Chapter 18
LOGO and Elementary Mathematics Education in Portugal

Paulo Carvalho
Cávado Sul Group of Schools, Portugal

Pedro Palhares
University of Minho, Portugal

António Osório
University of Minho, Portugal

Alexandra Gomes
University of Minho, Portugal

Ema Mamede
University of Minho, Portugal

EXECUTIVE SUMMARY

LOGO is an international reference in the area of educational software. This software was invented by Seymour Papert back in the 1960s, and soon established itself as the emblem of a new perspective for the use of technology in education. Some experiments with LOGO have been carried out in the last quarter of the twentieth century in Portugal, mainly by researchers in mathematics education. However, for a variety of reasons, it has never become popular among teachers.

In the last ten years in Portugal, a great effort has been made to change conditions in schools to get technology as part of the educational process. First, teachers have been trained to become proficient with information technologies. In the last

DOI: 10.4018/978-1-4666-0068-3.ch018

Copyright ©2012, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

four years a vast program of distribution of small computers among students has changed the scene of the classroom. Now almost every child has a computer to use and teachers have new teaching opportunities that were not there before. But is that sufficient to change practices?

The authors start this chapter with some reflections on the teaching and learning of mathematics, in particular geometry, and of course about LOGO.

The rest of the chapter is organized in three parts.

In the first part, the authors present a case study on the application of LOGO in elementary school that was developed in a 4th grade class in 2004. This research indicated that LOGO can help provide interesting answers to persistent problems of mathematics. The authors describe this case study and reflect on its results.

In the second part, the authors describe an elementary teachers' training programme on mathematics education that during four years has every year provided a small time for the exploration of LOGO and promoted its use to teachers in the classroom. They reflect on this program and offer insights on teachers' resistance to change their practices. The authors conclude the chapter with their own ideas for the implementation of LOGO in a group of schools in the near future.

INTRODUCTION

Reflections on the Teaching and Learning of Mathematics

When we think about the teaching and learning of mathematics we can consider two contrasting views. One is the traditional view, which is the one dominant among teachers at the start of the initial training (Brown & Borko, 1992). The other is the constructivist view. We defend the constructivist view, however with some nuances.

The first distinction between the two visions of mathematics education concerns the acquisition of knowledge. Thorndyke's connectionism theory, later reinforced by Skinner's behaviourism, followed the *tabulae rasae* principle, implying the transmission of knowledge (Orton, 1992).

Constructivism, in all its variants, defends a different perspective: every learner constructs his/her knowledge. For some variants of constructivism, knowledge is socially originated leading theoretically to the conclusion that all knowledge can be constructed in the classroom (Ernest, 1991). For other variants, however, there is knowledge of a social origin and knowledge of a logical type (Nunes & Bryant, 1996). Hewitt (1999), in particular makes a distinction between arbitrary things (students must be informed) and necessary things (students should construct them).

34 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/logo-elementary-mathematics-education-portugal/62218

Related Content

Humanities Data Warehousing

Janet Delve (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 987-992).*

www.irma-international.org/chapter/humanities-data-warehousing/10941

Sequential Pattern Mining

Florent Masseglia, Maguelonne Teisseireand Pascal Poncelet (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 1800-1805).*

www.irma-international.org/chapter/sequential-pattern-mining/11062

Financial Time Series Data Mining

Indranil Bose (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 883-889).*

www.irma-international.org/chapter/financial-time-series-data-mining/10924

Receiver Operating Characteristic (ROC) Analysis

Nicolas Lachiche (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 1675-1681).*

www.irma-international.org/chapter/receiver-operating-characteristic-roc-analysis/11043

Learning Temporal Information from Text

Feng Pan (2009). *Encyclopedia of Data Warehousing and Mining, Second Edition (pp. 1146-1149).*

www.irma-international.org/chapter/learning-temporal-information-text/10966