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Co4-Lab – Creating Knowledge through Making

Creativity and innovation have become the recognized hope for solving multiple, severe cumulative problems and risks related to climate change, sustainability of the Earth, and radical inequality. Therefore, it has been argued that schools need to nurture creativity and innovation deliberately and systematically, across all disciplines. Students have to be socialized to creative practices of working with knowledge from an early stage of their education.

This presentation will describe a large, ongoing research project Co4-Lab - The Laboratory of Co-Design, Co-Inquiry, Co-Teaching, and Co-Regulation aimed at cultivating the principles and practices of maker culture in primary and lower secondary school, in order to enable students participating in creating knowledge through social making. The project combines the cross-disciplinary Finnish traditions in craft, design and technology, science, engineering, arts, and mathematics (STEAM), with the methods of digital fabrication and hands-on learning. In the presentation, design experiments from four schools participating the pilot phase of the Co4-Lab project will be presented. Altogether, 14 classes (approx. 320 students, aged 10–14), 17 teachers, nine teacher students, and several tutor students took part in the pilot phase. The experiments focused of collaborative design of an intellectually challenging, aesthetically appealing, and personally meaningful complex artefact.

In two of the schools, Arabia school and Koulumestari school, the theme of the project was Everyday Challenges, the students (grade 5) were asked to design objects or tools that make their everyday life easier. During the project, the students explored their daily life with the help of their parents, participated in workshops of, for example, designing and programming, and visited various museums. Moreover, the student teams created and elaborated their ideas, ranging from a gel comb to a technical cleaner, through many iterative cycles.

In Aurinkolahti school 8th grade students were, first, trained as tutor students in a workshop of programming with GoGo Board. Second, the tutor students and five subject teachers (textile craft, technical craft, mathematics, physics, and art) guided 7th grade students through the designing of smart products. The students created designs of, for example, smart insoles for sports shoes or ergonomic handles for gaming with smart phones.

In Viikki Teacher Training School two themes were explored. One was Indicating Emotions, where the students (grades 5 and 6) programmed a series of led lamps for signaling their emotions and designed a case for the technology used. The other theme was Shitty Place, where the students looked for unaesthetic or dysfunctional places, and created designs to make them more inviting and useful. With the help of class teachers, nine class teacher students were responsible for leading the projects in the classrooms, as a part of their normal teacher training program.

The present fabrication technology allows bringing practices of maker culture to schools in the form of feasible projects with complexity, intellectual challenge, and aesthetic appeal. Besides fun and practical activities, the Co4-Lab project aims to facilitate deep learning through guided engagement in expert-like designing and inquiry; in short, students' deliberate efforts to build, create and synthesize knowledge through making.