



Chemical Education

A CHIMIA Column

Topics for Teaching: Robotics

Teaching Science: A Game for Robotics?

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Abstract: The congress SCIENTIÆ & ROBOTICA^[1] explores new teaching methods, models and concepts for science and mathematics based on the lively development of educational robotics. Through a variety of lectures and workshops as well as an impressive international participation it aims to contribute to the professional development and training of teachers from secondary level II.

Keywords: Congress · Education · Robotics · Teaching sciences

The tremendous development of science over the past 10–15 years makes teaching activities more and more challenging. Consequently, novel tools, approaches and skills are needed in order to keep up the high quality of science and mathematics teaching in Switzerland. We live in a rapidly evolving world driven by creativity, innovation and knowledge. The cornerstone of acquiring good knowledge, expressing creativity and turning knowledge into innovation is EDUCATION. Part art, part technique, teaching is an intricate, complex and incredibly challenging ability that in the era of the 4th industrial revolution (industrial digitalization) needs to be continuously developed, shaped, trained and coached. Textbooks and writing boards still have their role to play but teaching goes nowadays far beyond these traditional means to keep up the pace. So “who teaches the teachers?”!

Between 5–8 September 2018, EPFL will host the SCIENTIÆ & ROBOTICA, a congress co-organized by several societies of teachers (SV!A, VSMP, VSN, VSG) as well as SATW, EPFL, NCCR Robotics, CRC, Formation Continue UNIL/EPFL and the Swiss Chemical Society. This is a unique and exciting opportunity to bring together about 200 teachers of science and mathematics at the secondary level II from the whole of Switzerland who will explore the, sometimes unexpected, possibilities of robotics as a tool for teaching sciences and mathematics (Fig. 1).



Fig. 1. Digital tools in vocational education and training. ©Scientiae & Robotica

While at first sight robotics appear to be attractive, interesting and with almost limitless possibilities, successfully bringing robots to classroom is, however, anything but trivial. Several points need to be properly addressed: why? what? how? what for? The

SCIENTIÆ & ROBOTICA initiative with its ambitious and diverse agenda can significantly contribute to finding the appropriate answers to these questions by enabling constructive discussions, fair debates, fluid exchange of information and know-how between the participating stakeholders.

In addition, the use of robotics as a special educational technology in science and maths classes is thoroughly substantiated. Several areas of teaching will be illustrated: robotics as an object of study, as a tool of cognition and as a means of promoting the development and upbringing of students.

National and international experts will present the last developments in robotics *via* plenary conferences whose topics are as diverse as they are intriguing, ranging from ‘Mechanical experiments with single molecules’ (Prof. Ernest Meyer, University of Basel) to ‘Communicate Robotics’ (Sabine Hauert, Prof. University of Bristol, UK) to ‘A User’s Guide for Space Travel’ (Prof. Claude Nicollier, EPFL), to cite but few of them.

This rich full lecture program will be completed by workshops specifically conceived for all disciplines *i.e.* biology (Fig. 2), physics, chemistry, informatics and mathematics.

Another attraction of this event is the ‘hands on’ robotic contest

Thymio, whose protagonists, none other than the congress participants themselves, will get actively involved. Moreover, the participants will remotely control and program a Thymio robot^[2] to perform various tasks.

In this way, the teachers of future generations, generations that will certainly develop robots for much more complex tasks (Fig. 3) than today, will have the opportunity to experience how highly stimulating working on robots can be. The congress represents an inspirational starting point toward the future of teaching and will bring forward the huge potential of educational robotics.

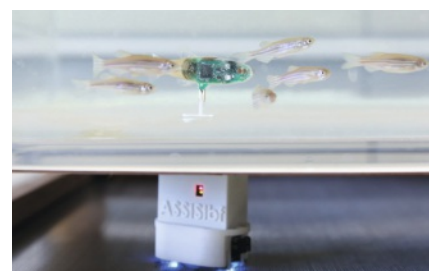


Fig. 2. Robot–fish interactions for social behaviour studies. ©Scientiae & Robotica

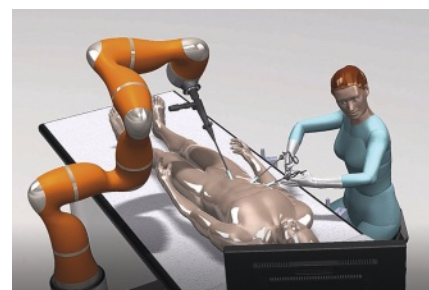


Fig. 3. The robot: a surgical assistant for tomorrow's operations. ©Scientiae & Robotica

[1] <http://scientiaerobotica.epfl.ch/>

[2] <https://www.thymio.org/en:thymio-r2t2#toc5>