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**Identifying student difficulties with basic scientific reasoning skills: An example from control of variables**

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Current national and local standards for the science learning of K-12 students emphasize both basic concepts (such as density) and fundamental reasoning skills (such as proportional reasoning, the interpretation of graphs, and the use of control of variables). At Western Washington University (WWU) and the University of Washington (UW), an effort is underway to examine the ability of university students to apply these same concepts and skills. Populations include students in liberal arts physics courses, introductory calculus-based physics courses, and special courses for the preparation of teachers. One focus of the research has been on the idea of control of variables. This topic is studied by students at all levels, from the primary grades, in which the notion of a “fair test,” is sometimes used, to university courses. This talk will discuss research tasks in which students are expected to infer from experimental data whether a particular variable influences (*i.e.*, affects) or by itself determines (*i.e.*, predicts) a given result. Student responses will be presented to identify specific difficulties.