Editorial: Special issue “Teaching robotics, teaching with robotics”

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This special issue arose from the 3rd International Workshop “Teaching robotics, teaching with robotics” held in Riva del Garda (Trento), Italy, April 20, 2012. The workshop was aimed to promote exchange and sharing of experiences among researchers in the field of educational robotics and continued the tradition of two previous successful workshops in Venice (SIMPAR, 2008) and in Darmstadt (2010) organized by the TERECoP (2009) project partnership.

The focus of the workshop was on the integration of educational robotics in school curriculum, which raises challenging issues on two important topics: the effective management of the direct and indirect positive effects of the laboratorial robotics activities in a wide spectrum of disciplines and the development of new assessment tools more suitable to a learning-by-doing approach. Several efforts which were developed during last two years at European level for integrating robotics in tertiary and school education, mainly in science and technology subjects, were presented in the workshop and are reported in the workshop proceedings. After the workshop, the authors of papers representative of the different thematic areas discussed at the workshop were invited to offer an improved and extended version; six of those papers were finally selected after double peer review and are included in this issue.

The first paper, “Educational Robotics as Mindtools” by Tassos Mikropoulos and Ioanna Bellou, proposes educational robotics as mindtools, following the principles of constructivism. The literature shows that constructivism and constructionism are the theoretical approaches to educational robotics, but most empirical studies are loosely connected to their principles. Mindtools are technologies that promote critical thinking and higher order learning in every discipline under a meaningful context. Under this view, authors show how educational robotics can be exploited as mindtools in physics and programming learning.

The second paper, “Using control heuristics as a means to explore the educational potential of robotics kits” by Ilaria Gaudiello & Elisabetta Zibetti, investigates the heuristics spontaneously applied by 6-10 aged children when controlling robotic devices with different levels of transparency and interactivity. The analysis of the heuristics offers an insightful way to highlight the potential value conveyed by the structural and functional features of robotic devices within a learning framework.

The next paper, “Learning to explain: the role of educational robots in science education” by Edoardo Datteri, Luisa Zecca, Federico Laudisa & Marco Castiglioni, explores the potential educational value of educational activities where primary school children are asked to explain the behaviors of a robot. The authors argue that explaining the behaviors of an educational robot provides children with the opportunity to develop scientific research skills.
and competencies and to engage in meta-cognitive reflection on fundamental issues surrounding scientific research methods.

The forth paper, “Digital Storytelling teaching robotics basics” by Michele Scandola & Paolo Fiorini, suggests a new approach to use Digital Storytelling as a powerful tool to teach complex concepts where the story is not the content but a glue for the main contents, while the digital medium remains the way to tell the story. Interesting illustrative examples are presented focusing on teaching basics of robotics for high-school students and robot-assisted surgeons as well.

The next paper, “Robots in education: new trends and challenges from the Japanese market” by Fransiska Basoeki, Fabio Dalla Libera, Emanuele Menegatti & Michele Moro is a technical report comparing the use of current robotics kits developed in Japan for educational purposes aiming at a large audience, from primary school students to university students and adult lifelong learning as well. The paper is completed with a short description of a new pseudo-natural language proposed for effectively programming one of the presented robots, the educational humanoid Robovie-X.

The issue ends with the position paper “Educational Robotics: open questions and new challenges” by Dimitris Alimisis. The paper is based on ideas presented and discussed in the frame of a special discussion panel held during the Workshop. The current situation is critically discussed and new challenges and trends are identified. The paper concludes with proposals for driving ahead the community and the robotics movement in education.

We really hope that this issue will contribute to the further development of the dialogue among the research community of educational robotics at European and international level.

References


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