TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

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Thema: **Student difficulties with interpretation of graphs**

Zeit und Ort: Dienstag, 21.5.2019, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Gesche Pospiech

Kurzfassung: Students are introduced to graphs rather early in their education and through different school subjects. They acquire most of their knowledge about graphs through the study of mathematics and physics. The previous research has shown that students have many difficulties with graph interpretation even at the university level, as well as at earlier levels. This study focuses on the following research question: How does student ability to interpret graph slopes and areas under the graph change across three different domains: mathematics, without context (M domain), physics or kinematics (P domain), and mathematics in contexts other than physics (C domain)? In order to answer this question eight sets of parallel mathematics, physics and other context questions were developed and administered to 385 first year students at Faculty of Science, University of Zagreb and to 417 first year students at University of Vienna. Besides giving answers to the questions in the test, students were also required to provide explanations and procedures that accompanied their answers in order to get an additional insight in the strategies that were used in different domains. Rasch analysis of data was conducted and linear measures for item difficulties were obtained. The analysis of item difficulties obtained through Rasch modelling pointed to higher difficulty of items which involved context (either physics or other context) compared to direct mathematical problems on graph. In addition, student explanations were analyzed and categorized. Student strategies of graph interpretation were found to be domain specific. In physics, the dominant strategy seems to be use of formulas, especially among students at University of Zagreb. This strategy seems to bock the use of other, more productive strategies which student possess and use in other domains. Students generally better interpret graph slope then area under the graph, which is difficult for students and needs more attention in physics and mathematics teaching.

Biographie: Lana Ivanjek received her PhD in Physics with the thesis “An investigation of conceptual understanding of atomic spectra among university students” from University of Zagreb, Croatia in 2012. In year 2014 she moves to Vienna, Austria as a post-doctoral researcher on Lise Meitner grant with the project Development of graph inventory. From 2016 she works at University of Vienna as a Senior Lecturer in the field of physics education research. Her main research interests are development and validation of new teaching materials and development and validation of conceptual inventories.