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Sources from the 16th century to the teaching and learning about mathematics

Abstract

The use of original texts from the history of mathematics is a way to introduce in the classroom the sources on which mathematical knowledge is based. Choosing historical texts carefully can help students to develop their mathematical reasoning skills and to realize the humanistic aspects of mathematical knowledge through the understanding of the formation process of mathematical thinking. Not all historical texts are appropriate for the learning of mathematics and we follow some criteria for choosing the most suitable, by asking some questions to the activity involved (Romero, & Massa, 2015). In fact, it is not only history by itself that is relevant to teaching and learning mathematics, but the historical proofs and procedures that favor the development of an idea or a concept.

The history of mathematics has enjoyed an official rank in the Catalonia curriculum of mathematics for secondary school since 2007. Since the last curriculum decree in 2015, problem solving has played a relevant role as one of the main processes for teaching and learning mathematics, which goes beyond finding simple solutions or just knowing the basic facts and formulas (Bednarz, Kieran, & Lee, 1996). The best known strategies to solve problems can be found in the work of Pólya (1957), which include for example, trying special values or cases, working backwards, guessing and checking. Problem solving is a complex mathematical activity, which contributes to the development of algebraic thinking.

In this communication we present four problems drawn from four mathematical treatises from the 15th and 16th centuries. The first one is a situation that was posed by one student to another in the first chapter of the *Libro de cuenta* (1554) by Juan Pérez de Moya, which also appeared in his last book of the *Arithmetica practica, y speculativa* (1562). This book is written as a dialogue between students, which allows the author to show different points of view about the usefulness of mathematics and the reasons for the importance of acquiring mathematical knowledge. The other three problems have similar wording and are drawn from the *Arithmetica* (1484) by Pietro Borghi, the *Coss* (1525) by Christoff Rudolff, and the *Libro Primero* (1552) by Marco Aurel, and deal with hiring a worker.

In the classroom, we first pose the problems to students, and after discussing the solutions they offer, we try to understand the way to solve them, as proposed by the authors. The different approaches used by the authors to solve the problems show the students that there is not only one correct way to solve a problem and also that the ignorance of standard methods can be overcome by other more creative methods. In addition, the use of problems from historical mathematical texts with analysis of the different mathematical procedures to solve them can encourage students to create their own methods when facing an unknown problematic situation.

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