Oral Defense Announcement
University of Missouri – St. Louis Graduate School

An oral examination in defense of the dissertation for the degree
Doctor of Education with an emphasis in Educational Practice

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B.S. in Chemistry, B. A. in Biology, May 1991, Regis University, Denver, CO.
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A Cognitive View of General Chemistry Education

Date: August 3, 2023
Time: 10:00 a.m. to 12:00 p.m.
Place: Sigma-Aldrich, TLC, Marillac Hall, Suite 100

Abstract
General chemistry or introductory college chemistry, is a prerequisite course common to science and engineering majors. For the past century, student failure rates have been reported as averaging between 25% to 35%. The cause of the high failure rates has traditionally been attributed to low student aptitude, or the lack of natural cognitive ability. Modern theories of learning based on cognitive science predict that prior knowledge and development of proceduralized skills determine general chemistry performance. Educational research supports this theory; the best prepared chemistry students take more rigorous science and mathematics courses in high school. However, these resources are not universally available, leaving many students at a decided disadvantage, since preparation gaps are not easily closed. The phenomenon of educational resource stratification and inequitable allocation leading to continued growing inequality is known as cumulative advantage. The presence of a cumulative advantage process can be discerned through characteristic trends in empirical data. Empirical data generated by general chemistry students at a medium size, suburban, Tier 1 university in the Midwest from 2016-2019 was analyzed for evidence of cumulative advantage. The results and potential effects were discussed.

Defense of Dissertation Committee
Keith Miller, Ph.D.
Charles Granger, Ph.D.
Helene Sherman, Ed.D.