

# eTwinning in the early childhood as starting line of innovative practices for the didactic of natural sciences

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**Abstract.** *The educational action of electronic twinning (eTwinning) is defined as a collaboration of a long duration where at least two schools from at least two European countries use the Information Communication Technologies (ICTs) in order to bring joint a pedagogical activity to an end. The didactic of natural sciences in the early childhood education is an instructive subject that differs from adult science. The basic aim of our research constitutes the investigation of the assumption that the pastime of pupils of early childhood with the program eTwinning can constitute a starting line of innovative instructive practices for the teaching of natural sciences. Based on the content analysis of 7 interviews with teachers of early childhood education it appears that pupils of early childhood education that materialized etwinning programs show particular interest for the natural sciences.*

**Keywords.** eTwinning, Natural Sciences, Early Childhood, ICT.

## 1. Introduction

In our days, the empowering of the European dimension of education and the efforts for international collaborations and growth, constitute basic elements of modern Greek educational policy. The growth of possibilities of the internet for the improvement of, on one side, access to education and training and on the other side the quality of learning is of decisive importance for the construction of a European society of knowledge.

In the present research framework, which constitutes a case study, and by realizing a short retrospection in the programs of European action

eTwinning (“electronic twinning”) we will report certain rewarded work in the field of natural sciences for the precocious children's age (preschool and early school age, that is to say children of 5-9 years). Also, conducting a research with teachers of precocious children's age that materialize the action eTwinning we attempt to investigate their opinions for the action and to confirm or not the research hypothesis of whether this pastime can constitute starting point for innovative instructive practices for teaching of natural sciences.

## 2. Theoretical Framework

The didactics of natural sciences in the precocious school age is the instructive subject that differs from the science of adults [1]. General speaking, it is desirable that ICT (Information Communication Technologies) to contribute in the build up of knowledge and with the help of ICT the knowledge of natural sciences is cross-subject approached [2]. In several cases, the preferences of children on the use of ICT reflect the everyday routine they experience at school and family environment, an element that is related to their spontaneous need for exploration of a “new” game [3], [4]. Children still need active learning experiences involving real objects they can manipulate [5]. According to Clements and Sarama [6] children can work cooperatively at the computer and they can be positive learners and helpers. Through the child-computer interaction, the teachers provide guidance including encouragement, focusing, affecting, and expansion.

Cooperative learning is a learning strategy that involves children working collaboratively in small groups, ensuring that all members master the assignments [7]. Through cooperative

learning, children will realize that one needs to rely on and have connections with others to be successful in their computer work.

Due to limited number of computers in most preschool classrooms, young children have many opportunities to share a computer with one or two partners. There are several ways in which computers can be part of the collaborative experience of learning. For example, collaboration at computers refers to that children not only work with computer, but also support each other.

Preschool children have more positive and rewarding experiences with keeping conversation going, cooperating and planning with peers than with adults or siblings [8]. These positive and rewarding experiences of social interactions have been demonstrated that young children would love to share using the computer with their partners.

Due to limited number of computers in most preschool classrooms, young children have many opportunities to share a computer with one or two partners. Children share their discoveries and give help to others. They also display more positive emotion and interest when working together [3], [4].

## **2.1 The eTwinning action**

The children of precocious children's age, which are the basic recipients of twinning between the schools, will consider in the future the pastime in a digital environment, simply as a natural way of work [10]. The European Union promotes the action eTwinning with a view towards developing and strengthening the creation of networks between the schools. The students at their study in primary and secondary education, have the opportunity to participate, along with their teachers, in a educational plan with their counterparts from other European countries [11]. Since November 2004, eTwinning constitutes one of the actions of the eLearning program of the European Committee. Collaborative online activity experiences foster the European goal for a multilingual, multicultural society. Web-based learning communities contribute to improving intercultural awareness, dialogue and understanding [12].

In the framework of the eTwinning action, schools from two or more European countries, using ICT, collaborate in order to acquire pedagogic, social and cultural benefits.

eTwinning seeks to develop and strengthen networking among schools [12]. European students with the help of their school teachers, participate in common educational work with some school from other European country, learning the school and social culture of other countries and practicing their dexterities in the ICT [11].

The action's eTwinning fundamental aim is to improve the pedagogic process, add value to learning, while simultaneously by exceeding the narrow significance of thematic school collaboration, it aims to a complete and systematic collaboration on all levels. The electronic twinning of schools can be realized on the occasion of city twinning, students/teachers exchanges or the wish for a new collaboration that will strengthen the significance of the European dimension within the school.

The improvement of knowledge for teachers and students in the use of ICT constitutes an important objective of the eTwinning action. At the same time, it offers to the teacher additional means in order to provoke the interest of his/her students, get informed about the educational systems of other European countries, exchange pedagogic ideas with other European teachers, strengthen his/her knowledge in a particular subject, practice his/her knowledge in the foreigner languages, improve his/her teaching methodology. Thus, the professional growth of teachers is promoted, as well as the osmosis of systems, opinions and proceedings, in combination with the collaboration between the partners, motivates teachers in their work [13].

The eTwinning European Internet portal (<http://www.etwinning.net>) provides all information, tools, materials and texts required for the preparation and development of a collaboration. The various forms of communication between the schools with the exploitation of ICT, educates the students in the use of ICT as training and expression tools, mobilizing at the same time their critical faculty, via the transfer and distribution of information - ideas as well as connecting previous knowledge with new.

Since the initiation of the program in 2005 Greece is found constantly within the 5 top places in the number of attendances in collaborations, between 28 states that take part in the eTwinning action. Furthermore, the pedagogic quality of Greek work is important and recognizable and is proved by the awards Greek schools have received in pan-European

competitions of eTwinning work since 2006 to date.

## 2.2 Natural Sciences and eTwinning

As cognitive subject matter the natural sciences present difficulties in approach for the teachers of precocious children's age due to their abstractive character, their strict layout, the special terminology, the experimental approaches and their bi-directional interactions with the social and cultural reality, creates in the duration of educational processes hindrances reversely proportional to age of students [14]. It is a fact that there are teachers who are resistant to discover the possibilities or even the opportunities that a international work based on the internet for the teaching and learning of natural sciences provide. For this reason, work on the subject of natural sciences is more popular compared to those that are directed to languages and ICT [15]. However enough examples exist for the manner in which the teaching and learning of positive sciences can be incorporated in the instructive practice.

For the teaching of natural sciences the choice of suitable methodology, as well as the knowledge of preexisting perceptions and also the training obstacles children face when approaching the subject play an important role in the approach of each scientific term [2], [14]. The role of ICT in the work of natural sciences is multidimensional [16]. The content of education in the positive sciences is catholic and independent from cultural influences. However, it is particularly beneficial for the teachers to observe how the differences between the educational systems influence the teaching of natural sciences [15].

Below, we report certain eTwinning work in the field of natural sciences which have been rewarded with European signs of quality or even pan European awards in competitions in mathematics and science in the years 2008 and 2009.

- *1, 2 Buckle my Shoe* is an example how to introduce science in kindergarten. At their website all the activities are presented for the followers: <http://twinmath.wikispaces.com/>

- In the project *The Entertaining Physics Class* - the title speak for itself. It is an example how to make learning physics fun, <http://twinspace.etwinning.net/launcher.cfm?lang=en&cid=34218>

- *The world is more than catches the eye* deals with chemistry. At their website they write: "We aimed at showing that Chemistry is a very important subject .... We prepared the lesson plan 'Chemistry in English' with some experiments which is very innovative in my school."

[http://www.etwinning.pl/konkursy\\_polskie/laureaci-konkursow-etwinning-2009-pelna-lista](http://www.etwinning.pl/konkursy_polskie/laureaci-konkursow-etwinning-2009-pelna-lista)

- The project *Alternative energies* is described as follows: "Why do we have to search for sources of alternative energies The partner groups look for alternative, ecological sources of energy, make their description, prepare Power Point presentations and put them on the Twinspace. Among all of them they choose three sources of energy, which will be the subject of research: solar, wind and water power", <http://www.energy-etwinning.org/>

## 2.3 Early childhood students & eTwinning

In our days the traditional school that was based on the teacher that possessed information and knowledge and transmitted to the student, is transformed to a new type of school, where the role of the teacher is instructive - advisory. Student acquires information and knowledge by functioning as a researcher, guided by the teacher often with the help of ICT [17].

Does the interactivity attribute, on which the ICT are based, offer to the student the possibility of participation along with the teacher in the planning of training activities and express freely the perceptions and his/her sentiments [6]. Moreover, the utilization of the internet from teacher and student abolishes the geographic limits, with result the learning being transmitted from region to region around the world, as well as interact with the perceptions of children via the exchange of work and their activities.

The use of ICT in an important range of school activities contributes to the cross-curricular approach of knowledge and to the application of active methods of learning, providing the possibility of adaptation of programs of study in new, modern instructive methods [4].

It also develops the general faculties of students, strengthening the mood for real participation in the classroom, by activating curiosity, as it is proven that the computer does constitutes the most attractive means, because the possibility for direct access of students to information, provokes the interest of the majority

of the school community and creates an environment, for creative research prone and experiential learning [23].

With the entry of ICT in the educational process the student shows higher interest in each cognitive subject that is taught, after now it has the possibility of participating actively by presenting his own personal work, utilizing the modern technological means, utilizing at the same time his/her dexterities [17]. Collaboration in relation to computers means that small groups of children work on the same computer activity at the same time [19].

### **3. Methodological Framework – The aim of research**

In a previous section we presented certain international eTwinning collaborations in the field of natural sciences in the precocious children's age that were distinguished for the innovation and the quality of their work. However, the opinions of the teachers themselves which constitute the “ambassadors of innovation” of this activity are of particular interest.

With basic methodological tool the content analysis [20] of 7 semi-directed interviews (3 with nursery teachers and 4 school teachers) which participated in the eTwinning action during the time period 2008-2010 in the region of Crete, we tried to investigate their opinions for whether the pastime of students and teachers of precocious children's age with the program can constitute a starting line of innovative instructive practices for the teaching of natural sciences.

### **4. Results**

On the basis of the thematic content analysis of the interviews [20] with the teachers that materialize or materialized eTwinning programs the above research hypothesis appears to be confirmed. The pastime of students and teachers of precocious children's age with the eTwinning action, according to the teachers of the sample constitutes starting line for innovative instructive practices for the teaching of natural sciences. Also, as they reported in their interviews, through an extra - curricular process as the eTwinning action, certain more general educational objectives are achieved that are summarized in following:

(a) enrichment of knowledge, possibility of investigation of information and acquisition of new knowledge as well as exacerbation of interest for search of knowledge beyond the established models of taught material,

(b) socialization of students not simply with the significance of acceptance and adoption of rules of social behavior but with the significance of approach of the “different” schoolmate, which through the joint pastime with the same object of study, becomes familiar,

(c) creative exploitation of ICT, adding in their informative, recreational and commercial potentially role a pedagogic, sociopolitical and cultural dimension.

The teachers of the sample concluded that the students of precocious age produced knowledge via their active attendance in training processes and their entanglement in exploratory processes, in processes of resolution of problems and decision-making, critical thought and rethinking. In regard to the use of ICT, it was reported that with the various creative activities, the children get to know the possibilities of computer use, mainly as tool of creation and entertainment. Also, they demystificate its use, discover the dynamic characteristics of multiple representations of information and more generally a lot of possibilities beyond the static form of printed means.

In a social level the students, according to the interviews of teachers of our sample, acquire the sense of common responsibility and common aim, conscience of common identity and resolve problems with dialogue and interaction. They also cultivate sentiments of mutualism, aiming at the achievement of common objectives but also equivalent pastime with the computer.

### **5. Conclusions - Perspectives**

In the modern pedagogic theory and action the collaboration of students is considered a particularly effective way for the growth and cultivation of communication dexterities and faculties, of search, analysis, expression and exchange of opinions and ideas between each other. In the present research, we realized that via the eTwinning action the students of precocious children's age show particular interest for the natural sciences. The teachers appreciate that the action provides the students with the possibility of active participation while presenting their own personal work, utilizing the

modern technological means, utilizing at the same time their dexterities.

Also, each student shows interest to function responsibly and in the spirit of the team work they have undertaken, and via dialogue within the team and the exchange of ideas and information, he/she improves his/her achievement. Nevertheless, in the process of learning with collaboration, the child can express itself spontaneously, due to the creation of a friendly environment. Developing a positive attitude towards learning, after he/she escapes from the traditional methods of teaching and passes in more modern techniques of education and learning that entails the important element of the creation of friendly climate between the student team. eTwinning offers an alternative method of science teaching which involves discussion, investigation and motivation for learners of all educational levels

With regard to the future of action in the Greek educational reality the teachers of the sample present themselves particularly optimistically while stressing the increasing rhythms of attendance from year to year. Also, with the changes the central team promotes of work the electronic environment-platform is expected to become friendlier to the users, allowing the real social networking of students and teachers. It is also worth to report the positive contribution of a potential planning from the national service of online internet courses for teachers aiming to train them in subjects that are related with the incorporation of work in the teaching schedule, the free tools of web 2.0 that they can be used by teachers and other relative training action.

The experience of interviewing teachers in the scope of the research on the eTwinning action reveals that learning in collaboration with students from other countries is attractive and advantageous. The existence of international learning communities, within which persons collaborate for the growth of knowledge and dexterities in the field of science, are no longer limited strictly to academic personnel. Moreover, it appears that the process of individual discovery of the natural world, for students is as fascinating to them as it was for the pioneers of physics.

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