

Abstract Submitted  
for the APR20 Meeting of  
The American Physical Society

**Developing a diagnostic instrument designed to disentangle student reasoning from conceptual understanding<sup>1</sup>** MILA KRYJEVSKAIA, BRIANNA SANTANGELO, ALEXEY LEONTYEV, North Dakota State Univ, MACKENZIE STETZER, Univ of Maine, BETH LINDSEY, Penn State Greater Allegheny, J. CALEB SPEIRS, Univ of New England — A common overarching goal of physics instruction is to help students improve the conceptual understanding and reasoning necessary to analyze basic physics situations successfully. However, existing physics assessments tend to focus on improvements in *overall* student performance, and do not readily help instructors ascertain whether observed performance issues primarily stem from reasoning difficulties or conceptual difficulties (or both). As such, our collaborative multi-institutional research group has been developing a two-tier instrument, the *Dimensions of Conceptual Understanding and Reasoning Instrument (DCURI)*, designed to disentangle the two dimensions of productive thinking (conceptual understanding and reasoning). The instrument allows instructors to diagnose the likely source(s) of poor student performance, which, in turn, can inform instructional modifications. The instrument also allows for an assessment of improvements along each of the two dimensions separately. As a result, instructors, researchers, and curriculum developers not only can examine overall improvement in student performance but also can pinpoint the impact of instructional interventions on each dimension.

<sup>1</sup>This material is based upon work supported by the National Science Foundation under Grant Nos. DUE-1431940, 1431541, 1431857, 1432052, 1432765, 1821390, 1821123, 1821400, 1821511, 1821561.

Liudmila Kryjevskaia  
North Dakota State Univ

Date submitted: 10 Jan 2020

Electronic form version 1.4