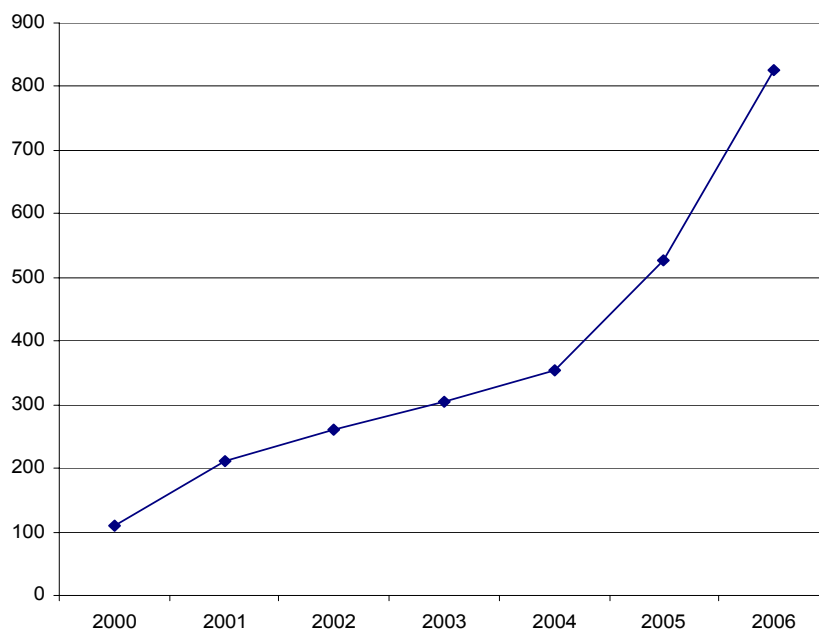


## Robofest 2006 Official Report

Total of 826 students, 230 teams from 4 countries participated in the 7<sup>th</sup> Annual Robofest student robotics competition. Robofest 2006 featured a warm up competition, 16 qualifying competitions, a VEX Pentathlon and one World Championship. Robofest focused on STEM (Science, Technology Engineering, and Mathematics) education and has grown rapidly since its inception in 2000, as shown in Figure 1.



**Figure 1.** Number of Robofest Student Participants Since 2000

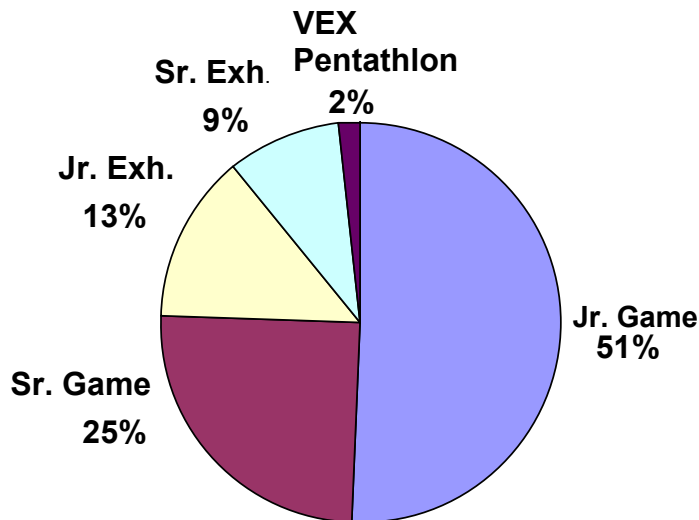
Robofest would not be possible without the help of many dedicated people. Robofest requires many experienced professional experts. The following Table 1 shows the total number of all officially registered people including teachers, mentors, students, coaches, judges, sponsors, and site volunteers for the 2006 Season, Robofest 2006 had its largest number of participants ever, reaching 1, 875 for registered individuals.

Location/Event	Teams	Students	Coaches	Sponsors	Volunteers	Site Volun.	SubTotal
Detroit, Herlong, MI	9	41	5	12	15	22	95
Monroe, WA	7	20	5	2	10	7	44
Official Withdrawal	1	2	2	0	1	0	5
Woodland, CA	8	43	7	3	14	13	80
Ansan, Korea	72	186	60	60	72	20	398
Flint, MI	18	72	14	17	22	15	140
San Jose, CA	1	4	1	1	1	1	8
Detroit, AAT, MI	12	56	9	14	21	32	132
Houston, TX	10	39	8	12	16	26	101
Video Submission	9	33	8	7	9	0	57
Saint Louis, MO	3	17	2	5	7	7	38
Rockledge, FL	4	16	4	4	5	6	35
Canton, MI	17	69	16	11	34	30	160
Northville, MI	13	36	9	3	25	18	91
Milk River, AB, CANADA	6	16	4	2	6	7	35
Ann Arbor, MI	23	102	15	21	28	21	187
VEX, Cranbrook, MI	3	12	3	2	3	11	31
Clinton Twp, MI	14	62	8	25	18	16	129
Warm-up, LTU, MI						49	49
World Champion, LTU						60	60
	<b>230</b>	<b>826</b>	180	201	307	361	<b>1875</b>

**Table 1.** Total Number of Registered Participants for Each Robofest 2006 Competition Location

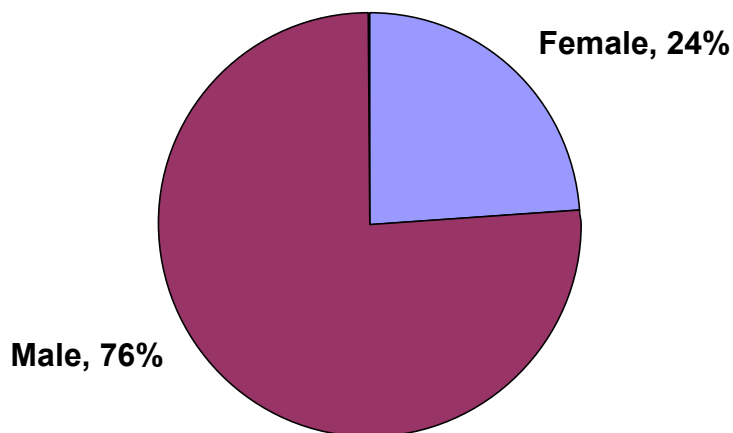
As shown in figure 2 below, 76% of Robofest Teams participated in the Games Competition, which was the Toxic Waste Challenge game; 22% of Robofest Teams participated in the Exhibition Competition. The Exhibition Competition had the largest number of participants ever. 2006 was the first season that we had both a Junior and Senior Exhibition Division. This was a good addition to Robofest and we envision Exhibition team registrations will continue to grow.

Robofest offered three new Pilot Categories in the 2006 event as well as a VEX Pentathlon Competition. The Pilot categories were Digital Animation, Digital Video Editing and Production, and Team Web Site Design. (These Pilot teams are not captured in the data below.) We had a hand full of few teams participate in video editing and team webpage design pilot competitions. Although teams appeared to be interested in the digital animation pilot category, no contest materials were submitted.



**Figure 2** Percentages of Teams by Age Division and Competition Category.

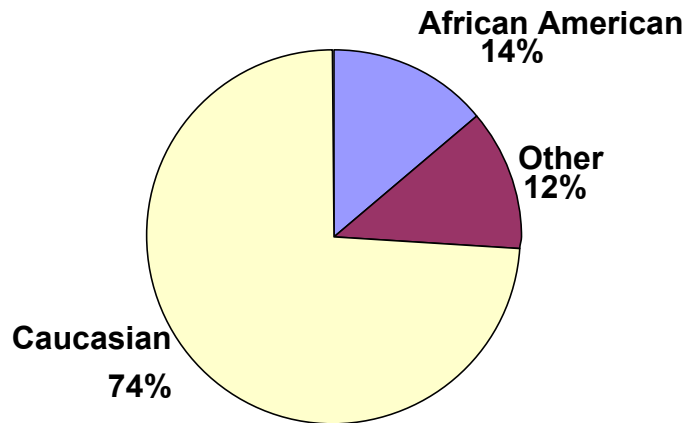
Figure 3 shows gender ratios of Robofest 2006 students. Robofest 2006 had a 1% increase in the number of female participants reaching a new high of 24% female participants up from 23% in 2005. (These numbers do not include the students participating at the Korean site.)



**Figure 3** Gender Ratios of Robofest 2006 Students

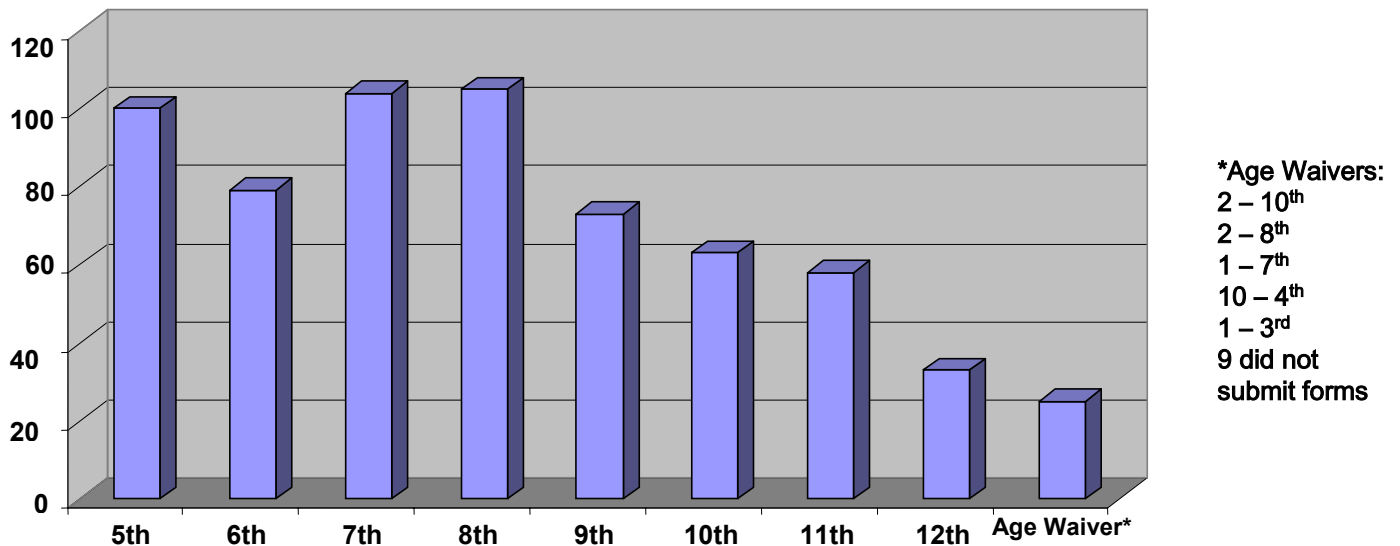
Robofest continues to focus on an ethnically diverse and culturally diverse student participant base. One quarter of all Robofest student participants are of ethnic diversity. Specifically, 14% of Robofest 2006 students

were African American, 4% Indian, 3% Arab American, 3% Asian, and 2% Hispanic. Robofest is working hard to encourage students from different ethnicities and from under served communities to participate in Robofest. During 2005, Robofest launched an outreach program to encourage Detroit at-risk student participation. This program continued in 2006 reaching two Detroit Schools, helping Robofest to reach additional diverse student populations. Additional schools were interested, but there was not funding to support the Academy at their school. Robofest would like to continue and expand the Robofest Academy outreach for 2007, but it requires manpower and funding. Figure 4 shows ethnicity data, this data excludes the 186 Korean students.



**Figure 4** Robofest 2006 Student Participant Ethnicity Data

Although Robofest is intended for students grades 5-12, 4% of our students were in grade 4, elementary school; 16% of 2006 student participants were in 5<sup>th</sup> grade; 45% were in Middle School (6<sup>th</sup>-8<sup>th</sup>); and 35% of the were in High School (9<sup>th</sup>-12<sup>th</sup>). (This figure does not include the 186 Korean students.) Age Waiver requests were new to the 2006 Season, requiring Coaches to complete an age waiver request and submit to Robofest administration for approval. There were 25 age waiver requests, 22 of the age waiver requests were to play-up an age division, while 2 requests were to play down an age division. See Figure 5 below.



**Figure 5** Number of Students for Each Grade Participated

Robofest remains very focused on student participants learning computer programming. 57% of 2006 Teams (131 out of 230) were using LEGO Mindstorms kits. Other kits Robofest Teams used included: IntelliBrain-Bot, Basic Stamps, Handy Board, VEX, I-ROBO, and others. The programming languages used in Robofest 2006

are graphed in Figure 6. Student teams continue to use advanced and varied forms of programming languages. This is a unique feature of Robofest, allowing students to use any programming language. Robofest provides opportunities to learn professional programming languages, and helps to prepare our students for future career paths. Many of this year's game teams were using custom made sensors for short range object detection. Robofest students continue to show high technical skills and advancements in their abilities. Figure 6 below.

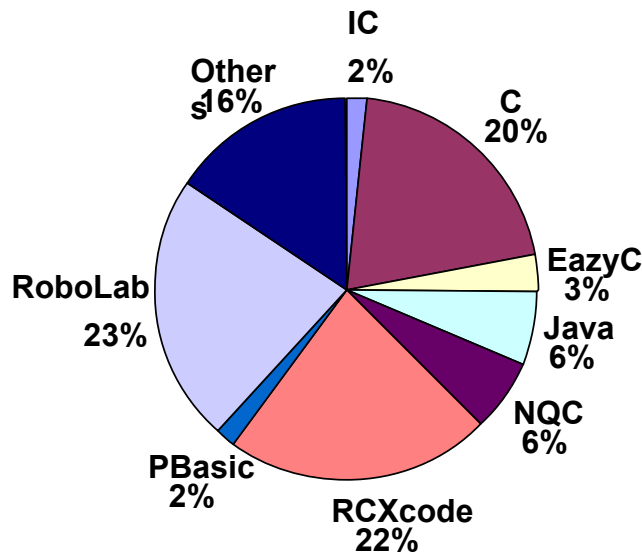


Figure 6 Programming Languages

### Robofest 2006 Achievements

Answer a question was the new feature introduced at Robofest this year. According to our anonymous web survey after the World Championship, Answer a Question was rated Excellent with 38% of respondents, 27% satisfactory, 27% somewhat satisfactory, and 8% unsatisfactory. This data is shown below in figure 7. For 2007, we will refine the question process and only ask questions related to robotics.

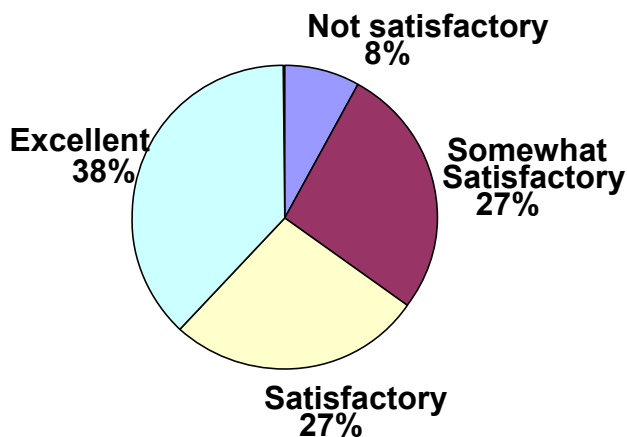
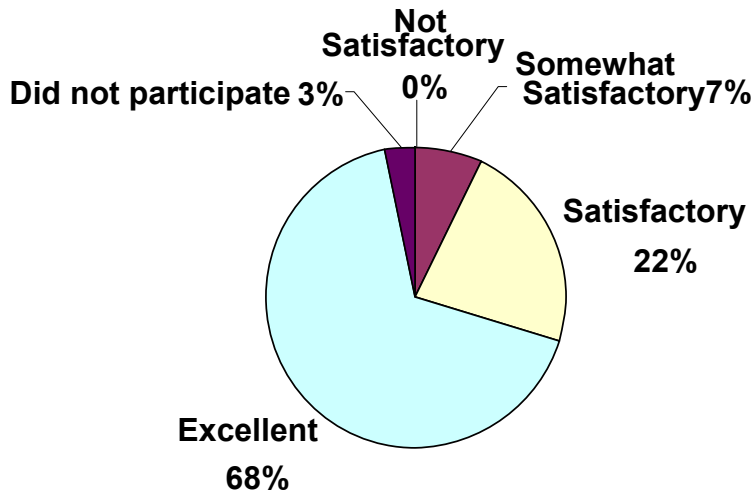


Figure 7 Answer a question survey result



**Figure 8** Overall Robofest Satisfaction

Overall satisfaction of Robofest was at an all time high this past year, with 68% of respondents said Robofest was excellent, 22% Satisfactory, 7% Somewhat Satisfactory, and the balance of 3% did not participate in Robofest this past year. This data is shown above in Figure 8 Overall Robofest Satisfaction.

Robofest had teams participating from four countries: USA, Canada, South Korea, and Mexico. A team from Mexico, who qualified from the Alberta, Canada regional competition, sent a DVD for the Senior Exhibition Competition in the World Championship. The team however, was unable to come to the USA due to the time to process US Visas. Robofest reached an all time high for number of teams who participated from outside the state of Michigan, 31% of teams (20 out of 65) were from outside of Michigan.

In general, secret unknown missions were well established during the competitions. We plan to continue this unique aspect of unknown missions and proctoring for the future Robofest game competitions to maximize students' learning through Robofest.

For the second time, personalized individual trophies were given to each student participant at the World Robofest Championships. This was possible due to our web-based team registration system that included individual student team player names. We thank all the coaches who entered their student names correctly and uploaded team/robot photos. As far as we know, Robofest is the only competition who recognizes each student's efforts by providing a trophy with student name engraved on a permanent metal plate.

Robofest was blessed this year to have 15 corporate and 7 individual sponsors. We were able to provide various prizes to the winners of the World Robofest Championship.

We were very pleased to recognized 5 plus year coaches during the World Robofest, they were:

- 7 year Linda Pence, 2000-2007
- 7 year Jay Sinclair, 2000-2007
- 6 year Betsy Lamb – 2001-2006
- 6 year Patricia A. Zimnie 2001-2006
- 5 year Sally Mancini, 2002-2006

Robofest also recognized Elmer Santos, GM, with a special plaque of appreciation for his dedicated volunteer work with the Cranbrook robotics team and for his work in helping to develop the VEX Pentathlon.

Although this year's game "Toxic Waste Cleanup Challenge" was very difficult, 9 teams at regional qualifier sites and 8 teams at the World Championships were able to achieve perfect performance scores at least one time.

As mentioned earlier, this year for the first time, we split exhibitions in to two divisions (Junior and Senior). There were many creative robot exhibition teams and we have succeeded in promoting and growing this very unique aspect of our contest.

Math and computer science related problems were given to Senior Division Teams for the unknown missions during the warmup and World Championship. According to the survey, over 75% of people said it was satisfactory and necessary.

Source codes of the 1<sup>st</sup> winners are available now to Robofest participants as well as Robofest mailing list members. We thank team 70-1 Kenwood Academy and 176-1 DeCoDerS for granting their codes to be made public.

## **Areas of Improvement for the Robofest 2007 Competition:**

We have identified the following facets of Robofest for enhancement and improvement in 2007.

### Web Systems

- Online web registration system was not stable when there were a lot of traffic. The web server was down several times.
- The maintenance and operation of the volunteer system was not performed well.
- There are inefficiencies caused by the team registration system, mailing list system, and volunteer system not being integrated.
- The connection between our registration system and PayPal was not reliable. As a result, our database was not updated accordingly even if the fee was paid. We had to manually check for maintaining the consistencies.
- The website must be more user friendly. Many files and information about the Robofest competition are still scattered on the web site. We must enhance our website design by improving our navigation mechanism of the website.
- It was difficult for new teams to find all the needed information. We will work on a 2007 coach/team manual and publish it early.
- There were some judging errors that occurred mainly because game competition rules were too complex or unclear. We will work hard to simplify and clarify all competition rules for all participants in 2007.
- There were some human errors/mistakes in the on-site use of MS Excel for scoring teams.
- We will add Head Judges as separate positions with detailed job descriptions in the volunteer management system.
- Unknown mission should be sent to each site host a few days earlier.
- Questions for "Answer a question" must be refined.

### Budget

- Robofest Budget results for the 2006 season were as follows: \$41,598 in revenue, \$44,779 in expense which resulted in an overall loss of \$3,181 for 2006.
- Shipping expenses incurred for 2006 were extensive. To reduce shipping costs for 2007, Robofest has asked hosts to keep their playing field materials for next year's contests.
- Some Robofest teams did not pay registration fees, or were no shows at qualifying sites. We plan to enhance the registration process for 2007 so coaches must pay the registration fee prior to entering student names.

### Event Organization

- During the World Robofest, we gave out too many winning trophies. Small individual trophies should be given out before the closing ceremonies and captured in a group photo. We know we need to improve the procedures of the Awarding ceremony.
- Robofest must strive to achieve its own goals: fair competition, fun, motivating, and affordable for every student.
- The time length of the larger qualifying sites was also an issue. We must work harder to fine tune the contest schedule to ensure finishing on time. We realize we need to simplify competition procedures.
- The complexity, size, logistics, and the cost of hosting outside Michigan teams was apparent for 2006 again. No public transportation in this Metro Detroit area brought us into panic again.

### Schedule

- We still need to reconsider the calendar dates of Robofest and World Robofest due to the overlap with other robotics events (FIRST, FLL World)
- We may need to consider World Robofest as two day event in summer

### Communications

- Although there were Robofest articles in several publications, Robofest was not well publicized in major media outlets. This is a shame, as students were doing very advanced competitions and their achievements should be well publicized. We hope to improve media coverage for 2007.
- For better communications and cooperation between teams and coaches we are considering to create Robofest blogs and forum sites.

### **New Things Planned in 2007**

- New Lego NXT is allowed as well as LEGO Mindstorms. However, we are considering different ways of recognizing award winners based on the robot kit.
- VEX Pentathlon will be continued.
- World Robot Sumo Championship may be held during the World Robofest.
- There will be additional more advanced divisions such as vision robot competitions.
- We are considering "Entrepreneurship" as an item to score exhibitions.
- New Services: Due to so many requests, we are pleased to announce new services:
  - Teams may re-order awards (Certificates, medals, trophies) with minimal fees.
  - We will also provide fee-based personalized medals and trophies.

I deeply thank everyone who has sponsored Robofest, volunteered for Robofest, and participated in Robofest 2006. Especially, I thank Lori Birman, Robofest Coordinator.

Respectfully,

CJ Chung  
June 6, 2006