Investigating the Relationship between Students’ Informal and Formal Inferential Reasoning

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Research Apprenticeship Report Abstract

The past few decades have seen unparalleled growth in the field of statistics, especially in its applications. Statistics courses are now found in almost every post-secondary school. The teaching and learning of statistics is also prominent in many high schools in the United States and has filtered into junior high schools and even elementary schools. The inclusion of probability and statistics as one of the content standards in the National Council of Teachers of Mathematics standards document (NCTM, 1989) triggered increased interest in how statistics is taught and how students learn statistics. While much progress has been made in statistics education, even after instruction many students are still lacking the ability to properly apply their statistical knowledge. In particular, students experience difficulties when drawing conclusions about populations based on statistical results (Garfield, 2002; Garfield & Ahlgren, 1988; Castro Sotos, Vanhoof, Van den Noortgate, & Onghena, 2009). Constructing confidence intervals or conducting hypothesis tests followed by properly drawing conclusions about a population require formal inferential reasoning skills. This study adds to the knowledge of the development of students' formal inferential reasoning, by focusing on the relationship between the components of informal inferential reasoning and formal inferential reasoning. Most recently, informal inferential reasoning has been studied as a means to bridge the gap between describing data using the concepts of variation and distribution and drawing formal conclusions about populations based on such data. This study examines informal inferential reasoning tasks in an effort to determine those that help to build the bridge to formal inferential reasoning for statistics students.