Educational Robotics - Evaluating long-term effects

Martin Kandlhofer[1,1], Gerald Steinbauer[1] and Petra Sundström[2]

[1] Institute for Software Technology, Graz University of Technology
{mkandlho, steinbauer}@ist.tugraz.at
[2] ICT&S Center, University of Salzburg
petra.sundstroem@sbg.ac.at

Abstract. This paper presents our plans to conduct long-term quantitative and qualitative evaluations on the impacts of the RoboCupJunior educational initiative. The studies will cover several years and will not be limited to one special region or institution. We want to get objective feedback to which extent the goals of educational robotics have been reached. In this paper our objectives, the methods to be used, actions already taken as well as the next necessary steps will be outlined.

1 Introduction

RoboCupJunior (RCJ) focuses on educational aspects encouraging young students to deal with science and technology [4]. Various papers have been published on this topic. But only very few works on evaluating the long-term effects and the impacts of educational robotic initiatives like RCJ can be found [1]. This position paper presents our plans to conduct a quantitative and qualitative evaluation of the effects of RCJ. We aim to conduct studies covering a period of several years as well as a broad population. We aim to investigate the impact on the future development of students and how their attitudes towards science and technology changes after participating in RCJ. Some of the factors we aim to evaluate are factors concerning how students improve their technical and social skills through RCJ activities, or if they do not. In this direction only long-term, widespread studies make sense. Similar evaluations have already been done in other scientific fields such as sociology, economy and education in general.

In Austria a nationwide network comprising of eight regional centers provides support for schools, teachers and students in participating in RCJ. Support actions include robotic introduction courses for students, training courses and workshops for teachers as well as renting robotic kits to schools. During open lab days student teams can use the available infrastructure at a regional center to prepare for competitions [2]. By utilizing the findings of our evaluations we intend to both improve and extend on our support actions in order to attract more youngsters to RCJ and engineering and scientific educations in Austria.

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2 Selected Methods

One essential part of the evaluation is the investigation of so called sample-careers that could act as role models. These we investigate by conducting semi-structured qualitative interviews with former RCJ participants from different parts of Austria [3]. As a guide for these interviews a set of specific questions regarding education, lessons learned as well as positive and negative memories has been defined. The idea is to find out the stories behind various students' careers and to take a closer look at how RCJ potentially has influenced their educational choices. The interviewees will be selected by region, gender and social background. In order to get the values on of the long-term effects, the year for their first competition must be before 2009. We plan to interview at least 2-3 students in each part of Austria, including both positive (i.e. now studying engineering) and negative examples (i.e. where it is obvious that RCJ have had no effect). As a second part of this work we will conduct long-term evaluations with children who have just started with RCJ. We intend to set up a better structure for monitoring their careers. Here a more intense cooperation with schools, especially with those who already have established RCJ activities is planned. In this context a set of questionnaires will be developed to collect data during the school year. In addition we plan to gather both statistical and qualitative data during annual national RCJ competitions. Respecting legal and ethical requirements all collected data will be treated confidentially and personal information will be made anonymous. Interviewees will be asked to sign informed consents.

3 Summary and Outlook

Up to now we have conducted interviews with eight selected students. The analysis of those semi-structured interviews is still ongoing. First preliminary results indicate a strong relation between RCJ and their future educational and personal development. Further interviews in Austria but also in other countries are planned. Beside those semi-structured interviews we have developed a set of questionnaires focusing on young students who just have been introduced to RCJ. We have already collected data during several introduction courses for beginners held in Graz. The next step is to extend this survey to introduction courses held in other Austrian regions as well. First data from a competition will be collected at the RCJ Austrian Open in April 2012.

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