Rethinking the “Investigation Course” in Primary School

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Abstract

The Investigation Course functions as a framework for the introduction and exploitation of digital media in the didactic-learning process, focusing on alternative forms of experimentation, exploration, knowledge structuring, expression, collaboration and communication for students and teachers. In this study we present “The Peace Symbol” cross-thematic educational scenario and activities as a pedagogic intervention by using the multimedia programming Logo-like environment MicroWorlds Pro with students of Primary School. We attempt to gain more insight into and contribute to the discussion on some critical elements of planning, developing and implementing an effective constructionist approach.

1. Introduction

The introduction and exploitation of Information and Communication Technologies (ICTs) in the classroom remains an open, composite and multifactorial issue. Logo-like environments offer students the possibility to express and exploit their thoughts, ideas and intuitions and support the process of building knowledge by creating learning environments rich in speculation and opportunities for experimentation ([1], [2], [3], [4], [5], [6]). Learning occurs through a process of continuous changes in the individual’s cognitive structures and is directly linked to the effects of the sociocultural environment [8]. At the same time, the context in which learning takes place [6], as well as the tools’ mediation [8] play a crucial part providing opportunities for active, exploratory and personally significant learning for the individual. The design, development and implementation of educational scenarios and activities in the context of the Investigation Course are based on a framework of general pedagogical principles that constitute the component of the ideas developed through the last years in the field of cognitive and sociocognitive theories, based on the social constructive model. The basic axes for the design of educational scenarios and activities suggested are: a) structuring exploratory roles ([3], [5], [6]), b) supporting the process of active knowledge building ([4], [6]), c) exploiting students’ previous knowledge, experiences and intuitions ([1], [7]), d) developing new student-teacher roles ([2], [5]), e) creating collaborative learning environments ([1], [7]), and f) using a cross-thematic approach.

The present study is part of a wider research, which aims to explore the possibility of implementing a cross-thematic educational scenario by using the Logo-like environment MicroWorlds Pro (Greek version 1.1) as an open and flexible framework for activities. The aim of this research is to bring forward the basic parameters of an effective cross-thematic teaching suggestion, in the level of design, development and implementation. It is a case study that uses ethnographic and action research elements, since the researcher was also the teacher of the class. The suggested instructional approach was pilot implemented in the framework of the Investigation Course at Hill School in Athens during the third trimester of the school year 2002-2003.

In the context of the Investigation Course, we mostly exploit microworlds of open exploratory softwares, such as Logo-like environments (e.g. MicroWorlds Pro) and data base management systems (e.g. Tabletop), which constitute the authoring tools and application environments for the development, management and exploration of microworlds. The activities of the Investigation Course offer opportunities for exploration, experimentation, formulation and testing hypotheses, interpreting and shaping ideas by placing emphasis on the development of high level reasoning and problem solving skills. The following are stressed as particular focal points of the Investigation course: a) emphasis is given to the process and not to the end product, b) students’ intuition is cultivated and exploited, c) students’ thoughts and ideas are visualized, d) students exploit their mistakes and are led to the depenalization of the
mistake, e) new problem solving strategies develop, such as the analysis of the problem in different parts, f) students make original artifacts of personal interest and meaning.

In each Investigation cycle (5-8 weeks) we can distinguish the following stages: a) Selection of the subject as a group decision according to the interests of the students. b) Experimentation, formulation and testing of hypotheses, expression of assessments and deductions. During the exploration, the students take notes of the particular learning path they follow/trace and write down their conclusions. c) Building an original artifact. d) Writing a combined project-essay. e) Presentation of the work in class and discussion.

2. Educational scenario: The Peace Symbol

“The Peace Symbol” scenario is a cross-thematic scenario that combines elements from Mathematics, Aesthetic Education, as well as from Social and Political Education [2]. This scenario and its activities were planned for the 4th, 5th and 6th grade of Primary school.

The scenario’s activities evolve in the following four phases: a) Phase A: Drawing circles by use of Logo commands and/or procedures. b) Phase B: Drawing the peace symbol by use of Logo commands and/or procedures. c) Phase C: Drawing the peace symbol by use of Logo superprocedures. d) Phase D: Completing-Presenting the combined project. In the framework of the scenario’s activities, students explore the properties of the circle and arcs familiarizing themselves with the concepts of orientation, angle, distance and scale. Taking into consideration the students’ previous knowledge and experience level, the teacher selects the specific activities, the particular didactic-learning goals, the final planning, the time schedule, the starting point and the task sequence having as basic guiding axes the fact that the students gradually build an increasingly difficult code: a) using simple Logo commands, b) using the simple and composite repetition command, c) defining procedures, d) defining superprocedures, e) defining parametric procedures and f) defining parametric superprocedures.

In the 4th grade the drawing of the circle and the peace symbol is completed by using simple commands and the repetition command, without proceeding to the definition of procedures, unless the students are more experienced. In the 5th grade the students define procedures for drawing circles and superprocedures for drawing the peace symbol whereas in the 6th grade the students define parametric procedures for drawing circles and parametric superprocedures for drawing the peace symbol.

3. Discussion

During the Investigation cycle, the students showed interest in their interaction with the MicroWorlds Pro environment remaining active and frequently showing enthusiasm. They demonstrated their inventiveness; they built alternative personal and social meaningful artifacts with different levels of detail and variations of methods. Follow-up interviews of students revealed greater willingness to see programming as relevant to everyday life and increased willingness to approach programming challenges with a positive attitude.

This scenario was developed and implemented as an anti-war protest after the declaration of war in Iraq in March 2003. The personal commitment of teacher and students, personal motives and involvement in a current affair and realistic situations of everyday life turned out to be of great significance.

4. References


