Project Based Learning and Interactive Video Conference in Elementary School.

José Manuel Sáez López
Universidad Nacional de Educación a Distancia
C/ Juan del Rosal 14, 28040 Madrid
+913986000
jmsaezlopez@edu.uned.es

ABSTRACT
The main objective of this study is to analyze practices related to Project Based Learning. The participants are 34 students from a rural school in Spain, who are coursing 4º, 5º and 6º grade in primary education. The mentioned project takes place in three months. Applied teaching method is Collaborative Learning and the main resource is Interactive Videoconference using “Skype” in primary school. Research instrument in this process is systematic observation. We conclude that through Project Based Learning, collaboration is essential; therefore, pupils make decisions together and they use their knowledge to work together and share responsibilities. In this context, students use Educational Technology which allows constructing knowledge through interpretation, analysis and synthesis.

Categories and Subject Descriptors
General Terms
Experimentation, Human Factors, Theory.

Keywords
Collaborative learning, Design Based Research, Elementary education, Synchronous Networking, Project Based Learning.

1. INTRODUCTION
Educational environments have been improving at the same time that new technologies have arrived to the Education through a slow revolution. Through Project Based Learning, we can use resources that Educational Technology provides us, taking into account teaching methods and techniques in several environments where interaction design plays a central role by improving the learning process. This research highlights:

- New devices and interaction techniques for educative environments
- Instructional and Interaction design
- Student centered design
- Collaboration, cooperation and coordination
- Classroom teaching techniques

2. THEORETICAL FRAMEWORK
The research process from a strategy focused on the application of Design Based Research (DBR) [1], [3], [5] allows an intervention from a complementarity of methods which contributes understanding of interactions in pedagogical processes.

Moreover, from an intercultural perspective, there are benefits from interactions between students from different nationalities through virtual learning environments, interactive videoconferencing [6], [7], [9], [10] and other communication tools (Edmodo, Skype) that enable enrichment and interaction in the process to create and share content [10].

Design based research is proposed as a strategy to innovate in education and it allows a systematic, interactive process focused on how students learn. This naturalistic approach aims to understanding the processes of learning through informed exploration, enactment, evaluation within a local context, and development of design principles. This approach improves the impact of interventions in educational processes.

Design Based Research is a methodology designed by and for educators that seeks to increase the impact, transfer, and translation of education research into improved practice [11]. This research approach provides a strategy to evaluate and innovate through methodology and a pragmatic approaches, exploring and improving educational processes which enable knowledge development.

2.1 Collaborative Learning
Working through Project Based Learning enables collaborative learning interactions among individuals, in which students communicate, express and develop critical thinking.

There are some important elements, such as positive interdependence, interaction, individual accountability and development of skills. Leading theorists in this field, [8], [15], highlight benefits of collaborative learning and positive interaction in these processes. Sheridan [14] emphasize that this type of learning prepares students as researchers, through satisfaction and motivation.

Experts in these trends [2] claim that this type of learning improves knowledge construction by sharing personal experiences. They ensure that virtual environments enhance opportunities for communication and participation in these educational models.

Brufee [4] concludes that students learn less in contexts where competition or individuality is encouraged, and they improve their learning in collaborative contexts. Collaborative learning involves overcoming traditional teacher-centered models, giving an active role to students.

Through Collaborative Learning there are several advantages related to higher order learning skills, i.e., critical thinking, metacognition, problem solving and decision making are acquired. Other advantages are motivation, greater student autonomy and related approaches to constructivism.
Although the design of the activities carried out with jigsaw technique require a huge effort to prepare and design activities by teachers, working with this strategies brings benefits and advantages derived from the skills related to participation, interaction and commitment, enabling communication in a process of active learning [12], [13].

3. Method
3.1 Aims
The main objective of this study is to analyze the practices related to Project Based Learning. Use of Collaborative Learning and Interactive Videoconferencing using “Skype”, in primary school enables students to assess benefits regarding implementation of Educational Technology and active Methods in Education. Specific objectives are:

- To check the functionality Interactive Video Conference in the Primary School.
- To assess the process in which Project Based Learning is implemented.
- To detect the Educational Technology needs of students in primary school.
- To analyze collaborative practices of students as they develop information seeking related to the project.

3.2 Participants
This research analyzes educational practice and Project Based Learning in primary education regarding the use of collaborative learning using Interactive Video Conference (ICV). Particularly, the Digital Story displayed in this learning activity takes place in a rural school in Spain from a multidisciplinary perspective in Science, i.e. Biology, Computer Science, Environment, Natural Sciences, Technology/ICT & World Languages.

The participants are 34 students from a rural school in Spain, who are coursing 4º, 5º and 6º grade in primary education. The mentioned project takes place in three months, from November to January. In this sample, 67.6% are girls and 32.4% are boys. The contingency analysis is not detailed because there are no significant differences regarding gender or group.

3.3 Procedure
The main instrument in this process is observation, which refers to a method of collecting information for research as the act of looking intently at something without changing it, with the intention to examine, interpret and obtain some conclusions about it. This systematic observation differs from the spontaneous observation that human beings made in the day, which is not planned in advance. By contrast, systematic observation used in this research is intentional, planned and structured, objective and recorded so that the information obtained is verifiable.

Systematic observation implies that it is necessary to define very well what researchers observe. Moreover, data collection is carefully planned, taking into consideration factors and interests through appropriate instruments.

Project Objectives:
- Learn about the fauna and Adelie penguins in Antarctica.
- Use educational technologies like Blog, microblogs (Edmodo) and Interactive Video Conference (Skype).
- Learn about how scientists live and work in Antarctica.

This kind of research is intended to describe the individual experience in particular environments. This project “Adelie Penguins. Connecting Antarctica” was awarded by Microsoft Education and it was presented at the “Global Forum 2014” (http://www.youtube.com/watch?v=85hp11jPH8&sns=tw)

(In Spanish: https://www.youtube.com/watch?v=FmLQ1kYS19E&feature=youtu.be&al)

Moreover, data triangulation can ensure that there is sufficient evidence to support the validity of results and minimize error variance. The data triangulation was implemented using qualitative information collected with several techniques as well as the analysis of some academic results.

4. ANALYSIS
Researchers analyze the practice in teaching and learning processes collecting precise information of the process in these cases.

Collection of information through a structured observation specifies precisely what should be observed, using notes and audio recordings (with audacity) and captured video of the screen (with the program Camtasia Studio). A structured observation helps to reduce selective perception problem. Observation is not participatory, because we remain outside the process that is unfolding without intervening in any time, as a non-participant observation eliminates the risk of over-identification that can result in a loss of objectivity. Also, it is an open observation, as the observer does not hide their role. The recordings allow two observers whether we value the practices developed by teachers, agreeing on the assessment of some factors detailed statistically in the analysis of results.

As interesting activity analyzed and framed in this project, there is a connection with researchers in Antarctica. Students analyzed information related to how scientists work. Students collected information and they discovered several things, for example:

- Scientists observed penguins. If they are sick or dead maybe the water is contaminated.
- In summer the temperature is minus 12.
- Scientists have several resources, like a cell phone with satellite.
- There are special penguins and mutations like “Blondie”.
- The penguins are half a kilometer from the satellite.
- The penguins are half a kilometer from where scientists work, because otherwise the noise of penguins does not let them sleep.
- There are also solar panels to achieve energy from sun.
Designed learning facilitates the development of different dimensions of 21st century skills: Innovation, Knowledge building, Use of ICT for Learning, Collaboration and Skilled communication.

As creative and innovative teaching practices used in your learning activity we note:

- Skilled communication: Student present their content to other students
- Use of ICT for learning: Power Point, Skype, Edmodo, Blogs
- Information management: Students follow daily lives of adelie penguins


4.1 Evidence of learning
Regarding learning outcomes, we have to analyze products created by the learners throughout the project, including use of technology. We take into account how technology has been used in the project.

We need to know to what extent students use technology in ways that support knowledge building, collaboration and learning beyond the classroom.

It is essential to analyze whether technology use enables new knowledge-building and collaboration beyond the classroom opportunities.

We need to analyze digital tools which have been used in imaginative and ground-breaking ways to support learning processes.

4.2 Knowledge Building
When analyzing knowledge building, we need to provide examples of how the learning activity requires students to move beyond reproducing what they have learned to building knowledge through interpretation, analysis and synthesis.

It is important to highlight to what extent the learning activity stimulate students to construct and apply knowledge

Figure 1: Adelie Penguins. Global Forum 2014. 
http://www.youtube.com/watch?v=85hp1JjPH8&sns=tw

4.3 Extended Learning beyond the Classroom
Regarding this topic, it should be borne in mind:

- If the learning experience is not bound by classroom walls, time-frame of conventional lessons, subject parameters
- If the project addresses real world issues (i.e. authentic situation and data from outside the classroom) or has meaningful impact on communities locally and / or globally please show examples of this.
- To what extent does the learning activity require solving real-world problems? Are students’ solutions implemented in the real world?

4.4 Collaboration
It is important to provide examples of how the students work with other people, sharing responsibility while making substantive decisions for developing a joint product, a design, or an answer to a complex question. Students may be collaborating with their peers in the classroom, or with students or adults outside the classroom.

We need to analyze to what extent does the learning activity require students to collaborate and negotiate with other people to make substantive decisions that shape the content, process or product of their work? Is their work interdependent?

4.5 Use of Technology for Learning
It is essential to describe whether the use of technology helps students build knowledge/collaborate or learn beyond the classroom, and whether or not students could build the same knowledge/collaborate or learn beyond the classroom in similar ways without using technology.

We need to assess to what extent do students use ICT in ways that support knowledge construction, collaboration, or learning beyond the classroom. We wonder if ICT uses enable new knowledge construction or extend learning beyond the classroom opportunities that would not have been possible without it.

We have to analyze if digital tools been used in imaginative and ground-breaking ways to support learning processes. We wonder if students are passive consumers of ICT, active users, or designers of an ICT product.
4.6 Innovation

It is essential to describe innovative teaching practices and technology that have been used in instrumental ways to change how students learn.

We have to analyze if educators demonstrate evidence of continuous improvement in their professional practice, model lifelong learning and exhibit leadership in their school and professional community by supporting other educator’s development and understanding of the impact on learning of the effective use of digital technologies.

Through this projects educators significantly change learning process through the use of ICT and they make a difference beyond their own classroom.

5. CONCLUSIONS

Given the structured systematic observation, in this Project Based Learning approach using technologies: it is noteworthy that there were some benefits related to collaboration, use of Educational Technology, Knowledge construction and innovation. Particularly conclusions are:

- Participation and collaboration is important. Pupils made decisions together
- Students used their knowledge to make decisions and work together
- Students’ work is interdependent they shared responsibilities. Nevertheless, in this case teacher encouraged individual accountability.
- Learning activities involves use of Educational Technology (Skype, IVC or Edmodo)
- Learning activities in this context allows constructing knowledge through interpretation, analysis, synthesis, or evaluation.

Therefore, when collaborating, it is important that the work is structured in a way that requires students to plan together and take the work of all team members into consideration, using Educational Technology with active methods and helping students to construct knowledge. Educational Technology as resources may change how students learn to work with other people, making decisions and solving problems.

6. REFERENCES


http://www.scratch2013bcn.org/node/164


