הכנס המדעי ה-18

מחקר, עיון ויצירה באורנים – תשע״ז

PISA, TIMSS, מגדר ויצירתיות:
סוגיות בהערכה בחינוך מתמטי

יו״ר: **עטרה שריקי**

Helen Forgasz **הלן פורגז**

TIMSS ו-PISA: האם קיים קשר ביניהם?

TIMSS and PISA: Are they Related?

TIMSS and PISA are two international testing regimes that attract much attention in government, educational, and public spheres when the results are released. Grade 4 and grade 8 students are assessed in the TIMSS testings, while PISA assesses 15-year olds. In this presentation, I will only focus on the tests related to mathematics. It is often wrongly assumed that the TIMSS and PISA tests measure similar aspects of students' mathematics learning, albeit at different grade levels. Over the years, there has also been a strong belief that if lower ranked countries simply learn how mathematics is taught in the highly-ranked countries, their students' learning, as reflected in these international tests, will improve. I will challenge both assumptions. I will illustrate that TIMSS and PISA are measuring different dimensions of student learning with respect to mathematics, and that these differences are related to understandings of curricular and pedagogical foci, as well as to questionable assumptions about the transferability of learning. Various factors contributing to highly and lowly ranked TIMSS / PISA countries will be explored.

Keywords: Assessment, TIMSS, PISA, Mathematics learning, Pedagogy

David Mittelberg **דוד מיטלברג**

פיזה 2012 : אתניות, מגדר והישגים בקרב תלמידים ישראלים

PISA 2012: Ethnicity, Gender and Achievement among Israeli Students

Published OECD PISA 2012 reports reveal that Israeli students ranked in the bottom third of the countries surveyed in mathematical literacy, while the gap between the highest and lowest scores was the second largest in the OECD. A secondary analysis of the PISA 2012 data set was conducted by ethnicity (Arab/Jew) to explore which variables lead to disparities in mathematical literacy between different socioeconomic levels and between Israeli Arabs and Jews. Large achievement differences were found between ethnic groups and levels in socioeconomic status. At the same time, published OECD PISA reports reveal no statistically significant gender differences in mathematical literacy for Israeli students. A secondary analysis of the PISA 2012 data set was conducted by ethnicity (Arab/Jew) and gender. Large achievement differences were found favouring males among Israeli Jews, with smaller differences favouring females among Israeli Arabs. The potential contribution of five affective variables to these differences was also explored. For Arabs and for Jews, similar patterns of gender difference favouring males were identified on four variables; for the fifth variable, Jewish males were favoured, and females favoured among Arabs. PISA data from multicultural nations should be disaggregated by ethnicity to obtain clearer information on minority groups' academic performance which might otherwise be masked within national data.

Keywords: Gender, Ethnicity, Affect and Achievement, PISA, Mathematical literacy

Atara Shriki **עטרה שריקי**

טיפוח יצירתיות מתמטית של תלמידים והערכת התפתחותה: מציאות אפשרית או חזון שלא ניתן למימוש?

Nurturing Students' Mathematical Creativity and Assessing its Development: A Possible Reality or an Unattainable Vision?

In a rapidly changing technological society, creativity is considered as an engine of economic and social progress. No doubt the education system has a central role in nurturing all students' creativity, and although the development of students' creativity is one of the stated goals of the Israeli Ministry of Education, mathematical creativity is normally not encouraged at Israeli schools. The causes of this reality are related to a variety of circumstances, among them: external pressures to cover the curriculum and succeed in standardized tests that mostly require algorithmic thinking and implementation of rules; teachers' tendency to teach similarly to the way they themselves were taught as school students; lack of adequate learning materials and accessible tools for following and evaluating the development of students' creativity; and more. The presentation will focus on results of studies that put to test two assumptions: (1) Nurturing students' mathematical creativity is possible at all ages and ability levels, and should be an integral part of the regular curriculum; (2) Providing teachers with a practical tool for designing learning materials aimed at nurturing students' mathematical creativity and a simple model for assessing their progress might encourage them to integrate appropriate activities in their regular teaching.

Keywords: Assessment, Mathematics creativity, Pedagogical approach to teaching mathematics.