Robotic Introduction to Gate Students

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Spring brought an abundance of flowers in May, and a motley crew of energetic GATE (Gifted and Talented Education) students to the annual GATE Student-to-Student Conference at Merrill College-University of California-Santa Cruz, California. The Oak Grove High School Eaglebots presented two hands-on work shops introducing a basic overview on robotics and how a robot functions. The workshop included a presentation and a hands-on demonstration. The presentation gave the students a basic idea of robotics by demonstrating how an individual robot behaves, dependent upon the program written for specific tasks.

While we were busy setting up the workshop in the beautiful college court yard, kids and their parents stopped by and asked us what we were presenting. They were so curious about our display they could not break away to go to other workshops. Our display included 13 different robots, awards and trophies, posters, Botguy, and many books about robotics.

When the first session began, around 30 kids and parents arrived. We introduced ourselves in ten different languages; English, Spanish, French, Mandarin, Tagalog, Basaya, Punjabi, Hindi, Bengali, and Vietnamese. After our introduction, we talked to the kids and their parents about basic programming and building a robot as an engineering project. We then introduced the audience to the iCreates, Legobots, and NXT's. The robots were programmed with basic programs to get the attention and to hook the young

minds in our audience, into exploring new ideas in Science, Technology, Engineering and Math. (S.T.E.M.)

The NXT's were programmed to drive forward and backward. The iCreate was programmed to move in a circle clockwise, go straight and then return to its point of origin, and rotate in a circle counter-clockwise, before stopping. All were amazed by the movements of the NXT's, iCreate, and Legobots.

Further exploration of the iCreate occurred when it bumped into something, turned around, and continued a forward movement. That robotic behavior led us into talking about the sensors on the iCreate and all the sensors we were given in the kit. Everybody expressed surprise to see the built-in sensor on the iCreate.

After demonstrating how the robots worked we showed the Botball game video and talked about the game rules and challenge for this year's game. The kids and parents seemed really interested when we shared our strategies for movement and tasks on the game board.

Finally, the real fun began. Before the GATE conference, we prepared fifteen tubs filled to capacity with Lego parts... wheels, axels, motors, servos, and odd pieces of all colors and sizes. Most of the tubs contained partially-built robots from our hands-on experience during club meetings. We distributed the kits to the kids and their families. Kids seemed really excited and giggled in mirth as they put together wheels and axles. Several kids actually managed to make their robots move, not by programming of course, but by making the wheels move. The kids worked on their robots for approximately 20 minutes.

Then time ran out and we told the kids to "freeze" and stay still while we

collected the tubs. During that time we noticed most of the kids were proud of building their robots and were talking to their parents explaining what they had done. We left the experience feeling we had accomplished the task of "Community Contributor" one of our behavioral standards for Oak Grove High School.

Our next workshop netted some surprises. We had some elementary students but to our delight, college students who were randomly walking by, stopped to watch the presentation. Nevertheless, we showed our audience the overview of our robotics program and gave all kids (elementary and college) some hands-on learning. During this workshop there were more tubs than kids. All ages of kids began mixing the tubs' contents to build a more creative robot. With fewer attendants at the second workshop, our spirits fell slightly, but we did not show it. We still managed to delight the kids and helped them build their robots. The majority of robots built, had minor flaws, but the designs were easily re-engineered to reflect a more stable and mobile vehicle.

By reviewing what we did in our workshops, we learned how to tutor and mentor younger kids. Tutoring programs are structured so that both the mentor/tutor and the students benefit. According to research, "peer relationships contribute to social and cognitive development and socialization" (Thomas). Some of the benefits of tutoring include:

- Kids gain positive attitudes, values, and skills through "peer modeling"
- Kids also learn to share, help, comfort, and relate to others through tutoring.
- The relationship between student and tutor helps the student gain a strong influence on achievement and on a child's development of "identity and autonomy."

According to the Access Center, peer tutoring is "an effective educational strategy for classrooms of diverse learners, including students with disabilities,

because it promotes academic gains as well as social enhancement".

Another tutoring experience but additional surprises. With the help of our teachers, we tutored many kids including incoming freshmen straight from middle school.

It was during a "Parent-night" at our high school. Parents were "shopping" for the best high school for the next school year. We had some parents coming to our table that we had set up for our robotics club. They were interested in our program because it promoted math, science, and technology. We (Eaglebots members) didn't understand why there were a lot of people going towards the sports section during the open house. Surely parents would choose brains over muscle? But, nevertheless, a lot of parents crowded the afterschool sports table and we were at our table muttering that sports could only take you so far. I'm not one hundred percent positive, but there are not many people that would actually make it to the professional leagues or even make a living out of sports. But if one studies engineering or anything in the field of science, they are almost guaranteed a job and can actually earn a good living, though that's only my opinion. So, we were there waiting for more parents to arrive at our robotics table, hoping for freshmen to sign up. However, by the end of the day, only 3 people had signed up to join robotics. As we packed up, I secretly headed over to the sports table and found a lot (and I mean a LOT) of signups from either their parents or from incoming freshmen. I was a little saddened, that many people would choose muscle over brains, but that's how America runs, the illusion of the

American Dream.

After the parent night, we packed up our stuff and stored it at our club's classroom. So far, we haven't received any e-mails from our incoming freshman saying that they'll join robotics next year. We'll keep our hopes up when the tables are up next year for Club Day (a meeting of the clubs where students from our high school sign up to participate in the clubs). We realize that we need to model a different academic priority in our community. By living and working in our community we can demonstrate that we can also successfully reach academic goals, graduate high school and go to and graduate from college.

Moreover, we have done a lot of community service, giving back to our community. We have also had mentors from another high school experienced in robotics help us each year.

To improve our mentoring, we have researched how to tutor and mentor others. We have matured as a team both by being mentored and mentoring others. We have learned how to peer tutor (students our own ages) enjoy cross-age tutoring (Joins students of different ages) and to tutor and coach one another. "Peer tutoring is an effective educational strategy for classrooms of diverse learners because it promotes academic gains as well as social enhancement." (The Access Center (2008)

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