of coaching can be achieved for both teacher and student. Coaching provides systematic, practical, and directed steps toward the purpose of the learning. This technique can also be implemented in the classroom by providing teacher with opportunity to have improvisation in teaching and to get to know students’ characteristics as well as providing students with opportunity to develop their individual learning style

2. Method
This is a research and development study. The purpose of this research is to produce a valid, practical, effective, and appropriate for the field requirement learning device. According to Punaji(2013:277) research and development study is a process aimed to develop and to validate educational product. The development can be in the form of process, product, and design. Sugiyono [23] reveals that Research and Development is a research method employed to produce particular product and to test the effectiveness of the product. The product that will be developed is mathematics learning device based on coaching technique in class VII of Junior High School (SMP).
In this research, the development model employed is Plomp model. It consists of three investigation stages, namely, preliminary research, development or prototyping stage, and assessment stage. In preliminary research, researcher is conducting the preparation consists of needs analysis, student analysis, curriculum analysis, and concept analysis.

Development or prototyping stage is to design and develop learning device gradually by using formative evaluation in order to improve and to revise the developed prototype. Meanwhile, assessment stage is to conduct semi summative evaluation to enable drawing conclusion on final prototype or to assure that the developed product is eligible for coaching technique.

3. Result And Discussion

Based on the results of research that has been done, it was found that the mathematics learning device based on Coaching techniques had fulfilled the valid, practical and effective criteria. The description of each aspect is as follows.

3.1. The validity of learning tools based on Coaching techniques

In terminology, a valid learning device must meet valid criteria in terms of content and construct. The validity of the contents means the suitability of the product produced with the material, the construct validity means the suitability of the product produced with the developed model.

In the validity of the lesson plan, the aspects assessed are all the components of the lesson plan, language and writing. lesson plan (LP) validation was done by 3 Mathematics experts and 1 Language expert. During validating the lesson plan (LP) and having made Revisions, the lesson plan (LP) has a validity value of 4.5, which means that the LP has been valid both in terms of content and construct.

The validity of student work (SW) was carried out by 3 mathematicians, 1 language expert and 1 education technology expert. Mathematics experts validate the lesson plan (LP) in terms of presentation of material and content. Language experts validate in terms of language, while educational technology experts validate in terms of the appearance and graphics of student work (SW) developed. After validating, it can be concluded that the student work (SW) validity value is 4.4, which means that the student work (SW) is valid and meets the criteria of a good student work (SW).

3.2. The practicality of learning tools based on Coaching techniques

A good learning device that should have practical value, means that the learning device hendalah easy to use, easy to understand, easy to apply and efficiency in terms of time of use. To find out the tools developed are practical, the researcher must collect data from observations of the implementation of learning and questionnaires filled out by teachers and students. Based on the analysis of the results of teacher and student questionnaires, it can be concluded that the student work (SW) used is easy to understand, interesting, and provides learning motivation for students.

3.3. Effectiveness of learning tools based on Coaching techniques

Effective learning tools can be seen from the impact or effect of these learning devices on students. Assessment of effectiveness is done to see the extent to which the use and benefits of learning tools in improving students' mathematical abilities. Assessment is done by giving test questions in the form of a description to students. From the analysis of the data, there were 75% of students who got an average score above the KKM, meaning that the learning kit was stated to have been effective in increasing students' understanding of mathematical concepts.

4. Conclusion

Based on the results of research and discussion it can be concluded that: First, the learning tools that have been developed through a process of self evaluation, validation with 5 validators have been valid in terms of content and construct with a validity value of 4.5 with valid criteria. Second, learning tools
that have been developed through a one to one evaluation process, small groups and field tests have met practical criteria in terms of implementation, convenience and time. The results of this study can be seen from empirical data, namely practicality questionnaire data and observational learning implementation data. The practicality value has an average of 4.6, a percentage of 92% with practical criteria. Third, the mathematics learning tools based on coaching techniques has effectively given an impact on the students' understanding of mathematical concepts. This can be seen from the average acquisition score of the ability of students to understand the concept of an average of 75%.

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