

TECHNOLOGY AS A RESOURCE TO PROMOTE INTERDISCIPLINARITY IN PRIMARY SCHOOLS

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This poster aims to show how technology may be used as a resource to promote interdisciplinarity, namely using mobile technologies to engage children to learn mathematics, applied to the sound subject, according to 1st grades of primary school syllabus. A preliminary study shows that the proposed tasks resultant from technology resources are efficient to catch the attention of the students and can engage them to learn mathematics and science.

Keywords: Technology, interdisciplinarity, hands-on, mobile technologies, primary school.

INTRODUCTION, LITERATURE REVIEW AND THE PRELIMINARY STUDY

The great lack of professionals in the STEM areas must be countered with an early intervention at the level of the early years of schooling, (DeJarnette, 2012; Rocard et al, 2007). The incorporation of hands-on experimental activities into the classroom, leads to significant improvements in performance and produce positive attitudes towards science (Mody, 2015; Johnston, 2005).

Kim e Bolger (2016) sustain the creation of a curriculum that integrates Mathematics, Science and Technology, being crucial to involve teachers into interdisciplinarity lessons adequate to this approach. Kermani e Aldemir (2015) defend the integration of Mathematics, Science and Technology in the first years of school, through teachers' professional development, as well as the creation of well-designed materials to implement hands-on experimental activities.

Technologies in primary education can promote children's attention, socialization, development of language and learning (Gimbert, & Cristol, 2004). Technology leads to a positive impact on student's motivation and meaningful learning, provides hands-on learning opportunities and can integrate school subjects like mathematics (Costley, 2014).

This study is part of a bigger pedagogical intervention project, in first grades of elementary schools, aiming to introduce cross-cutting methodologies, focused on learning and teaching mathematics, science and technology, within a cluster of schools in Portugal. This poster aims to show how technology may be used as a resource to promote interdisciplinarity, namely using mobile technologies to engage primary school children to learn mathematics, applied to the sound subject, according to primary school syllabus. In order to achieve this purpose, a team of university teachers, in the areas of electrical engineer and mathematics, designed sound artefacts to explore mathematical tasks with technology.

A preliminary study occurred with 3rd and 4th grade students of local primary schools who worked the sound with technology. With a design research methodology, we intend to present how children engaged on the proposed tasks. At the classroom, students were introduced to sound contents and performed hands-on activities exploring the day to day sound and how to measure it, with technology. After this presentation, children organized in groups with a tablet or mobile phone per group, were invited to play a game, called "SonicPaper". First, they installed on their

tablets/smartphones, the Sound Meter application that allows sound intensity measurements and the QR code reading application. To perform the game, questions to be answered and clues, together with the campus map, allows participants to find the key points, previously defined, where they had to register the sound intensity. Key points had signs alluding to the sound and QR codes giving answers to some questions and clues to the next location.

After finishing the game, children return to the classroom, to find out if their answers are correct and to present the registered sound measurements. Organization and processing of data of the measurement results was performed, in order to promote interdisciplinarity with mathematics.

FINAL CONSIDERATIONS AND FUTURE WORK

Data analysis, from participant observation and semi-structured interviews, lead to the conclusion that the proposed technology resources are efficient to catch the attention of the participants and can engage students to learn mathematics and science, according to the school syllabus. In particular, it permits to work school subjects like “space orientation” and “organization and processing of data”.

In the course of the hands-on activities and the SonicPaper game, children were very participatory, showing a great interest in the tasks performed. Because this strategy promotes students’ motivation and attention, we propose to use these resources in the context of teachers’ professional development (Costa & Domingos, 2017), to adapt them to be implemented at primary school.

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ⁱ This work is supported by national funds through FCT - Foundation for Science and Technology in the context of the project UID/CED/02861/2016