The eCraft2Learn workshops: putting forward an open craft and project based methodology for computer-supported artefact construction

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In many cases, new technologies are simply reinforcing old ways of learning in current school settings and very often they are introduced according to a narrow perception as being suitable only for talented youth or only for Science-, Maths- or Engineering-oriented majors.

Current developments call for a move from this elitism to the recognition that fluency with making technologies represents knowledge and skills valuable for every citizen. This idea is embraced by the eCraft2Learn project that draws upon the Constructivist "learning by making" practice [1], embraces the "Do-It-Yourself" (DIY) culture and instead of enforcing knowledge acquisition it aims at introducing the "maker movement" [2] in education.

In the context of the eCraft2Learn project, a serie of workshops run in formal and informal educational sites in Athens, Greece involving 54 young learners (13-17 years old). The workshops followed the eCraft2Learn methodology that involves five (5) stages: ideation, planning, creation, programming and sharing. The teachers are challenged to act as coaches and to support the young learners to go iteratively through the five (5) stages towards computer- supported artefact construction.

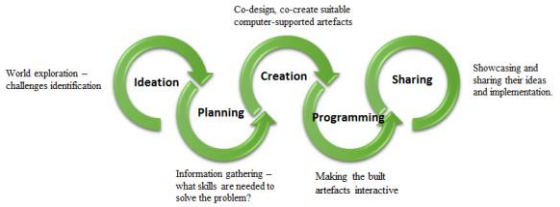

Fig 1 The craft and project based methodology

Some of the produced artefacts (i.e. the Lighthouse project, the Shy Rabbit, the moving robotic artefact, the 3D-printed bridge and more) were presented during the 3rd Athens Science Festival by the participant students under the discrete support of their teachers. The general vibes, as well as individual reactions, were recorded through three different lenses, meaning the lens of students, the lens of teachers-coaches and the lens of visitors.

Students were asked to describe their entire experience including their participation at the workshops and explain if, and how, the curriculum of eCraft2Learn differed from the school courses. All of them were excited about being part of this project since they felt that their horizons have been broadened as far as new technologies and robotics are concerned, and also that they had the chance to develop some social related skills such as cooperation and communication. They were also excited about having the opportunity to present their own work and interact with such a wide audience. Moreover, they highlighted the importance of being involved in hands-on activities and having the teachers by their side as coaches and assistants, which took the "teacher-student" relationship to another level.

Similarly, the teachers/coaches highlighted the fact that the students felt confident to take, in an implicit way, the leading role, and set the pace on the entire process of teaching/coaching. They even felt impressed by the ability of their students on finding solutions to difficult problems by seeing things from new perspectives.

Finally, the visitors show great interest on getting informed about students work and they were posing a lot of questions about the mechanisms of the artefacts. They were fascinated by the entire project and they sustained/argued that there should be more STEM-oriented programs since are encouraging children to use their imagination along with the use of technology while improving their personality and character (i.e. learn to communicate their ideas with their teammates and/or other people, present their own work, breaking gender stereotypes etc.).

[1] Papert, S., &Harel I. (1991). Preface, Situating Constructionism, in Harel, I. &Papert, S. (Eds.), Constructionism, Research reports and essays, 1985- 1990 (p. 1), Norwood NJ.

[2] Blikstein, P. (2013). Digital Fabrication and 'Making' in Education: The Democratization ofInvention. In J. Walter-Herrmann & C. Büching (Eds.), FabLabs: Of Machines, Makers and Inventors.Bielefeld: Transcript Publishers.