SmartBots

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Project Title	SmartBots
Project Team	Dr Andrew Fluck (SiMERR Tasmania), Rob Torok (Claremont College), Karen Wilson (Faculty of Education, UTAS)
Period	2007
Funding Agency	SiMERR
Organisational Base	SiMERR Tasmania

Description

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Robotics is a trans-disciplinary, project-based learning activity drawing on mathematics, science and technology. It is motivating and engaging for many students and fosters resilience and perseverance, problem solving skills, communication skills, teamwork skills, independence, imagination and creativity.

The SmartBots project was an on-line robotics extension program for middle school students (aged 10 to 14 years). This project built capacity and expertise in robotics (benefiting mathematics, science and technology) and online learning for teachers in rural schools. It also networked the students and teachers in those schools, and provided a model that can be applied across disciplines and levels, while providing curriculum diversity, enrichment and extension.

In small groups, students used LEGO MINDSTORMS robotics kits and accompanying software to work through a series of skill building activities and challenges, which were designed and supported on-line by teacher Rob Torok. Each week, students worked through an activity, usually based around a particular challenge with an adult mentor on location providing encouragement and support. Early in the program, the activities were structured as guided tutorials, designed to develop skills and understandings relating to particular objectives. Later in the program, these activities were more open-ended challenges, designed to cater to a range of abilities, culminating in the robotics competition Robocup Junior.

The weekly challenge pages were made available to participating students and team mentors within a password-protected website, and students were encouraged to submit weekly progress reports and share their responses to the challenges. Participants had the opportunity to discuss ideas and showcase their work with others in the program.

Participants

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19 schools, 90 students, 23 team mentors, Department of Education, Tasmania, LEGO Education

Findings

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A short test of robotics aptitude showed pupils learned a lot from the SmartBots project. Some also changed their post-school aspirations over the duration of the activity. Pupils in rural schools showed an 8% increase in first nominations for going to university after school, compared to an 11% increase for students in urban schools.

Highly successful learning outcomes were obtained, despite local facilitators in the schools having very little knowledge of robotics. For instance, the SmartBots project enabled remote schools to participate in the RoboCup Junior Competition. This was done by sponsoring a regional event in Launceston, giving access to the competition to many schools that had never competed before. Two SmartsBots teams went on to the national finals in Queensland and one of the teams won a travel scholarship to China.

Outcomes

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Publications

- Torok, R. (2007) Marty: a performance art robot. In The Lego mindstorms NXT idea book. San Francisco: No Starch Press.
- Boogaarts, M., Daudelin, J.A., Davis, B.L., Kelly, J., Levy, D., Morris, L., Rhodes, F., Rhodes, R., Scholz, P., Smith, C.R., & Torok, R. (2007). The Lego mindstorms NXT idea book. San Francisco: No Starch Press.

Conference presentations

- Torok, R. (2008, October). SmartBots: Robotics online for middle school students. Paper presented at the annual Australian Computers in Education Conference, Canberra, ACT.
- Fluck, A. (2008) SmartBots. In Building Partnerships to improve educational outcomes in rural and regional Tasmania. SiMERR Tasmania.
- Fluck, A. (2007, November). SmartBots (Robotics on-line). Paper presented at the National Summit of the National Centre for Science, Information and Communication Technology, and Mathematics Education for Rural and Regional Australia, Canberra, ACT.
- Meijers, M. (2008, May) Video games - an essential literacy for the New Millennium. ASLA Online III Virtual Conference.

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The SmartBots project is now embedded in Tasmanian public education as part of the gifted and talented program (CELO) where Rob Torok is given a 0.2 of a full- time load to deliver the program. The number of schools involved has extended with schools on waiting lists. How this program articulates into education and work pathways is now the subject of a new project.

As a follow up from this program a group of ICT educators and businesses representing pathways from kindergarten to high School, polytechnic, academy, university and work is being established.

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