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Technology and the learning of mathematics

Abstract

Technology is from always present in mathematics classes and from always accompanies our mathematical thinking. Until the computer era specific technological aids had a rather well defined purpose and role in mathematics classes. With the advent of computer technology the teachers, students, and others face at an increasing rate new aids: from simple calculators to PDAs, from World Wide Web and dynamic geometry to tablet computers. New accessories do not mean just changes in operating modes but as well changes in functionalities, which range from documenting to measuring capabilities, from computing to displaying various representations, from feedback to communication. New technologies are introduced to school practice via dedicated projects or by enthusiastic teachers, but, all in all, the use of specific technology varies greatly from school to school.

Teachers have provided a rich documentation of episodic uses of specific aids in mathematic classes. The effect of usage of various technologies and models of teaching with technology was as well the object of several researches. In most cases some studies show an improvement in students' achievements, and some not. In any case, the results of these studies do not influence significantly the school practice itself. In fact, many researchers claim that the role and effect of the usage of technology in mathematics classes should be considered from a different perspective. According to them, technological aids should not be considered only from the point of view of their functionality and the resulting students' mathematical knowledge. A technological aid does not mean just faster computing, faster drawing of graphs or nice representations. Immanent to it are changes in interactions between participants, changes in roles of the participants, changes in the very learning process. Thus when introducing a technological aid one should take into account also the teacher's understanding of what mathematics and the learning of mathematics is about and other factors as well. We believe that being aware of these factors may help teachers in deciding about the use of technology in their classes. For this purpose we shall present some concepts, eg. instrumentalisation, orchestration, and didactic contract, with which some current theories interpret the phenomena in mathematics classes when technological aids are introduced.