

## Investigating Secondary School Students' Difficulties in Modeling Problems PISA-Model Level 5 And 6

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### *Abstract*

The chart of Indonesian student of mathematical ability development in Program for International Student Assessment (PISA) event during the last 4 periods shows an unstable movement. PISA aims to examine the ability of children aged 15 years in reading literacy, mathematics literacy, and science literacy. The concept of mathematical literacy is closely related to several other concepts discussed in mathematics education. The most important is mathematical modelling and its component processes. Therefore the goal of this research is to investigate secondary school students' difficulties in modeling problems PISA-model level 5 and 6. Qualitative research was used as an appropriate mean to achieve this research goal. This type of research is a greater emphasizing on holistic description, and phenomenon identified to be studied, students' difficulties in modelling real world problem in PISA model question level 5 and 6. 26 grade 9 students of SMPN 1 Palembang, 26 grade 9 students of SMPK Frater Xaverius 1 Palembang, and 31 participants of mathematical literacy context event, were involved in this research. The result of investigate showed that student is difficult to; (1) formulating situations mathematically, Such as to representing a situation mathematically, recognizing mathematical structure (including regularities, relationships, and patterns) in problems, (2) evaluating the reasonableness of a mathematical solution in the context of a real-world problem. The students have no problem in solve mathematical problem they have constructed.

**Keywords:** Mathematical model, Modelling competence, PISA, PISA Questions level 5 and 6, Students' difficulties in solving PISA-model Questions. Mathematics Literacy.

### **Abstrak**

Grafik perkembangan kemampuan matematika siswa Indonesia pada ajang PISA selama 4 periode PISA terakhir menunjukkan pergerakan yang tidak stabil. PISA bertujuan meneliti secara berkala tentang kemampuan anak umur 15 tahun dalam membaca (*reading literacy*), matematika (*mathematics literacy*), dan IPA (*science literacy*). konsep literasi berkaitan erat dengan beberapa konsep-konsep lain yang dibahas dalam pendidikan matematika, tetapi yang paling penting adalah modelling (pemodelan matematika) dan komponen prosesnya. Oleh karena itu tujuan dari penelitian ini adalah untuk mengetahui kesulitan siswa sekolah menengah pertama memodelkan masalah model PISA level 5 dan 6. Penelitian yang digunakan untuk mencapai tujuan penelitian ini adalah penelitian kualitatif. Jenis penelitian ini adalah lebih menekankan pada deskripsi secara keseluruhan, dan

mengidentifikasi kesulitan siswa dalam membuat model matematika dari soal PISA level 5 dan 6. 26 orang siswa kelas 9 SMPN 1 Palembang, 26 orang siswa kelas 9 SMPK Frater Xaverius dari 1 Palembang, dan 31 peserta kontes literasi matematika di Palembang, terlibat dalam penelitian ini. Hasil investigasi menunjukkan bahwa siswa mengalami kesulitan dalam proses; (1) merumuskan masalah dalam kehidupan sehari-hari ke dalam model matematika, Seperti menginterpretasikan konteks situasi nyata ke dalam model matematika, memahami struktur matematika (termasuk keteraturan, hubungan, dan pola) dalam masalah, (2) mengevaluasi kewajaran dari solusi matematika dalam konteks masalah dunia nyata. Namun siswa tidak memiliki masalah dalam menyelesaikan model matematika yang telah mereka bangun.

**Kata Kunci:** Model matematika. kompetensi pemodelan matematika, PISA, Soal model PISA level 5 dan 6. Kesulitan siswa menyelesaikan soal PISA. Literasi matematika.

### ***Introduction***

Program for International Student Assessment (PISA) is conducted by the OECD (Organization for Economic Co-operation & Development) and United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics. PISA aims to examine the ability of children aged 15 years in the regular reading (reading literacy), mathematics (mathematics literacy), and Science (science literacy). Indonesia is one of the PISA participating countries that have joined since 2000. The chart of Indonesian student of mathematical ability development in the PISA event during the last 4 periods shows an unstable movement, Indonesian's students only able to answer questions PISA level 1, 2 and 3, and a few students can solve level 4 questions. Chairman of an international group of mathematicians for PISA 2012, Kaye Stacey (2010), argued that the concept of literacy is closely related to several concepts discussed in mathematics education. But most important is the modeling because the cycle of mathematical modeling is a central aspect of the conceptions of PISA students as an active problem solvers, but students or problem solver often do not need to be involved in every stage of the cycle of modeling, especially in the assessment context, Blum, Galbraith, Henn & Niss, (2007). Therefore, researchers interested in conducting research to investigate middle school students' difficulties in modeling PISA model problems level 5 and 6.