

SP - (15929) - EFFECTS OF CONCEPTUAL AND CONTEXTUAL TASK CHARACTERISTICS ON STUDENTS' MECHANICS CONCEPTIONS

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Short Abstract

Conceptual change research has demonstrated that individual students may hold a "knowledge-in-pieces" or "fragmentary" knowledge base. In order to understand better the conditions that evoke particular conceptions and to design instruction accordingly, we investigate how (a) conceptual task characteristics (variations in the underlying concept or the way the concept is approached) and (b) contextual task characteristics (variations in the situation to which a concept applies) affect the activation of students' conceptions (SCs) in Newtonian mechanics. A test in which conceptual and contextual task characteristics (CCTCs) were varied systematically was administered to three different student cohorts (undergraduates with physics as a major and minor subject as well as high school students aged about 16 years). T- and Mann-Whitney-U-tests were performed to investigate if tasks with specific CCTCs differ in their solution probabilities, revealing varying conceptions. Great effects were especially observed when conceptual characteristics were varied (Authors, 2020). For instance, students of all cohorts activate more appropriate conceptions if tasks concerning Newton's 1st law ($v = \text{const. but } \neq 0$) describe forces and ask for the resulting motion than vice versa. The presentation will provide the effects identified for different cohorts in detail. Furthermore, we will discuss implications for teaching and further research.