

## Informal Learning at School. Science Fairs in Basic Schools

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**Abstract.** *The communication herein reports on the second edition of the annual Science Fair at Externato Maria Auxiliadora, in Viana do Castelo, Portugal. It was intended to give continuity to the research project on science fairs of the previous year improving, based on past conclusions, some aspects: the age group of the participants was enlarged to ages 10 to 15, and there was a major effort to engage parents and the whole school community in the process and in the development/construction of the projects to the science fair. Besides that, to the teachers involved in the project, was assigned an increased set of weekly hours to give support to the works realization. The participation of the students was not obligatory and it had no weight in the student's formal evaluation.*

*The results suggested that the whole school benefited from the enlargement of the age group of the participants in the event, and that the projects made by the younger students were particularly interesting. We concluded again that the Science Fair contributed effectively to an increase of the student's interest on scientific subjects.*

**Keywords.** Basic Schools, Informal learning, Science Fairs.

### 1. Introduction

Science Fairs are generally classified as cultural and pedagogical activities that involves all school communities, allowing public presentation of the scientific projects [1] developed by the students, the dialogue, the sharing and discussion of knowledge among students teachers and, hopefully, parents and the

community. Work methodologies are developed, research performed, and the creativity of students but also teachers and visitors during the exposition, is explored [2,3]. Science fairs stimulate the construction of the scientific knowledge along the years, the exchange of ideas, work habits and knowledge [4].

However, the success of this kind of event didn't depend only on the effort of students but it is also necessary that they feel the support given by their teachers and parents. The help given by professionals of the scientific area in study might be very important during the development of the project and the preparation of the presentation [4]. However is important that this kind of support begins at home. Therefore, parents should be notified about the realization of the science fair as early as possible [5] and enrolled actively.

A good organization of the science fair is also necessary to make it a success. Therefore organizers should select the appropriate space for the number of participants and visitors that they expect [6], select dates and opening hours carefully [7] and make available materials and services if necessary [6]. If parents are notified sooner, certainly they don't mind to help in the organization, helping the organizing teachers [5,7] and so leave them with more time to support students with benefits also in terms of security and working rules [4].

### 2. Development of the project

On previous year project, the first science fair organized at school Externato Maria Auxiliadora was limited to students with ages between 12 and 15 years old (7<sup>th</sup> to 9<sup>th</sup> grades) and the scientific

areas involved on projects were restricted to Physics and Chemistry. The participants and organizers' lack of experience led to some faults that one tried to remove in this second edition of the science fair.

The fair was advertised sooner by middle October 2007, and the deadline for submission was 29th November. However, it was necessary to give more time in order to support the formation of groups, the choice of themes and the preparation of the projects. Trying to surpass these difficulties, it was established the end of the 2nd term (March) as deadline for the delivery of the projects. The realization of the fair was set for the beginning of the 3rd term (April), since then the students are not overloaded with works and tests, like it happened last year, and were able to give oneself up to the realization of the projects. The two weeks school' break that preceded the fair was very useful to finish the projects and to prepare the presentations. The proposed date for the fair seems to have been a good choice since the student/teacher interaction could be done in a daily base, and the students could practice their presentations and reinforce their scientific knowledge on the subject of their project. The time gap between the choice of the projects and the realization of the fair, also allowed teachers to check if the projects were feasible or not in terms of presentation at the available space, as well as checking the security conditions, making the students aware of the constraints. The gathering of information in this phase was essential for the subsequent distribution of the physical spaces in the fair.

Another factor that contributed to the success of the science fair was the fact that, in the beginning of the year, parents were informed in a general meeting about the realization of this event, and of the importance the activity may have for the students in their learning/"growing" as well as of their active participation in the process. By the end of the 2nd term all parents were informed in writing about the fair date and were invited to attend and participate.

Although this initiative was originated at the school's science departments, the Arts and Technological education department was also actively involved for some support on the construction of the fair mascot (

Figure 1 – Poster with the mascot of the science fair) and also helped in some projects.

Another pleasant surprise was the enthusiastic participation of the pre-school students, not only

in the visit to the fair, but also in the preparation and presentation of two experiences.



Figure 1 – Poster with the mascot of the science fair

### 3. Results and discussion

101 students (around 67 % of the students of the school) participated in the fair. It is possible to see in

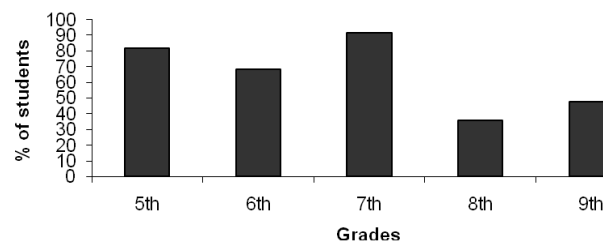


Figure 2 – Percentage of students of different grades that participate on the science fair

that there was a larger participation of the students of the 7th grade and below (ages between 10 and 13 years old).

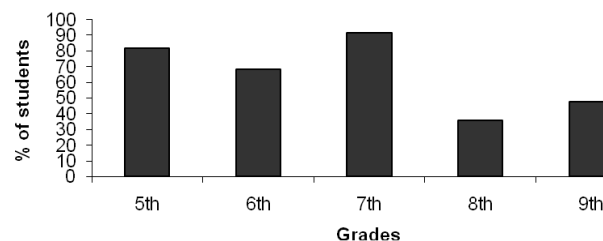
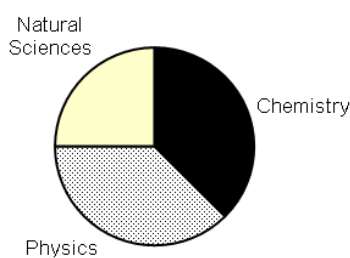


Figure 2 – Percentage of students of different grades that participate on the science fair

The enthusiasm and great level of involvement of the new-coming students (last year fair only students from 7<sup>th</sup> to 9<sup>th</sup> grades participated) was obvious. It was remarkable the participation of more than 80 % of the students of the 5th year, for whom this activity was completely new and that have a still limited contact with science subjects. We may conclude that it seems to be a good age to initiate them into projects of this extent. The enthusiasm in the participation in the process is very important. However it is of great importance the constant surveillance of the evolution of the students' participation in this type of events across the year (and in the subsequent years), creating work habits in the preparation and development of scientific projects, making sustainable this increased interest in science.

One important aspect that we take into account is the fact that some elder students deliver their projects after the deadline or that disregarded the standards of security imposed. In some cases this lead to the non acceptance of some projects, as a way to emphasize the importance of responsibility, including in what concerns deadlines and security rules. This imposition also led to an improvement of the final products in comparison to last years' fair.

Also important is the continuity of previous year projects, which is recommended in the literature [4]. Two of last year' projects were further developed and presented by the same groups this year. This fact would have interest, if the improvements were not only aesthetic, instead of scientific ones as it should be.



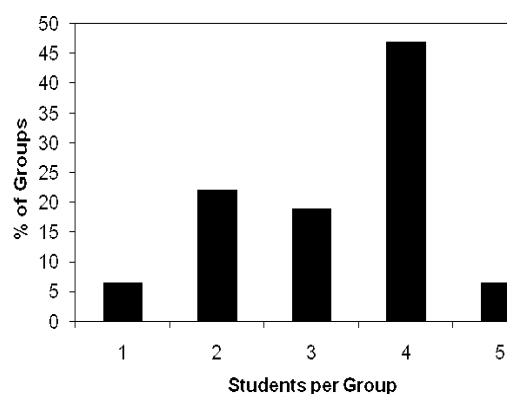
**Figure 3 – Distribution of the projects between the science fields**

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, it is possible to see that the distribution of students by subject was homogeneous. These projects were classified in the respective areas take into account the theoretical basis. Among the 32 projects presented, 12 were approached in

the Physics perspective, 12 of the Chemistry and 8 in the broader classification of Natural Sciences. This last area was a novelty regarding the previous year, when there were only projects of the areas of physics and chemistry. It seems that this difference can be related to two quite obvious reasons: the biggest involvement and support given by the teachers of natural sciences discipline, and the participation of students from 5<sup>th</sup> and 6<sup>th</sup> grades (authors of 5 from 8 projects on this natural sciences group). It is important to stress that, in spite of the homogeneity described previously, the students treated the subjects under rather varied perspectives, i.e. related to the environment, technology, everyday phenomenon explanation,... It was also interesting to see the variety of resources used to improve the quality of presentations, from common posters and dossiers, to reports and Gowin's V explored in the classrooms.

In terms of the number of students' which constituted each work group (Figure 4 – **Distribution of students per group**), it was verified that around 47 % of the projects were developed in groups of 4 students. On larger groups was found no major disparity in what concerns students' knowledge, and it can even be considered beneficial in some way since the students could take turns in the presentations,



allowing them to visit other stands and see, and discuss, other projects.

**Figure 4 – Distribution of students per group**

Taking in account the projects development stage, the presentation clearness and the creativity, the jury had chosen five winning projects and, by vote, the students have chosen another. It was interesting to notice that the five selected works were developed by groups of students of the 5th, 6th and 7th grades. This

demonstrates the high quality of the projects of these students when compared to those elder students.

We considered, and will work accordingly, very important to check if this quality will be kept in the following years.

We can conclude that science fairs are of great interest to schools and their students, since they give the opportunity to students to increase their knowledge in an autonomous way working hands-on. One can finally conclude that the improvement of sciences fairs in schools is dependent on the continuity of the activity, participation and involvement of whole school community, and, probably the most important point, the sharing of knowledge and experiences between teachers.

#### **4. Future work**

This project was awed to be of all school community interest. The continuity of the realization of science fairs is a way of curricular enrichment, and a way to increase not only the success in terms of student' learning of scientific subjects but also as the motivation, at larger, for learning. In addition science fairs are a way to enhance students' responsibility and autonomy. In the following academic year the project will be developed within "Area de Projecto" classes (project classes), which will allow teachers to have a larger control of the whole process. It will be done an attempt to articulate the projects with other fields of study in interdisciplinary approaches.

Another aspect to be improved in the following science fair will be a previous definition of the jury which will choose the winners of the initiative.

There is an intention to open the event to elementary school students of the same

institution but organizing this "junior" fair in a different room. This initiative will allow studying the degree of involvement of these students, the quality of projects, the time spent and the number of participations, attitudinal and learning gains.

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