

A Curriculum for STEM Literacy from Early Childhood to University Education

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The overarching quest in this keynote is for a STEM curriculum that is meaningful for all children and students, relevant for society, coherent and accumulative. “Non scholae, sed vitae discimus”, wrote the Roman philosopher and politician Seneca 2000 years ago. Learning is not for school, but for life. And since our lives have changed considerably since the days of the Roman Empire, most of us don’t learn Latin anymore at school. But how about STEM in schools? Is it up to date and preparing all children and students for their role in society? Do we offer them the right experiences, so they can make up their minds and develop into an engineering, a scientist, or choose a different path but still develop into a responsible citizen with a positive attitude towards the contribution of STEM to society? If we have to cope with the overwhelming challenges such as posed by the climate change, we not only need more engineers, but we also need to educate citizens that are not alienated from STEM through discouraging school experiences. I will start from birth: how we can help young children to explore the affordances of the material world and develop their cognitive and linguistic system through curiosity, embodied perception and action and interacting with their care takers. We proceed to elementary education, in which the material phenomena in daily life provide a rich context for learning, not just for understanding the concepts of science, but for linguistic skills, social skills, creativity, executive functions. In secondary schools, we will focus on the affordances of authentic inquiry and design assignments by introducing students to the STEM contexts in the real world and how textbook knowledge and calculations may contribute to solving real problems (or not). In higher education, developing skills for boundary crossing will be a theme, to help students investigate questions and solving problems with wicked tendencies in multidisciplinary settings in which stakeholders often have different value positions and speak different professional languages. The last question to be addressed is how to help each other in this learning progression and how to align and develop the pedagogical and content knowledge that will be required from educational professionals and teacher educators.