

Science Fairs as mechanisms for University – School - Community collaborations in Cyprus

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Abstract. *This is an outline of the Science Fair projects jointly organized by the Learning in Science Group, University of Cyprus and local schools. In our approach, the Science Fair focuses on developing students' scientific thinking and investigative skills. This year, two science fairs were organized by the Learning in Science Group. During the fairs, elementary school students and undergraduate students worked together to undertake independent investigations and presented their work in an open exhibition where they also had the opportunity to demonstrate interactive exhibits.*

Keywords. Science Fair, scientific thinking skills, university - school collaboration.

1. Introduction

The Learning in Science Group at the University of Cyprus has a coordinated program of research into student thinking, scientific reasoning and conceptual development. The main purpose of our work is to design, develop and disseminate research based curriculum and educational processes that promote student inquiry through a sequence of formal, informal and non-formal activities.

As part of this overall activity we have designed a program of educational implementation of science fairs as a means of developing scientific thinking skills. In this report, we are describing this process and presenting results from the activities that have jointly been carried out between two local

schools and the University of Cyprus during the 2004/2005 academic year.

2. The Science Fair Process

Science Fair projects have long been used as a mechanism for placing emphasis on learning through "doing". Making observations, asking questions, identifying problems, proposing solutions, and interpreting data are necessary skills for students in school and throughout their lives. Even though there is a general argument that science fairs are organized in order to promote such skills, there are relatively few examples of fairs that have clearly specified educational goals and are assessed for their learning outcomes. In many cases, schools organize science fairs in order to develop positive attitudes towards science and the activity is considered as a celebratory school event.

At the Learning in Science Group the emphasis is on using the science fair as an educational medium for rallying schools around the aim of developing scientific thinking skills. In our approach, students are typically guided to develop a common conceptual basis about science investigations and design experiments through a short sequence of lessons. Subsequently, they are assigned individual projects which involve undertaking an investigation with simple materials in which data is collected, analyzed, interpreted and the whole process and its results are communicated through specially prepared poster and exhibits.



Picture 1. Poster from the Chriseleousa science fair presenting an investigation about magnets

At the same time, parents and other community volunteers are involved by the school and the university in offering support for the projects. Once the work of children (10-12 year olds) and undergraduate students reaches a level where specific products are available, the school organizes a public event where each child with one undergraduate student that was assigned to her display a poster and an exhibit.



Picture 2. Interactive exhibit from the Chriseleousa science fair about factors that influence the speed of a boat

The poster describes the procedural aspects of their work. The exhibit engages the public in a specific aspect of their investigation through an interactive activity or a game. The involvement of parents in developing the interactive exhibits is of particular importance.

3. Science Fairs

During the 2004/2005 academic year two science fairs were organized by the Learning in Science Group, University of Cyprus, in collaboration with two different elementary schools (Chriseleousa Elementary School and 1st Egkomi Elementary School) as a part of an undergraduate science methods course. Each undergraduate student was assigned to an elementary school student and together they had to implement an investigation and present the results in a science fair. University faculty, university students, elementary school students and teachers were involved in this process. The final outcome was usually a poster and an activity/game that was related to the investigation.

The first science fair of the 2004/2005 academic year took place at Chriseleousa Elementary School. The 47 students that participated collaborated with their teachers, university faculty and 47 university students and parents to present the outcomes of their investigations during the fair, which took place on November the 21st 2004 on the school grounds.

The second science fair took place at the 1st Egkomi Elementary School. Sixty five undergraduate students, 42 elementary school students, 3 school teachers, university faculty and parents collaborated. The outcomes were presented in an open exhibition on April 9th 2005.

Below we describe some of the investigations that were presented at both science fairs.

3.1 Sinking or floating

During this project, the students had to investigate: (a) the factors that influence the sinking or floating of different bodies in the same fluid and (b) the factors that influence the sinking or floating of similar bodies in different fluids.



Picture 3. Sinking and floating at the 1st Egkomi Science Fair

The outcome of the investigation was a poster that presented the questions, the experiments and the conclusions. The public was also engaged in a game in which they had to build boats that would be able to float.

3.2 Rockets

During this project, the students had to investigate the factors that influence how far a rocket will travel. They had to design experiments and carry them out in order to come to conclusions.



Picture 4. Paper rockets at the 1st Egkomi fair

At the science fair the two students and the undergraduate students presented the process and the results of their investigation on a poster. Additionally, they asked the public to enter into a contest in which they had to make and test the best rocket with the provided materials.

3.3 Colourful flowers

During this project, the students had to investigate (a) whether a flower, a carnation for example, can change colour when placed in coloured water and (b) what factors influence how quickly the flower will change colour.



Picture 5. Colourful flowers at the 1st Egkomi fair

The interactive exhibit for the investigation included a workshop on how to easily dye flowers using colored water.

4. Conclusions

In the case of science fairs, our curriculum has matured through years of implementation and evaluation: for the last few years, it has been possible for individual teachers, in their own schools, to use our materials, with guidance, in order to organize their own fairs.

Our thematic areas focus on two important needs:

- The need to encourage students to develop an understanding of the relationship between science and society.
- The need to place greater emphasis on the reasoning strategies which underlie science and to use science as a medium for developing generic and transferable thinking skills.

The fairs that we organize in the context of teacher preparation programs at the University of Cyprus serve multiple purposes. First, it is possible to collaborate with a school and have one student teacher work with one child, an experience that is valuable for both. Secondly it is possible to use each of these events as a context for preparing future teachers to use this approach and the associated materials and participate productively in the organization of

local science fairs in their own schools in the future. Finally, this also serves as a mechanism for creating links between the University, schools and local communities, which create new opportunities for communication and collaboration.

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