BUILDING AN EDUCATION PROGRAM

By Eve Krakow

Robotics Competition

The bleachers are packed with hundreds of cheering teenagers; music blares and thumps from the speakers. Lights dance on the "playing field," which features, at its centre, a three-tiered structure containing rows of inverted cones. In each corner, there's a contraption of wires, wheels, hinges and tubes, flanked by two students with a remote control. The signal is given! Welcome to Quadrum 2004, the third annual CRC Robotics Competition.

Robots get points for picking up tennis balls of the right colour and dropping them into the cones. Sound easy? Think again. "We were up until 3:30 a.m. last night trying to fix our robot," said Alex Ethimiepoulos, a Secondary V student from Western Laval High School, just before the first round of heats began. "Then this morning, a circuit blew."

The three-day event is the culmination of weeks and weeks of work, much of it beyond regular school hours. In addition to designing and building a robot to play a specific game, students have to write a 12-page journal documenting the building of the robot, produce a 5-minute documentary video, create a Web site to promote their team, their school and the competition, and set up an information kiosk at the event. All components have to be bilingual.

A multidisciplinary activity

The annual competition is organized by CRC Robotics in association with the Educational Alliance for Science and Technology (EAST). Mike Downey, a chemistry teacher at Selwyn House, is one of the project's initiators. Four years ago, he teamed up with fellow teachers Tom Downey and Brad Moffat from Selwyn House and André Barette from Collège Laval. They wanted to create a motivating learning situation that would use the principles of the Québec education reform and the strengths of the secondary school curriculum to help students learn.

"We tried to come up with an idea that would incorporate as many subjects as possible," said Downey. Students are judged on all aspects: journal, Web site, kiosk, video, robot design, the game and sportsmanship. "However, it is the robot that motivates the kids."

The competition rules state that students must do all the planning and building. Teachers provide support and act as advisors. Outside professionals, such as engineers, may be called on as mentors to help students with questions that exceed the students' or teacher's knowledge. However, only the students are allowed to touch the robot.

About 400 students from 16 secondary schools and one CEGEP participated in the competition's 2004 edition, held in February at LaurenHill Academy's junior campus. Team sizes ranged from 4 to 60 students. In most cases, they were divided into subgroups, with each group responsible for one of the five components.

Photos: Paul McCarthy

Hundreds of students watched their and other teams' robots battle each other for points.

The all-girl team from Sacred Heart with their robot "Elle"

Students make last-minute adjustments to their robots.

Sarah Al-Roubaie, a Secondary V student from Sacred Heart School, led the engineering team and piloted her team's robot at the competition. Designing the robot was not easy, she said. "Every time we thought of an idea, something went wrong." She learned a lot about planning and engineering—and wiring, in particular.

Coming from an all-girls school, Al-Roubaie was on the only all-girl team. "A lot of people think building robots is just for guys. We hope to prove them wrong." Tired of comments on their all-girl status, the girls decided to push the stereotype all the way, painting their robot pink and calling it "Elle."

Judges from the Canadian Space Agency

To judge the best robot design, engineers were brought in from McGill, the École de technologie supérieur, CAE, and the Canadian Space Agency (CSA). David Phillips works on the Canadarm II robotics team at the CSA. "The overall skill is impressive," he said. He also noted that the work required of the students "is similar to the work we do."

The engineers also had to certify that all components of the robots were on the list of acceptable components. "We try to maintain a level playing field, so that a team with more money can't go out and buy a better motor, for example," Downey explained.

A teacher's perspective

"If ever there was an example of the reform, this is it," said Peter Harbert, a physics teacher from Rosemere High School. Participating for the second year, his school had a team of 32 students. Ten teachers of Math, English, French, Information Technology and History were also involved. "The learning experience for students is incredible," Harbert said. "They learn people skills, leadership skills and how to resolve arguments among themselves. Normally in a classroom, there's always a teacher there to intervene. Here we stand back and let them figure it out."

As teams encounter one glitch after another, a large part of the event involves problem solving and troubleshooting. "Frequently, the team that wins is the one able to deal with things as they happen," said Downey.

Did someone say Apollo 13? ◖

About CRC Robotics

CRC Robotics is a non-profit organization associated with the Educational Alliance for Science and Technology. The organization initiated the CRC Challenge with the following goals in mind:

- to set up a student-oriented and student-directed activity
- to create a project that integrates science, math, multimedia, language arts and computers
- to develop a hands-on approach and help students link the classroom to the workplace
- to foster and build teamwork and communication skills
- to promote the idea of working together to accomplish a common goal
- to instill the concept that achieving team goals is more important than winning

Gearing up for 2004-2005

The CRC is now busy preparing for this year's competition. The theme is **Targeau-Bonseye 2005**. Here is the schedule of events.

- **Sept. 29, 2004:** Teacher information night. This is an opportunity for teachers to hear what the CRC Robotics Challenge is all about.

- **October 29, 2004:** Deadline for registration.

- **November 19, 2004:** Teacher workshop day. Teachers involved in the program are invited to spend the day with the competition organizers. The workshops give teachers a chance to familiarize themselves with the equipment used in the competition.

- **November 19, 2004:** Official publication of the rules. All schools are given a set of rules for the game their robots will be expected to play.

- **December 6, 2004:** Kick-off day. All schools meet and spend an evening at the host school. They receive their kits, which include motors, control boards and other components, and they participate in workshops to learn how everything works.

- **February 17-19, 2005:** Targeau-Bonseye 2005 at John Rennie High School. Let the games begin!

Unfortunately, there is a high entry fee to participate. Downey hopes to eventually increase the number of partners so as to lower the cost.

For more information, visit <**www.robo-crc.ca**>.