ABSTRACT

The purpose of this study was to determine if student performance on Missouri’s Biology End of Course assessment is influenced by a Physics First curriculum sequence. Lederman (2001), the American Association of Physics Teachers (AAPT, 2002), and others have supported a revision of high school science course sequence from the traditional (biology-chemistry-physics) to one promoting Physics First (PF) for ninth grade students. In this sequence PF is followed by chemistry, and then biology. AAPT considers the sequence is more appropriate for learning the fundamental principles of the sciences, but there is a lack of empirical studies in the literature to provide evidence of its success. In Missouri, performance in science is only measured using the Biology End of Course (EOC) assessment where school proficiency data is reported as the percentage of students who score in the Proficient or Advanced levels. This research analyzed 2009-13 Biology EOC assessment results from 235 Missouri schools in order to determine the significant factors that predict proficiency. Independent variables included the assessment year (YR; 2009-13), grade level (GL; 9-11), science course sequence (SEQ; PF or other), and socioeconomic status (SES; % students enrolled in free or reduced lunch).

Hierarchical linear modeling was used to determine which of the four main effects and/or interactions contributed significantly to the model’s fitness. Results showed YR and SES were the only significant predictors to assessment performance, and a reduced linear model with only these two variables was not significantly different than the larger model with all variables and interactions included. This study has found the PF curriculum sequence does not produce significantly different biology scores than any other used by Missouri schools.