

Abstract

In recent years, research in learning and teaching mathematics has become interested in language and its relationship with mathematics learning. It is not only interested in language as a mean to communicate only about mathematical ideas but also as a way to construct meanings (Morgan, 1996). The Standards for mathematics teaching and learning suggested by the National Council of Teachers of Mathematics (NCTM) confirmed the importance of mathematical communication, and the need to include opportunities for the development of communication skills among the students in mathematics curricula at all levels (NCTM, 2000).

Studies and research in Arabic that seek to analyze mathematical texts from a linguistic approach are rare. This is except a research paper entitled "Mathematics and Language and Communication" presented at the conference "Arabic Language in Palestinian Universities Between Reality and Ambition". In his paper, Alshwaikh (2012) has confirmed that there is an urgent need to conduct such studies.

The current study aimed to explore the image of both mathematics and the learner of mathematics presented in the geometry units in

Palestinian mathematics textbooks, specifically in the fourth, seventh, tenth and twelfth grades. In order to achieve the objectives of the study, I aimed to answer to the following questions:

1. What is the image of mathematics represented by geometry in the Palestinian mathematics textbooks?

2. What is the image of the learner of mathematics represented by geometry in the Palestinian mathematics textbooks?

In this study, I adopted the analytic tool developed by Tang, Morgan, and Sfard (Tang, Morgan, & Sfard, 2012), which is based on Morgan's (2006) linguistic approach and Sfard's (2008) characterization of mathematical discourse. The analytic tool was translated to Arabic by Alshwaikh (2013) through the project "Analyzing the Palestinian school mathematics textbooks: A multimodal perspective" in cooperation with Professor Candia Morgan from the Institute of Education, University of London (Alshwaikh & Morgan, 2013). The analytic tool includes five properties of the discourse properties (specialization, objectification, alienation, logical structure, status of mathematical knowledge) to identify the image of mathematics, and three properties of the discourse

properties (agency, authority, formality) to identify the image of the learner of mathematics.

Results of the analysis showed that the geometry units analyzed in the four grades textbooks tend to represent an absolute symbolic and specialized image of mathematics, and this image increases as we go from fourth grade to twelfth grade. The results of the analysis also showed that geometry units in these grades tend to represent a the learner of mathematics as scribbler more than a thinker who is engaged in solving mathematical problems. These two images may explain the difficulties and problems that students may encounter during learning mathematics in the Palestinian context.

At the level of learning and teaching mathematics, this study recommends the importance of introducing the teachers to the different images of mathematics and its learners. It also recommends the importance of introducing teachers to teaching methods that could help in encouraging students to think critically in mathematics. At the level of the educational policies and curriculum design, the study recommends the need to develop mathematics textbooks that show the other image of

mathematics as a human activity and to show the learners of mathematics as actively engaged in the learning process more than just following pre-defined steps. The current study also recommends that research is needed on the development of the used analytic tool to be more appropriate to the characteristics of Arabic language, and to explore other forms of communication in order to see their impact on the image of mathematics and learner of mathematics.