

Positive APptitude. From Social Entrepreneurship to ICT Programming

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Abstract. This communication reports the development of an ICT programming project for the creation of applications for mobile devices developed with 5th grade students of the 2nd and 3rd Cycles classes of André Soares Basic School in Braga. The project run in the frames of the 14th edition of the "Science in the School" competition of the Ilídio Pinho Foundation, under the theme of Science and Technology in the service of a better world.

Initially designed to respond to the need to promote innovative teaching practices through the development of new methodologies and promotion of multidisciplinary in the teaching and learning processes in the 2nd and 3rd cycles of Basic Education while encouraging entrepreneurial skills and the creation of collaborative knowledge. The project was supported by the Hands-on Science Network Association and was also integrated and disseminated in an international cooperation partnership for innovation and good practices of the European Erasmus+ program.

The first phase of the "Science in the School" competition required a proposal of new project ideas. After being selected for the second phase, project development, with financial support, the group obtained extra motivation to implement this methodology of science and technology learning.

The project started by identifying a problematic situation and finding a possible solution/response in the context of programming a mobile application (app). It was decided to seek a functional yet simple app capable of helping people in an early diagnosis of illnesses or malaise identifying the disease and advising how to address the proper resources available of the Portuguese National Health Service. This prototype was aimed for an older, living alone, population with little mobility and who are facing a situation of insufficient family support. However it can

easily be put at the service of the entire society.

Students begin discovering the App Inventor, a tool that fosters a hands-on learning environment and reflective teaching as it allows the student to create and improve programming while discovering and exercising creativity, making learning more playful. This tool has a block-based development environment that incorporates web-based services, interaction with social networks, reading bar codes, interacting with orientation and geolocation sensors, as well as other advanced features such as text-to-speech and speech recognition. The teaching of the programming logic is stimulated by several challenges requiring problem' understanding and abstraction while leading the students to express themselves adequately in order to identify and solve a problem. To do so it was necessary for students to master the programming language adopted in programming. Students experimented, discovered, tested and concluded, creating information processing responses in the form of logical-mathematical reasoning. In this process, the students had fun, relating the use of technology to cognitive absorption, shaping the construction of this project always taking into consideration the students' preferences. This programming process that allows you to create applications for mobile devices that can meet real needs is significantly important for student' motivation. App Inventor provides a meaningful learning environment, allowing young programmers to overcome the difficulties of developing a programmed application for mobile devices that previously was limited to computers and microcomputers. At the same time along the project key skills and entrepreneurial spirit was developed. The SCAMPER process of generating ideas was transmitted, channelling it to overcome situations/problems and stimulating the creativity needed in this process. It was at this moment that ideas/suggestions were collected, elaborating a main idea/guiding line for the project - clearly a moment of great construction of metacognitive knowledge.

Building on the acquisition of this knowledge and on creating a mobile application to aid decision making, students focused on building and programming the app, structuring a prototype while potentiating and stimulating cognitive processes. This was an interactive

process that reconciles the concrete and the abstract in problem solving and that involved several steps such as structuring, constructing, implementing, automating and controlling a device. In all these stages a process of knowledge-building took place in alive and participated experiences. This metacognitivism interconnects distinct scientific areas (sciences, mathematics, physics, technology and linguistics) with the consequent acquisition of transversal competences.

The final product is the result of a blended-learning process (B-learning), creativity and hands-on processes. The processes of collaborative work, the moments of verbalization and experimentation, allowed to develop a way of seeing how to do science, transferring the new knowledge to the creation of new skills and knowledge for the benefit of society.

Keywords. App Inventor, app, entrepreneurship, hands-on, creativity, mobile devices, smartphones, B-learning.

