



Universidade de Lisboa
Faculdade de Psicologia e de Ciências de Educação

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***Early
Technical
Education***

Socrates- programme Comenius 2.1

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TESTING MATERIALS

CHILDREN AND COMPUTERS

Participation of the 2nd year Students of the Sciences of Education Course Faculdade de Psicologia e de Ciências da Educação da Universidade de Lisboa

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1- Institutions

Code	Level of scholarship	Type of Institution	Age range
EB.1	1 st cycle of Basic School	Public School	6 -12 years
TL.1	1 st and 2 nd cycle of Basic School	A.T.L.* Private	6 – 12 years

* A.T.L. Free Time Activities (after classes)

2- Groups

Code of the group	Code of the school	Level of scholarship	Number of pupils	Age range Average Age	Activities tested
A.2	TL.2	1 st and 2 nd year of Basic School	13 8 boys & 5 girls	6- 8 years - 6,5 years	a5, a6, a8, a9, a10
B.3	EB.1	3 rd year of Basic School	18 (divided into 2 groups)	- 8 years	a1, a5, a10, a11, a12.

a1 – How does a computer work? ; a5 – Word-processing program; a6 – Paint program; a8 – CD-Rom; a10 – Insert pictures with clipart; a12 – Create a computer manual

3- Methodology used

3.1. General

Every group had established a first contact with the principals of the institution and with people who work directly with children (teachers and social servants). This being in the touch with schools has had different objectives, namely to present themselves to the schools, to present the Early Technical Education Project (its assumptions, aims, objectives and development) and ask for permission to and to negotiate the necessary conditions to conduct

the experiments as well as to context the materials needed and the activities that will take place.

To test the materials the students had prepared themselves, in several axes:

- Studying the theoretical frame of the experiments, including subjects related to the project – early technical education; scientific and technical education in the curricular guidelines and explicit curricula; mainstream; research methodologies.
- Learning about the scientific and the technological concepts related to the understanding of the experiments.
- Characterization of each institution and group of pupils. This study had included indicators such as the economical, cultural and social environment of the institution, of the pupils and its parents.
- Global planning and schedule of all the activities to be developed and a specific planning of each experiment.
- Selection, preparation and building the materials needed to promote the experiments of technical and scientific nature.
- Previous realisation of the activities, in order to preview some difficulties and to assure the best conditions to do the experiment with children.

Instruments of data collecting

Every group had done an interview to the teacher or instructor of children at the end of the experiment. In order to do that, they had elaborated a guideline of the interview, which includes the explanation of the interview and thanks to the interviewed, the objectives and some subjects elected to be developed. They also had applied questionnaires to the pupils at the end of each activity. To build those two instruments of analysis (the interview and the questionnaire) some evaluation indicators had been taking account which had already been previously decided in the Project ETE.

The students had also done the minutes of each meeting with children, where they had done the analysis of their work with children, the way how the experiment had happened and had indicated the results, conclusions, the most positive and negative aspects of the activity and some suggestions.

Data analysis

In order to analyse the contents of the interviews, of the naturalistic observations and the questionnaires, the used technique had been the content analysis. Simultaneously, the synthesis of the interviews and of the observations had been done in order to stress the more important ideas for a further global analysis and comparative analysis of collected data by other instruments and from other sources.

3.2. Specific

Beyond the referred methodologies that were applied by all the groups, some features that differentiate each group, are:

Code of the group	Methodologies	Techniques	Instruments/Moments	
A.2	Case study*	Participating observation	Diagnostic test to the pupils	Before each activity
			Group interview	After each activity
B.3	Children worked on pairs	Participating observation	Diagnostic test to the pupils	Before each activity

* By coding each child and by reporting and comparing the results of the initial and final evaluations, the students could analyse the evolution on the development of each child in each activity and in the whole project “Children and Computers”.

4- Innovating and adapting

The group A.2 had coded each child such as **Girl 1, Boy 2...**

They were created homogeneous groups of 2 girls and 2 boys and joined groups of one girl and one boy. Each element of the pair would try, afterwards, the activity, by joining her/himself to another child that hadn't yet done the experience, in order to explain it to her/him.

The group A.2 had build an interactive and multimedia program, hypermedia form, in a CD-ROM (observe the noticed CD-ROM) including stories to children and with a hyperlink to the Paint program, where the pupils could paint their favourite characters and scenes (annexe 2).

5- Results

5.1. Pupils

Generally no differences were observed between boys and girls. Both groups were willing to participate and learn and both acquired the expected technical knowledge and skills. Nevertheless, some behaviour differences were observed: while the girls tended to be careful on esthetical matters, the boys were not so quiet and to finish the tasks quickly.

In the group A.2 the activity they liked the most was the one of the Paint, once they could see their work printed. In the group B.3 the activity they liked the most was the one of the photo associated to the manual computer.

5.2. Teachers

The teachers want to continue this work in the computational area, because they had considered it very motivating, to be able to attract the attention of the children, adequate to their development level and very useful to the development of children skills.

The teachers had appreciated the learning method of one pupil teaching to one another. The teachers they think to use more often this work method, advantageous to the learning and behavioural processes of the children.

They had also appreciated the use of stories, especially for those children that still have some difficulties to read.

5.3. Students

The students were more sensitised to:

- The need of early technical and scientific education.
- The importance of using "experimental" activities to develop in children the understanding of the technical and scientific phenomena.
- The pertinence of constructivism learning principles in active construction of scientific knowledge by children.
- The importance of the assumption by teachers of their new roles in a constructivism perspective of learning in a scope of the Learning Society.
- Questions that relates mainstream with science and techniques.

The students had acquired:

- Knowledge in technical and scientific domains, in curricular development and in the Educational System.

The students had consolidated, deep and applied to real situations:

- Knowledge about pedagogy, planning, research methodologies, collecting, presenting and data analysis.
- Skills about computers and about their integration in new learning situations.

6- Conclusions

The methodology used by Group A.2 seems very pertinent and efficient because children, once they have to explain to their peers what they had learned, they had consolidated their knowledge.

It is also pertinent to notice the importance of team work to the children, in what concerns the development of communication skills and cooperating attitude.

On the other hand, and especially concerning the activities developed by Group B.3, the direct use of the materials and the “make belief” play, had turned a learning methodology positive and efficient.

Once the differences found, in the genre point of view, were at the behavioural level, the study of the results of this kind of experiences must pay attention to that variable.

Annexes

Annexe1 - Photos



Group A.2 – Institution

Group A.2 – Institution



Group A.2 – Institution



Group A.2



Group A2 – Activity 6
Paint Program
Children work

Annexe 2 - Examples of materials constructed by the students





Paintar

- ♣ A Branca de Neve e os Sete Anões: Anão / Branca de neve / Bruxa
- ♣ Os 101 Dálmatas: Dálmata com flores / Dálmata na espuma / Dálmata num embrulho
- ♣ Pocahontas: Jonh / Pocahontas e Jonh / Pocahontas e pai
- ♣ Tarzan: Macacos e elefante / Tarzan e cobra / Tarzan e Jade
- ♣ A Pequena Sereia: Caranqueio / Linquado e sereia / Príncipe e sereia
- ♣ Pinóquio: Pinóquio e grilo / Pinóquio e o pai / Pinóquio e a fada
- ♣ Cinderela: Cinderela / Fada e Cinderela / Cinderela e príncipe
- ♣ A Bela e o Monstro: Bela a passear / Bela e o Monstro / Bela e chávena
- ♣ Dumbo: Dumbo a tomar banho / Dumbo com a mãe / Timóteo



Elements of the application constructed by the group A.2