IMPLEMENTATION OF METACOGNITIVE REGULATION STRATEGIES AND ACTIVITY BASED LEARNING THROUGH BEST SELLER MATHEMATICS LEARNING ACTIVITY TO ENHANCE STUDENT’S MASTERY IN MATHEMATICS

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Research Highlights
This paper discusses the concept of combining two learning strategies, it’s Metacognitive Regulation Strategies (MRS) and Activity Based Learning Strategy (ABLS) to design and developing the Best Seller Mathematics Learning Activity (Apm-BS). Metacognitive skills through metacognitive learning strategies that emphasize learning that involves regulating and managing thinking action during the learning process can improve the students’ mathematical skills (Schraw & Moshman, 1995). The strength of learning activities in promoting interaction, discussion, coaching and collaborative skills can create active student engagement and contribute to meaningful learning (Festus, 2013; Celik, 2018). Learning through the combination of these two strategies is expected to have an impact on the students’ mastery. During the active involving in learning activity, help students to planning, monitoring and evaluating of their comprehension level in order to mastery the mathematical concepts and skills. So it can be suggested as an initiative and intervention to the problem of low level of mathematical mastery.

Graphical Abstract

Research Objectives
Well metacognitive development, capabilities and practices are related to meaningful learning. While, learning process is influenced by effective activities. The problems faced by teachers is a difficulty to choose the best practices (activity) meets the development of metacognitive skills. In fact, the present study try to discuss the potential of using the activity based learning combined to metacognitive strategies in order to improve student’s performance. So, the conceptual learning framework using principles of metacognitive strategies and activity based learning are created. Therefore, the research objective are, i) to analyse the needs of learning activities that meet the development of mathematics skills, ii) to design and develop the mathematics learning activities based on application of entrepreneurship, buying and selling activities, and iii) to evaluate the effectiveness of Apm-BS compare with conventional teaching and learning strategies.

Methodology
The present study is applied of the development research design, ADDIE Model. Starting with the needs analysis phase is an analysis of the background problems refer to teaching and learning process in mathematics. In the design and development phase, two strategies have been selected to be modified to develop mathematical learning activities which are oriented to entrepreneurial skills, buying and selling activities. Next, the final phase of the implementation and evaluation, the usability and effectiveness of the activity were tested through experimental studies to see the comparison of student achievement. Instruments used in this study according to the phase. For the analysis of needs phase, the questionnaire can delivered to selected mathematics teachers and students related to mathematics subject in secondary school by using purposive sampling technique. The design and development phase involves experts in field of mathematics to test the suitability of Apm-Bs and the validity of the content. Next, in the implementation and evaluation phase, the instrument used is the lesson plan (Apm-Bs and conventional), modified metacognitive questionnaire from Junior Metacognitive Awareness Inventory (Sperling, Miller & Murphy,2001) and Mastery Test. Data analysis will be carried out using statistics descriptive and inferential analysis using SPSS version 23 software.

**Results**

The need analysis through review of literature to the previous studies shows that there are correlation between activities done in the classroom and students performance. To improve students performance, requires metacognitive skills that are developed during learning. Here, it can be concluded that the need to design learning activities can allow students to develop metacognitive skills. The mathematical learning conceptual framework illustrates the development of meaningful learning through the implementation of activities as mediators for students developing the various skills needed to enhance mastery. Learning activities should meet the criteria of metacognitive learning strategies that can empower students towards managing the thinking process and also encourage students to monitor their learning. Elements in activities such as communication, interaction, cooperative and collaborative skills are associated with metacognitive regulation skills such as planning, monitoring and evaluating. In fact, through entrepreneurial, buying and selling (trading) activities in Apm-Bs helps students relate the communication, interaction, cooperative and collaborative skills and metacognitive regulation skills in solving mathematics tasks and problems. Efficiency and actively exploring out the Apm-Bs activities will allow students to improve their math skills.

**Findings**

The conceptual framework of mathematics learning activities were designed and created based on the merges of principles of metacognitive learning strategies and activity based learning. The studies of metacognitive strategies reported that there are a significant between the strategies implemented with the students' achievement. Students' mathematical skills are correlative with metacognitive skills developed during learning through metacognitive strategies. While communication, interaction, cooperative and collaborative skills also help students push themselves to be actively involved and passionate in exploring the learning. These skills are the mediators for increased metacognitive skills that will affect the mastery of the student’s mathematical concept.
References