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A Framework for understanding data about society

How can we prepare students to understand statistical data and quantitative findings about trends, gaps, or changes in key societal issues such as regarding demographics, crime, unemployment, wage equality, migration, health, well-being, and other diverse areas of importance to society? Does the current (mathematics) curriculum really address the needed skills of future adults?

This paper sketches in broad strokes the emerging sub-field of “civic statistics”, and situates it within the fields of statistics education and mathematics education. The paper is based on insights from ProCivicStat, a collaborative project of six universities in five countries (Germany, Hungary, Israel, Portugal, and the United Kingdom) funded by the European Commission’s ERASMUS+ program.

The ProCivicStat analysis points to five general characteristics of civic statistics and the ways in which they are reported to the public, i.e., statistics describe multivariate phenomena, refer to or compare aggregated data that can be analysed on multiple levels, and relate to data that are often dynamic in nature and change over time. Further, given the above characteristics, civic statistics are presented to the public via texts and visualizations that are either broader and richer, or different than what is included in regular statistics and mathematics classes.

Based on our analysis, we reviewed a new comprehensive model describing the unique knowledge bases and other aspects needed so that young adults can comprehend, critically evaluate, communicate about, and engage with statistics about society. Among other things, the model relates to knowledge bases covering selected statistical and mathematical constructs and skills, literacy skills, extensions related to official statistics (e.g., understanding of indicators), understanding models and multivariate representations (e.g., related to population growth and population projections), knowledge of research methods and data production methods used in official statistics, the importance of certain beliefs and attitudes, and other facets described on the ProCivicStat website: www.procivic.org. Based on the above, we will discuss gaps in the current school curriculum and present implications for new learning goals, learning processes and teaching methods that are needed not only to improve statistical literacy but more broadly to promote engagement with civic issues in mathematics classrooms and prepare students for effective citizenship.

ProCivicStat conceptual model - 11 facets

