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Boosting Romanian students' interest in learning mathematics through the constructivist approach

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Abstract

This paper aims to describe the dynamics of student interest in mathematics over the levels of education, focusing on identifying the pedagogical factors involved in teaching and learning mathematics.

The theoretical premises of this paper are included in national studies on curriculum reform in Romania (coordinator L. Vlăsceanu-2002 CNEE-2012), in works on constructivism in education (Siebert). From direct observations and practical experience with Maths teachers, we noticed that as students advance on the steps of schooling, they do not show the same interest in Mathematics.

The constructivist approach with emphasis on the affective dimension of learning, on the positive motivation, on solving concrete tasks, keeps "up" the students' interest in mathematics.

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1. Introduction

The curricular reforms of the past decade have led to the redefinition of the status of many disciplines in terms of the skills centred approach. "Competence is the key concept that crosses all levels of education and all disciplines" (CNEE, 2012, p.59).

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In this context, the place and role of Mathematics in the national curriculum is a very important one, justified through the skills it aims to form: from the key skills essential for adaptation to the world we live in (the ability to apply mathematical thinking to solve various problems in daily situations) to discipline-specific skills (grouping problems depending on the number of accepted solutions, interpreting problem situations with practical content using combinatorial elements, choosing strategies for solving practical situations in order to optimize results, etc.).

In the curriculum of many countries, Mathematics holds a privileged place, justified by the skills it forms and the values it promotes, as demonstrated by Singh Kulbir Sidhu in his paper: “the educational values of mathematics: practical or utilitarian values, disciplinary value, cultural value” (2006, p.3) to which he adds: development of concentration, art of economical living, power of expression, self-reliance, attitude of discovery, understanding of popular literature, quality of hard work. "(2006, pp.11- 13)

In the national study on curriculum reform in Romania in the early 2000s, a critical analysis of the Mathematics curriculum emphasized that mathematics plays an important role in students' academic life, being present in many of the national assessments. The recommendations of that time regarding Mathematics concerned especially the impact of alternative textbooks that had not had the desired effect: “Motivating students to study Mathematics was not revived by the introduction of alternative textbooks. The textbook did not become the student’s partner in the learning process that he undertakes” (Vlasceanu, 2002, p.367). In other words, textbooks are "mirrors" that reflect the conceptions on teaching and learning (mathematics), the student’s role in learning, on the context in which learning takes place: "Mathematics textbooks are used in different ways by teachers, but almost every country produces its own textbooks and these reflect the beliefs and practices of a particular mathematics education culture” (Sutherland, 2007, p.15).

The question we want to answer starting from the above considerations is: what happened to student motivation for learning mathematics? Did the changes in recent years: focus on skills, cooperative learning, changes in teachers’ beliefs produce changes in students' interest in Mathematics, too?

Currently, Mathematics in Romania is part of the “Mathematics and natural sciences” curricular area as "key curricular areas for technological progress" (CNEE, 2012, p.128), emphasizing the formative role of mathematics in a knowledge based society.

The constructivist approach to education has influenced teaching, learning and assessment of mathematics.

Constructivist learning principles (Siebert, 2001) which emphasize the role of cooperative learning, the role of affectivity in learning, the involvement in the construction and reconstruction of meanings of learning are increasingly present throughout many disciplines from social sciences to engineering sciences as evidenced by a brief foray into specialty literature.

Despite new guidelines on teaching and learning Mathematics and its formative effects, from direct observations and practical experience with math teachers, we noticed that as students advance on the steps of schooling, they do not show the same interest in mathematics.

Obviously, studying Mathematics involves several factors: individual factors (related to students’ potential, motivation and personality traits), social factors (the social context in which learning occurs) and pedagogical factors (methods, teacher-student relationship, teaching means and materials, etc.).

This research aimed at identifying the reasons for which students learn Mathematics at different levels of education, with a focus on identifying the pedagogical factors involved in teaching and learning Mathematics.

2. Purpose of Study

Our ascertaining research had as aim the description of the dynamics of student interest in Mathematics throughout all levels of education.

Hypothesis: students’ interest in mathematics, on different levels of education, is determined by the constructivist approach (methods, learning environment) to this subject.

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