

STEAM teaching of the time concept in kindergarten and primary school.

Jesús Carnicer Murillo.

Museo Didáctico e Interactivo de Ciencias de la Vega Baja del Segura de la Comunitat Valenciana. Carretera de Beniel Km 3,2, 03312. Orihuela, Alicante, Spain

Francisco Barceló, Ana Sáez

CEIP Santo Negro, Centro de Educación infantil y Primaria, carretera de Sax 27, 03600, Elda, Spain

Noelia Manzanera, Estefanía Sanjuan, María Enrique García, Victor Pellús, Rosa Serna, Jessica Palomar

Colegio Nuestra Señora del Carmen. Calle Duque de Tamames, 16, 03300 Orihuela, Spain

Abstract. The following work presents a didactic innovations developed in a class of 5 year old students and two classes of 6 and 7 years of two different schools. In both the physical concept of time was taught through STEAM teaching. The innovation was designed and put into practice by 2 kindergarten teachers and 6th primary teachers who participated in a training process prepared by the MUDIC-VBS-CV in collaboration with the CEFIRE of Orihuela. Throughout the process, the professors counted with the advice of trainers from MUDIC and the University of Udine.

1 Introduction

This poster presents a didactic training and innovation project for the kindergarten and Primary schools. The teacher training project began with a course (30 h.) in which scientific and didactic knowledge related to science and technology teaching was presented from a STEAM approach. The course was followed by a seminary (30 h.) in which was prepared a classroom program to teach the concept of time at these levels with two kindergarten teachers and six elementary teachers from two different schools. The entire training process was designed and developed by the Didactic and Interactive Museum of Sciences of the Vega Baja del Segura of the Valencian Community (MUDIC-VBS-CV) through the CEFIRE (A training center) of Orihuela and with the advice of two Udine University professors.

The designed classroom program was implemented with 44 students of 6 years old , 44 students of 7 years old of a school in Orihuela and 20 students in a Kindergarten school in Elda. The results of the experience regarding the didactic change of the teachers and the learning of the participating students can be considered as close as those expected in the design of the training and innovation process.

2 The teacher training project.

The MUDIC-VBS-CV is a science center whose main objective is to popularize science in the Vega Baja del Segura of the Comunitat Valenciana region. This center also aims to investigate the teaching of science and technology in formal and non-formal contexts and with this objective it organizes teacher training activities in collaboration with the CEFIRE of the region and the Miguel Hernández University. In the third trimester of 2016, the MUDIC organized in the CEFIRE of Orihuela a course (30h) "Teaching STEAM in Kindergarten and Primary Education" in which different scientific and technological contents were used to teach in these stages with a STEAM approach. After the course the teachers attending the course were offered to participate in a seminar to prepare a didactic innovation that they

should develop in their classes. After the course 8 teachers (7 Primary school teacher and 2 Kindergarten teachers) participated in the seminar (30 h) and they made didactic innovation in their classrooms. The chosen concept for innovation was "time", this concept had been presented in the course by Marisa Michelini, a professor in university of Udine and Emanuela Vidic, primary teacher in comprehensive school of Udine. These teachers had already developed a training process with teachers from the northern of Italy with this concept and advised the realization of the seminar and innovation in the classroom with a MUDIC professor [1].

The first part of the seminar allowed the teachers to agree on what the students should learn about the concept of time. In the second part of the seminar the teachers prepared rubrics on each concept related to different aspects of the teaching of each concept. The last part of the seminar was devoted to preparing the activities to be carried out with the students, always agreeing with an IBSE methodology [2]. Many of the activities proposed were carried out by the teachers, then they chose the ones they considered the most interesting to do in class. In each activity, scientific concepts and contributions to the objectives pursued were analyzed, as well as the best way to carry it out in class. Finally, the teachers carried out a program of learning and evaluation activities.

In children, the activities carried out were: Narration of the story "Around the world in 80 days", Elaboration of a mural about the narrated story, construction of an hourglass, construction of the merkel sundial, race of liquids, printing on toilet paper of different movements, etc.

In primary school: To view a video with pictures and music over time, to make a mural about the video, to build an hourglass, to build a vertical sundial and a horizontal individual and a horizontal collective analemático in the patio, race of liquids, etc.

3 Results and Conclusions

The poster will present the learning results achieved with the student in relation with the expected ones. The results related to the didactic change of the participating teachers in the training process will also be presented. To advance in this sense all the teachers participating in the project are preparing another similar project this time on the theme of light.

The MUDIC-VBS-CV has developed a STEAM course on light in the last trimester of 2017 and is developing the corresponding seminar so that the participating teachers prepare a didactic innovation on this subject. We think that the teachers teamwork who deal with didactic problems advised by well-trained trainers is the best way to achieve the necessary didactic change and that this necessary step in all the educational stages is a priority in the kindergarten and Primary stages.

4 References

- [1] Michelini, M. and Vidic, E. Impostare in termini trasversali l'educazione nella scuola primaria : Una sperimentazione di ricerca sul tema del tempo. Innovazione nella didattica delle scienze nella scuola primaria al crocevia fra discipline scientifici e umanistici. Pp 110-123. (2010)
- [2] Martina S. J. van Uum, Roald P. Verhoeff and Marieke Peeters. Inquiry-based science education: towards a pedagogical framework for primary school teachers. International Journal of Science Education, vol 38, pp 450-469. (2016)