ABSTRACT

Bivariate relationships play a critical role in school statistics, and textbooks are significant in determining student learning. In recent years, researchers have emphasized the importance of learning trajectories (LTs) in mathematics education. In this study, I examined LTs for bivariate data in relation to the development of covariational reasoning in three high school textbooks series: Holt McDougal Larson (HML), The University of Chicago School of Mathematics Project (UCSMP), and Core-Plus Mathematics Project (CPMP). The LTs were generated by coding for the presence of variable combinations, learning goals, and techniques and theories. Task features were analyzed in relation to the GAISE Framework, NAEP mathematical complexity, purpose and utility, and the CCSSM Standards for Mathematical Practice.

The LTs varied by the presence, development, and emphases of bivariate content and alignment with the GAISE Framework and CCSSM. Across three series, about 80% to 90% of the 582 bivariate instances addressed two numerical variables. The CPMP series followed the GAISE's developmental progression for all combinations whereas UCSMP deviated for two categorical variables. All CCSSM learning expectations were found in HML and CPMP but not in UCSMP. At the same time, several bivariate learning expectations present in textbooks were not found in CCSSM. For the task features, few instances were at a high level of mathematical complexity and rarely included a *Collect Data* component. Analyses revealed the accordance of the GAISE and mathematical complexity frameworks. Research findings provide implications for curriculum development, content analysis, and teacher education, and challenge the notion of CCSSM-aligned curricula.