ICMSCSME 2015

International Conference on Mathematics, Statistics, Computer Sciences, and Mathematics Education

ISBN 978-602-72198-2-3

PROCEEDING

"Exploring Mathematics and its Application in the Future"

2-3 October 2016
Hasanuddin University
Makassar, Indonesia

Proceeding of International Conference on Mathematics, Statistics, Computer Sciences, and Mathematics Education (*ICMSCSME*) *2015*
ISBN 978-602-72198-2-3

Proceeding

International Conference on Mathematics, Statistics, Computer Sciences, and Mathematics Education

(*ICMSCSME*) *2015*

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ISBN 978-602-72198-2-3

FOREWORD FROM CHAIRPERSON OF ICMSCSME 2015

Assalamu 'alaikum warahmatullahi wabarakatuh
And sincerely greetings to all.

It is my great pleasure to welcome all our invited speakers and participants to International Conference on Mathematics, Statistics, Computer Sciences, and Mathematics Educations 2015 (ICMSCSME 2015) jointly organized by Mathematics Department Faculty of Mathematics & Natural Sciences Hasanuddin University, and Indonesian Mathematical Society (IndoMS) Sulawesi Region.

The conference is attended by around 200 participants, they are from Nepal, Philippines, India, Slovakia, Malaysia, and Indonesia.

It is hoped that the ICMSCSME 2015 will catalyze and increase academic and research collaborations between institutions involved, internationally and also locally. I sincerely hope that this will spur further advancement of scientific research and fruitful collaborations between organizations.

Finally, I would like to congratulate all the speakers and participants for their participation in this ICMSCSME 2015. On behalf of the conferences organizing committee, I would like to take this opportunity to thank all who have contributed either directly of indirectly to the success of the event for their generous contributions.

Finally, to all ICMSCSME 2015 committee thumbs up for a job well done. May Allah's blessing be upon you, Aamin.

Thank you,
Wassalam,

Dr. Nurdin
Chair of ICMSCSME 2015

ISBN 978-602-72198-2-3

FOREWORD BY DEAN OF MATHEMATICS AND NATURAL SCIENCES FACULTY HASANUDDIN UNIVERSITY

I would like to congratulate the Mathematics Department, Mathematics and Natural Sciences Faculty, Hasanuddin University and Indonesian Mathematical Society Region Sulawesi (IndoMS) for successfully organizing this joint conference of the International Conference on Mathematics, Statistics, Computer Sciences, and Education Mathematics 2015 (ICMSCSEM-2015) and the South East Asian Mathematical Society School (SEAMS School) on Coding and Graphs 2015.

I give me great pleasure to welcome all distinguished guests, invited speakers, invited lecturer, and participants to UNHAS and Makassar Indonesia. For some of you, this visit may probably be your first visit to Makassar and I wish you SELAMAT DATANG. I hope your brief visit to Makassar, in particular Makassar will be a memorable and fruitful one.

UNHAS is committed towards fulfilling the strategy set forth in the National Higher Education Plan for Indonesia Higher Education Institution. This conference demonstrates the commitment of UNHAS to promote internationalization as one of its main agenda. International research collaboration commitment includes collaboration in building new findings, teaching, and learning, and service activities to create opportunities for collaborative efforts, thus enhancing research and possible research exchange.

It is the aspiration of UNHAS to be an established research university and UNHAS is continuously promoting international research collaboration. I sincerely hope that this joint conference will be a platform where international research collaborations can be fostered and consequently nurtured.

Hopefully is of benefit to all readers.

Yours faithfully,

Dr.Eng. Amiruddin

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Proceeding of International Conference on Mathematics, Statistics, Computer Sciences, and Mathematics Education (*ICMSCSME*) *2015*
ISBN 978-602-72198-2-3

Development of PCL Approach in Mathematics Learning Integrated with Character Education at Junior High Schools in Gorontalo Province

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ABSTRACT

Character education is an integral part that is very important to be paid attention in education and learning process particularly in mathematics learning. Character education in learning activities was conducted by using integrated approach in a subject. The integration of education character in mathematics learning can be done through active approach. This approach is chosen because it is to build the character, the students are the ones who should have active role in learning process. One of active learning approaches was Problem Centered Learning (PCL). This research aimed at (1) investigating comprehensively the theories that are used to develop the PCL approach which is integrated with character education by following the stages of research and development model; (2) investigating comprehensively whether or not the developed learning tools is appropriate with PCL approach which is integrated with education character. This research was conducted through learning tools development stages. The process of learning tools development was using 4-D model modification according to Thiagarajan, Semmel & Semmel that consisted of define and design, develop, and disseminate stages. The final result of research gained that the knowledge that was developed through PCL based learning tools had contribution to the emergence of social interaction and negotiation.

Keyword: Character Education, Mathematics Learning, PCL Approach

1. Introduction

Character education is an integral part that is equally important to be paid attention in the teaching and learning process especially mathematics learning. Character education in teaching and learning activity within the class, implemented using the integrated approach within the learning thus, is expected to have instructional effects and nurturing effects for the students' characters development. Each educational unit can determine which character values that would be emphasized that suits the school's character, the characters of the region, or the characteristics of the subject.

Integration of character education within the mathematics learning activity can be done by designing the learning activities using active learning approach explicitly and implicitly to develop certain character values. This approach is chosen due to in

ISBN 978-602-72198-2-3

building character, students should be more actively participating during the learning process.

In correlation with the characteristics of 2013 curriculum, it is the author personal believes that what is meant by active learning approach is learning approach which is designed to: (1) the learning process is centered on students; (2) the learning process is interactive (interactive teacher- learners-environment-sources/other medias); (3) learning process based on multimedia tools; (4) learning process in the form of group learning (teamwork based); (5) learning process that emphasizes and nurtures the more critical and critical thinking of the students; and (6) the learning process that have an impact on the development of good characters values on students, [1]

Referring to the criteria above, in this research, one of the active learning approach is Problem Centered Learning (PCL) approach. PCL is one learning model that requires students' mental creativity to understand a concept through a situation and problem presented in the beginning of a lesson. This model is designed with the objective of students to be able to develop their own concept of understanding, involving the high thinking activity to create higher level of independence and self-confidence. According to Wheatley [2] this PCL approach is designed to give students to be more actively involved in the learning process by encouraging them to: (a) invent their own ways in solving some problems; (b) brainstorming on the level beyond arguments on what is wrong or right; (c) creative thinking beyond calculation written calculation.

PCL is divided into three components, namely, task, group, and sharing [3]. This approach is started by preparing the class through assigning some problem solving tasks to the students to accomplish those tasks. This activity is then followed by dividing students into small working groups and encourages them to collaborate. Upon the completion of discussion in each group, the last activity is the class discussion. In this session of the discussion, each group presents the materials that they have discussed within their group. It is expected that through this classroom discussion the sharing would happen thus, it would produce a solution to the problem at hand.

Based on the topic/content/materials aspect of mathematics subject in junior high schools or from the active learning approach discussed above, there are several characters values identified explicitly and implicitly that will be able to be constructed, developed and shaped in each mathematics learning session. Those values are vigilance, logical thinking, critical, self-confident, tolerant, responsible, and communicative, open mindedness, collaboration to learn from each other, take and give, and respect each other, optimism, ability to make quick and appropriate decision and constant self-reflection [4], [5], [6].

Therefore, it is clear that mathematics learning can facilitate development and nurture of character values, hence, can contribute in the nation's character building.

Implementation strategy that the teacher can apply is through identifying the character values that would be developed based on the topics within the mathematics subject, selecting the appropriate learning approach to develop and shape those values, create role model in implementing those values and evaluate it.
To implement that strategy in mathematics learning, conceptual and empirical study through a research to develop a learning approach using the PCL approach integrated with character education is needed. The developed learning approach is to optimize the students' roles as subject of the learning and to optimize the learning process in improving the students' ability and the establishment of students' character as part of the instructional and nurturing effects.

This research is aimed at designing and developing the PCL approach integrated with character education, through (1) a comprehensive study of theories used to develop the PCL approach integrated with character education by following the stage of research and development model; (2) comprehensive study of whether the developed learning tools is appropriate with the PCL approach integrated with the character education.

2. Research Method

This research is a research to develop learning tools such as, Lesson Plan, Learning Media, and Learners' Activity Sheets, and Learning Achievement Test.
The development model that would be used in this research is the research and development model of Four D model [7]. 4D model is chosen because it is more systematic and appropriate for developing learning tools, however, in this research, the researcher has modified the 4D model. This model is simplified into three stages, called define, design, and develop. The disseminate stage cannot be implemented because the objective of this research is to develop the learning tools to produce better learning tools emerge from the development stage.

The instructional development instruments used in this research are validation sheet, teacher's ability sheet and students' activity sheet, and learning achievement test. The data analysis for this research is the analysis of the validation of learning tools/instruction, analysis of teacher's ability in managing the classroom, and analysis on the activity of learners during learning process.

3. Research Result

3.1 Description on the Defining Stage

3.1.1 Initial-Final Analysis

The result of the observation and interview gathered the information that the learning activities were using conventional pattern in which learning are more dominated by the teachers. The learning activities were conducted where teacher describes the mathematics concept, gives examples and asks students to do the

exercises. In learning activities, students tend to be passive and were not chance to construct their own knowledge independently.

Based on the interview with the mathematics teachers it was also revealed that the junior high school students' mastery of the mathematics topic is very low. Based on the cognitive learning theory, students have to be actively involved in learning to construct their knowledge for them to better memorize the topic. One of the better learning alternatives to encourage the students to participate actively in learning process is through PCL approach.

Implementation of PCL approach in learning needs appropriate learning tools. Therefore, the learning tools currently used by the schools are not appropriate for implementing this alternative learning approach; thus, a set of appropriate learning tools is needed to be developed to support the learning implementation.

3.1.2 Students' Analysis

In this analysis, several things as follows were revealed:

1. The socio cultural backgrounds of the students are diverse. The parents jobs are also various from teachers, civil servants, farmers, labor, merchant, business etc.
2. The junior high schools students' age is ranging from 11-15 years old. According to Piaget, their cognitive development is in the formal operation stage.
3. Based on the knowledge background of the students, the sub-topic of Comparison and Chance learnt by the students in grade VIII is not a new concept at all, because this sub-topic was once taught when they were still in elementary school. In addition, those topics are often found in their daily lives.

3.1.3 Materials Analysis

The materials analysis is aimed at identifying the parts of main themes that would be learnt by the students in Comparison and Change topic in grade VIII of junior high school that refers to the 2013 curriculum.

3.1.4 Task Analysis

Task analysis consists of general assignments and specific assignments. The general assignments refer to the basic competencies and core competencies in 2013 Curriculum. Meanwhile, specific assignments refer to modified indicators of learning achievement.

3.1.5 Specification of Learning Objectives

Specification of learning objectives are conducted by defining the basic competencies in learning achievement indicators specifically, based on the material analysis and assignment analysis.

3.2 Description of the Designing Stage

3.2.1 Media Selection Result

Learning media is needed in the implementation of learning using the PCL approach that has been adjusted with the material analysis, assignment analysis, learning objectives specification, and available facilities in the school. Based on those

analyses, the media needed in PCL approach for those materials are white board, board markers, LCD, and Laptop.

3.2.2 Format Selection Result

Format selection for learning tools is adjusted to the principles, characteristics, and steps of the PCL learning approach. The steps of the PCL learning approach consist of opening activity, core activity, and closing activity. Learners' activity sheet, assignment and learning achievement test are made colorful with the expectation of drawing the learners' interest and thus, they would be motivated to learn.

3.2.3 Initial Design Result

In this stage, an initial design of lesson plan for three meetings, the learning media, the learners' activity sheet, learning achievement test for the comparison and chance are made. All the results of this designing phase is called Draft I.

3.3 Description of the Development Stage

3.3.1 Expert Validation Result

Validation and Revision of the Lesson Plan Result (RPP)

The experts validation were focused on the format, content, illustration, and language within the developed learning tools. The result of these experts validation such as, correction, critics, and suggestion were used as basis to revise the lesson plan. The revised lesson plan based on the inputs from the experts is called Draft II. All the three experts gave appropriate and very appropriate grading; they also concluded that the lesson plan could be implemented with minor revision.

Validation and Revision Result of the Learners' Activity Sheet (LKPD)

The assessment made by the validators toward the LKPD consists of: the direction of assignment and information. The experts validation result on the learners' activity sheet turn out to be appropriate and very appropriate result. All three validators concluded that the LKPDcould be used with minor revision. Hence, the LKPD was revised accordingly.

The Validation and Revision Result of the Learning Achievement Test

The assessment made by the validators on the learning achievement test is on the format, language, illustration, and content of the test. The validators gave appropriate and very appropriate remark on the test. All four assessors concluded that the learning achievement test could be used with minor revision. Hence, the learning achievement test was revised accordingly.

3.3.2 Readability Test

Before being implemented, the Draft II has undergone the readability test administered to 6 students in three different junior high schools in Gorontalo province. Those six students were taken from classes that were not the experiments classes. The result of this readability test is called draft III. The input from this test was that there are some misplaced words in LKPD. The revision of the LKPD was

then made accordingly to enable the learners to interpret problems or tasks given and to assist them in finding the solutions of those problems.

3.3.3 Learning Tools Trials

The trials were intended to make the developed learning tools flawless, before the learning tools is implemented in experiment classes. The trials were implemented for three meetings, as in the lesson plan. The trials were attended by two observers to observe the learners activities and the teacher's ability in managing the classroom. The teacher's activity observer sat in the back of the class and the students' activity observer sat beside the observed learners. The researcher played the general observer role, to observe the overall process of learning. The data from this trial stage were analyzed, then the result is used as consideration to revise the draft III to make it a good and qualified learning tool.

The data from this trials were data on the activity of the learners, data on the teacher's ability to manage the classroom. Based on the set criteria of teacher's ability to manage the classroom, the teacher's ability in managing the all the three trials classes were under the minimum good category. Meanwhile, the students' activity analysis, it appeared that the percentage of students' activity in each observed aspects in each Lesson plan was in the border of tolerated criteria of ideal time. Therefore, it was concluded that the students' activity was effective.

4. Conclusion and Recommendation

4.1 Conclusion

1. Based on either the topic/content/material aspect of the mathematics subject in junior high school or from all three aspects of PCL approach, several characters values that can be developed, nurtured, and shaped were identified explicitly and implicitly in each math session. Those values are, vigilance, logical thinking, critical thinking, self-confident, tolerant, responsible, communicative, open mindedness, collaboration to learn from each other, take and give, and respect for each other, optimism, ability to make quick and accurate decision, and constant self-introspection.
2. Integration of character education into math learning is done through designing learning activity using the PCL approach that explicitly or implicitly can shape certain character values.
3. PCL is a model of learning approach that requires students mental activity to understand a concept through situation and problem presented in the beginning of the learning session. Knowledge constructed through implementation of learning tools based on PCL contributed to the emergence of character values such as: vigilance, critical, tolerant, communicative, collaboration to learn from each other, take and give, and ability to make quick and accurate decision, and constant self-introspection.

4.2 Recommendation

1. PCL approach integrated with character education needs to be implemented in math learning in order to develop the learners' character.
2. Further investigation on effectiveness of the developed learning tools especially related to the school character and different social circumstances and different mathematics topic.

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