

## Students' Strategies of Measuring Time Using Traditional *Gasing* Game in Third Grade of Primary School

Anton Jaelani, Ratu Ilma Indra Putri, Yusuf Hartono

### *Abstract*

Understanding of measuring time has difficulty for children because it is intangible. Standar units often use directly by teacher for learning time measurement. Many researches involved game in designing learning material to facilitate fun and meaningful learning for children. For this reason, learning of time measurement that connect with children's daily experience was designed. The context of this research was traditional *gasing* game. The study is situated in implementation of Indonesian version of Realistic Mathematics Education, labeled as PMRI. This research aimed acquire learning trajectory of time measurement using traditional *gasing* game for the third grader of primary school by describing students' progress in learning. Design research methodology comprising preparing for the experiment, teaching experiment, and retrospective analysis was used. The research was conducted in SD (Sekolah Dasar) Pusri (Pupuk Sriwijaya) Palembang as one of PMRI (Pendidikan Matematika Realistik Indonesia) school. The result of the teaching experiment showed that learning design could foster students to experience reinvention of time measurement historically. It stimulated students to emerge their sense of time, measure time using non standar unit, understand the concept of standard unit, and measure time using standar unit. Students' strategies that were emerged showed students' progress through situation and problems that were provided by traditional *gasing* game.

**Keyword:** time measurement, *gasing*, design research, PMRI

### **Abstrak**

Siswa mengalami kesulitan ketika belajar mengukur waktu karena waktu merupakan nilai yang tidak dapat diindera oleh manusia. Satuan standar sering digunakan secara langsung oleh guru dalam mempelajari pengukuran waktu. Permainan telah banyak diikutsertakan dalam suatu pendesainan pembelajaran untuk mendukung siswa mengalami pembelajaran yang bermakna dan menyenangkan. Hal ini dijadikan dasar untuk mendesain sebuah pembelajaran yang dikaitkan dengan sesuatu yang dekat dengan siswa dalam kehidupannya. Permainan *gasing* tradisional dijadikan sebagai konteks untuk desain pembelajaran dalam penelitian ini. Pembelajaran menggunakan model PMRI, yang merupakan versi Indonesia dari RME. Tujuan dari penelitian ini adalah menghasilkan lintasan pembelajaran pengukuran waktu yang menggunakan permainan *gasing* tradisional di kelas III Sekolah Dasar yang dijelaskan melalui proses perkembangan pemikiran siswa. Penelitian ini menggunakan metode design research yang terdiri dari tahap-tahap preparing for the experiment, teaching experiment, dan

analisis retrospektif. Penelitian dilakukan di SD Pusri Palembang sebagai salah satu mitra sekolah PMRI. Hasil dari teaching experiment menunjukkan bahwa desain pembelajaran ini dapat membantu perkembangan siswa untuk mengalami pengukuran waktu secara historis dan menstimulasi siswa untuk memunculkan sense of time, mengukur waktu menggunakan satuan tidak standar, memahami konsep kekonstanan dalam satuan standar, dan mengukur waktu menggunakan satuan standar. Strategi-strategi yang muncul dari siswa menunjukkan perkembangan pemahaman siswa melalui situasi dan permasalahan yang terdapat dalam permainan gasing tradisional.

**Kata kunci:** pengukuran waktu, gasing, design research, *PMRI*

### ***Introduction***

Measuring time is a human activity that has started since human civilization itself there. Before 1600, Galileo has made measurements using his pulse (Glennie & Thrift, 2009). Calendar system that is universally known and used at this time was derived from the development of the Roman calendar which existed at the time of Julius Caesar in 46 BC (Holdford-Strevens, 2005).

Learning time measurement and emerging sense of it are important for primary school students so that students do not make mistakes early when they perform calculation of the results of time measurement. NCTM (National Council of Teachers of Mathematics) states that measurement is one of the most fundamental of all mathematical processes (Dacey et al, 2005), including the measurement of time. Reys Suydam, and Lindquist (2003) state that measurement as a mathematical topics studied by primary school students are most often used in everyday life. Many students have difficulties in measuring time because it is intangible (Buys & Bakhove, 2005)

Freudenthal (1991) states that mathematics must be connected with reality. Norvell (2007) argues that students can learn the concept of time using the game that includes the concept of duration. The research of Wijaya (2008) showed that *gundu* and *benthik*, as one of Indonesian traditional game, can be used as starting point when students learn to measure length between two objects.

In this research, researcher involved traditional *gasing* game as the context for learning time measurement. Traditional *gasing* game has the situation that provides the need of students in measuring time.