

The Role of Context in Third Graders' Learning of Area Measurement

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Abstract

Many researches showed that the most of students find the difficulty in measuring area. The formula of area tends to be taught directly without involving the conceptual basis and the area measurement are separated from children's daily experiences. For this reason, the teaching and learning of area measurement was designed and link to a set of students' experience-based activities. The context of this research is Indonesian traditional handicraft namely anyaman. The study is situated in the context of implementing an Indonesian version of Realistic Mathematics Education, labeled as PMRI in Indonesia. Design Research methodology comprising preliminary design, teaching experiment, and retrospective analysis is applied. This research described the investigation of the context as preliminary of teaching and learning about area measurement held in 3th grade of primary school SDN 119 Palembang. The result of the teaching experiment showed that problem embedded in a context could encourage the students to develop the idea of area measurement concept. The strategies through emergent modeling showed how students' contribution could be used to develop gradually their reasoning of area measurement concept. In the experience-based activities for learning area measurement, emergent modeling played an important role in the shift of students' reasoning from informal level towards formal mathematical concepts of area measurement.

Key words: *Area measurement, Anyaman, design research, PMRI*

Abstrak

Beberapa kajian menunjukkan kesulitan siswa dalam melakukan penghitungan luas. Siswa lebih cenderung dikenalkan dengan penggunaan rumus tanpa melibatkan konsep itu sendiri dan pembelajaran luas terpisah dari pengalaman siswa sehari-hari. Hal tersebut mendasari untuk mendesain suatu pembelajaran luas dan menghubungkannya dengan aktivitas berdasarkan pengalaman siswa (experience-based activities). Tujuan dari penelitian ini adalah untuk melihat pemahaman (reasoning) siswa tentang konsep luas dengan menggunakan konteks kerajinan tradisional anyaman dan menghasilkan suatu local instruction theory untuk konsep luas dari informal ke formal dengan pendekatan PMRI. Metodologi yang digunakan adalah design research dengan tahap preliminary design, teaching experiment dan retrospective analysis. Penelitian ini mendeskripsikan bagaimana kerajinan tradisional anyaman memberikan kontribusi pada siswa kelas III SDN 119 Palembang untuk memahami konsep luas. Hasil dari teaching experiment menunjukkan konteks anyaman dapat merangsang

siswa untuk mengembangkan pengetahuan mereka tentang konsep luas. Seluruh strategi dan model (emergent modelling) yang siswa temukan, gambarkan serta didiskusikan menunjukkan bagaimana konstruksi atau kontribusi siswa dapat digunakan untuk membantu pemahaman awal mereka tentang konsep luas. Dalam aktivitas berdasarkan pengalaman siswa untuk pembelajaran luas, emergent modelling mempunyai peranan penting dalam memahami konsep luas dari level informal ke formal.

Kata Kunci : Pengukuran luas, anyaman, desain Riset, PMRI

Introduction

The study of area measurement is an important part of the primary school curriculum because of the relation of the basic concepts of area measurement with other mathematical ideas. The applications of area concept influence the students' understanding for other domains in higher grade (Cavanagh, 2008).

Researches in the field of mathematical education showed the poor understanding of area measurement involving the concepts. The emphasizing of teaching and learning of area measurement should not only in using the formula but also giving the students of opportunity to study the pattern, identical unit, and structure of the array (Fauzan, 2002; Van den Heuvel-Panhuizen & Buys, 2004; Cavanagh, 2008). In Indonesian traditional approach of education, the teacher and textbook tend to move quickly to the using of formula for the areas of basic shapes without giving the students the opportunity to study the pattern and structure of array (Fauzan, 2002). Although children know the measuring instruments and apply the formula that dominates to solve the problems of area, there is no guarantee that they understand what measurement of area is.

Aforementioned issues in the teaching and learning of area measurement background this research to design instructional activities for area concepts. Area concept is the understanding how a specified unit can cover a flat surface iteratively and completely (Cavanagh, 2008). In this research, the researcher involves Indonesian traditional handicraft, *anyaman*, as the context in preliminary of teaching and learning about area measurement. This traditional handicraft is one of materials of culture teaching in primary school. *Anyaman* has the potential basic concept of measurement area and it is real for students as the preliminary of teaching and learning about area. It is relevant with Freudenthal's idea that stresses mathematics as human activity and the need to connect mathematics to reality through problem situation. *Anyaman* as problem situation could contribute to the emerging of mathematical practices.

Theoretical Framework

In this research, students' thinking of area measurement was emphasized in some aspects. The aspects used are the selection of the square unit, the unit iteration, the counting of measurement unit, and the use of formula of area. Children need to develop the understanding of area as a specified unit that covers a flat surface