The History of the Geometry Curriculum in the United States

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Summary:

This monograph investigates the evolution of the geometry curriculum in the United States over the past 150 years. A primary goal is to increase awareness of the shape and nature of the current geometry curriculum both by explaining how things have come to be as they are and by illuminating just how things now are—after all, it is often difficult to appreciate how things are without considering how they could be different or knowing how they have been different in the past.

Given the limited access to first hand accounts of the enacted geometry curriculum during the past 150 years, the monograph relies on more durable materials. Textbooks, especially in the United States, provide a good record of the implemented curriculum at any given point in time (though one must keep in mind that the implemented curriculum can vary significantly from the ideal or achieved curriculum). Policy documents can provide insight into the choices made in textbooks by hinting at the issues considered and the recommendations made. Of course, since policy documents do not always lead to changes in textbooks, they can have little effect on what actually happens in those classrooms in Chicago or Kalamazoo. But other accounts can be brought to bear: journal articles in The Mathematics Teacher, for example, have provided first-hand accounts of teaching experiences, opinions and arguments from those in the mathematics community, as well as reports on research studies related to the teaching and learning of geometry.

The monograph is organized according to a chronological sequence of “notable events” leading to discernable changes in thinking about the geometry curriculum over the past century and a half—roughly the extent of time during which geometry has been taught in American schools. Notable events include important reports or commissions, influential texts, new schools of thought, and developments in learning technologies. Such notable events affected, among other things: the content and aims of the geometry curriculum; the nature of mathematical activity as construed by both mathematicians and those involved in mathematics education; and, the kind of resources students are given for engaging in mathematical activity. Before embarking upon this train of notable events, it is necessary to consider the “big bang” of geometry, namely the moment in time that shaped—to a large degree—the future life of the geometry curriculum. This corresponds to the emergence of Euclidean geometry, the Ancient Greek geometry developed over two millennia ago. Given its influence on the shape of the geometry curriculum, familiarity with the nature of the geometry articulated in Euclid’s Elements is essential to understanding the many tensions that would eventually surround the school geometry curriculum.

Several themes emerge over the course of the monograph, and are re-examined in light of current trends. These include: the aims and means of the geometry curriculum, the importance of proof in geometry, the role of visualization and tactile experiences, the fusion between solid and plane geometry, the curricular connections between geometry and algebra, and the use of motion and continuity.

[NOTE: Final draft of complete manuscript is under review for publication.]