## The Value of Technology Education

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The first paper in this section (Competence goals towards responsible creativity) is a response to the inclusion of ‘the ability to reflect and think critically’, in the recent Norway curriculum as an element of competence, and this paper considers how the Arts and Crafts subject deals with this change. It is considered that thinking critically is represented by (a) ‘awareness through making’, (b) ‘empower for change and citizen participation’, (c) ‘address complexity of real-world problems’ and (d) ‘participate in design processes, and that some of these narratives are embedded in Arts and Crafts, and others are not.

The second paper, originating from Finland (Promoting technological thinking) recognizes that technological thinking is a complex construct, so attempts to define or describe it are avoided. The claim of the paper is that human action is thinking, rather than reflection of it, and consequently there cannot be thinking without physical experience, interaction with physical objects. The school trend to substitute the virtual for real is therefore a severe threat to the development of technological thinking.

The third paper Explores First Year Engineering Students’ Levels of Technological Literacy at Two Higher Education Institutions in the Western Cape Province, South Africa by examining possible influences of socio-economic status (SES) on the technological literacy of engineering students. The findings suggest that students have a basic level of technological literacy based on the dimensions Artefact, Process, Direction/Instruction, Tinkering and Engagement. Preliminary results of the qualitative part of the study shows that there is a tentative influence of SES on the participants’ technological literacy.

The fourth paper in this section, The sensor that operates the door - College students’ mental models of everyday control systems Israel aims to identify student-teachers’ mental models of everyday life control systems to develop appropriate instruction processes that help them understand pedagogical content knowledge. It was found that the Israel student-teachers’ mental models are partial, most of them have a structural model that contains only the visible components that are part of the operation unit and not the control unit; and their functional mental models are also missing.

The fifth paper from Ireland Investigates the effect of engineering student’s spatial ability and expertise on general complex problem solving. Research indicates that spatial ability can support individuals in overcoming limitations in expertise, and this research therefore hypothesised that spatial ability will influence the performance of engineering students across different levels of expertise on a general complex problem-solving task. The finding suggests that engagement in engineering education, at least that experienced by the participants, does not lead to the development of generic problem-solving skills.

Pupils’ Emotional Experience in Human-Technology Interactions is the final paper in this section, in which the authors from Malta develop a framework for modelling pupils’ emotional experiences when interacting with technological artefacts, the assumption being that emotion is itself a consequence of the interaction between the human individual and the technological artefact. It was found that the simplicity of an artefact and the ability to provide immediate visual feedback results in a more enjoyable interaction between pupils and artefacts.



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