11 - Evaluation and Assessment of Student Learning and Development | Empirical

SP - (16557) - EVALUATING STUDENTS' CRITICAL THINKING: DESIGN OF A CRITICAL THINKING ASSESSMENT IN PARTICLE PHYSICS

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Short Abstract

Although the teaching of critical thinking (CT) skills is desirable in all school subjects and specifically in science, there is a lack of tools to assess the extent to which students acquire these skills in a particular domain. Here we present a Particle Physics Critical Thinking Test (PPCT) to assess student acquisition of CT skills in a specific domain of particle physics. The PPCT contains 17 constructed-response items that reflect the CT skills targeted in a standardized CT test. To validate its content, we used expert reviews, a small paper-pencil administration with physics teacher students (N= 8), and a cognitive interview with high school students (N= 4). The test was administered as a posttest to grade 10 and 12 students (N=34). The results of a quantitative analysis show that the internal consistency and inter-rater reliability of the PPCT test are satisfactory. The PPCT can be used to evaluate the acquisition of CT skills by students and also the effectiveness of an instruction in the specific domain of particle physics. In addition, it may be useful to educators and teachers for further research to develop an instrument to evaluate student CT skill development and the effectiveness of an instruction in a specific domain.