

## **2006-947: THE DO'S AND DON'TS OF STUDENT PROJECT COLLABORATION BETWEEN COLLEGES: A HINDSIGHT VIEW FROM TWO COMMUNITY COLLEGES**

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# **The Do's and Don'ts of Student Project Collaboration Between Colleges: A Hindsight View from Two Community Colleges**

## **Abstract**

The human powered submarine project began for both schools in October of 2004, with the race deadline of June 26, 2005. Seven Everett Community College students and four Edmonds Community College students decided to take part in the challenge of building a human powered submarine. Together, both groups of students needed to obtain SCUBA training, create and install the safety systems, integrate all of the components, test, and repair the submarine. The team completed a functioning wet submarine in 9 months and competed in the International Submarine Races (ISR). This paper outlines the teaming successes and pitfalls of the project.

The International Submarine Races (ISR) involves human powered submarines that are designed and built by various students, including large universities, community colleges, private companies, and individuals. It provides an opportunity for students to take what they have learned in the classroom and apply it to a real-world situation such as the design and manufacture of a product as well as how to work in a team.

As the two schools began to collaborate, many unexpected triumphs and frustrations began to come to the surface. Items such as communication, timelines and competing schedules, workload, and distance proved to be the most challenging items, while the ISR competition, organization, teamwork, hands-on learning, and overall experience gave the team reasons to celebrate the project.

The joint effort between Edmonds and Everett Community Colleges provided both schools with valuable lessons about how to collaborate. Open communication is the most important aspect in any teaming situation and it is important for both sides to commit to ensuring it exists.

## **Introduction**

The submarine project undertaken by Edmonds and Everett Community Colleges was full of unanticipated challenges and victories. The project originated from an Everett Community College student's interest in participating in the International Submarine Races (ISR) held every odd year in Bethesda, MD, at the Carderock Naval Warfare Center's David Taylor Model Basin. This basin is approximately 3200 feet long and 22 feet deep. The 2005 competition was the ISR's 8<sup>th</sup>. The competition involves human powered submarines that are designed and built by various students, including large universities, community colleges, private companies, and individuals. It provides an opportunity for students to take what they have learned in the classroom and apply it to a real-world situation<sup>1</sup>.

When the interested Everett Community College student approached his pre-engineering advisor about the competition, the advisor suggested involving the Edmonds Community College Materials Science Technology students to build the composite hull since the Edmonds program is focused in that area. This arrangement hoped to balance out the specialties from each school:

Everett Community College<sup>2</sup> with traditional pre-engineering courses focused on theory and traditional materials, and Edmonds Community College<sup>3</sup> focused on applied learning and composites<sup>4</sup>. With the school's respective specialties, it seemed natural that Everett students should create the drive and propulsion systems while Edmonds students create the hull.

As the two schools began to collaborate, many unexpected triumphs and frustrations began to come to the surface. Items such as communication, timelines, workload, distance, and competing schedules proved to be the most challenging items, while the competition, organizational, teamwork, hands-on learning, and overall experience gave the team reasons to celebrate the project.



Edmonds & Everett Community College Submarine Team at the 8<sup>th</sup> International Submarine Races<sup>5</sup>

## Challenges

### Communication

Communication was the underlying factor to all of the challenges encountered during this joint effort. The students from each school were strangers to the other program's when this project started and neither side put forth the necessary effort to make the team a cohesive group. Communication occurred most often by email, which is not personal enough to effectively build a team. The phone calls that did take place were from the student leads of each school to each other and were often short and to the point, with no personal interactions. Meetings between the two groups were seldom and over irregular intervals.

The advisors tried to help by organizing group meetings every other week at alternating locations. This did not seem to change the team dynamics because many of the students did not show up for the meetings.

### **Timelines & Competing Schedules**

The project began for both schools in October of 2004, with the race deadline of June 26, 2005. When the project was initiated, the Edmonds curriculum allowed for the students participating to work on the project for credit toward their degree, while the effort at Everett came as an extracurricular club effort. This difference proved to produce a large disconnect between the students. The Edmonds students had in-class time to work on the submarine, which should have made their timeline easy to work with. The Everett students did not have the luxury of working during class time, so they needed to find times outside of their regular classes to meet, design, and create.

The two schools also created separate timelines to finish their portion of the project. Unfortunately, the two timelines were never compared and synchronized, so students from the hull team (Edmonds) were waiting on items from the propulsion team (Everett) and vice versa.

The Everett and Edmonds students did not have the same academic schedule, either. Edmonds spring break was two weeks, while Everett's was one. This difference in schedule meant that the Everett students would be taking their final exams sooner than the Edmonds students, which happened to be during the final few days of the build. This unfortunate timing only increased the stress and frustration from both sides. The Edmonds' students felt abandoned at the end of the build and the Everett students felt misunderstood and unappreciated.

### **Work Load**

The Edmonds students were expected to work extremely hard and put forth much more effort than the Everett students because they were getting credit for their work. However, in the end, the students from Everett matched the Edmonds student's working efforts. This also seemed to foster some resentment from the students from both sides. Neither saw or appreciated the amount of effort put forth from the other school. The Everett students resented the Edmonds students because they had put in as much time and effort but received no credit. The Edmonds students resented the Everett students because the Edmonds students felt the Everett students did much less for the project.

### **Distance**

Although Everett and Edmonds Community Colleges are only 17 miles apart, distance was a large factor. Not having both teams under one roof proved to be difficult. For the students, finding a mutual time to meet was hard enough, in addition to transportation issues such as driving time and availability. This distance increased the difficulty in design, manufacture, and communication between the students.

### **Victories**

## **ISR Competition**

The ISR competition was an extremely rewarding adventure for the students. At the race the team became more cohesive due to their close quarters and availability. The students were able to meet navy personnel, administrators, and other racers. They were able to see the innovative nature of their fellow submarine teams and discuss some common issues with them. The environment at the races was very collaborative and not competitive. All the teams came together and supported one another in their quest to race their machines.

## **Organization, Teamwork, and Hands-on Learning**

Other positive things to come out of this competition are the organization, teamwork, and hands-on learning skills that the students were exposed to. Even though the teams from the two community colleges didn't function as a cohesive team, the separate work groups did perform well. The students were also able to learn from this experience and learn to do better in a team environment for the next time. They had to learn organizational and project management skills in order to make all of the components and create all of the reports necessary for the competition. The students also learned how to take theoretical knowledge and apply it to a real-world environment.

## **Overall Experiences**

Overall, the human powered submarine project was a great learning experience for the students. In today's global environment teams are expected to work well together while being miles apart. In industry, suppliers and manufacturers have competing schedules and need to juggle their projects in order to complete them. When a student graduates from an academic program, employers look for them to have these skills. This project walked the students through a real-life example of how difficult it is to have functioning teams that are split by distance, priority, and schedule. By experiencing this before they start working in industry, the submarine team students are able to have the advantage of knowing what needs to be done to produce an effective team.

## **Lessons Learned and Suggestions**

In the end, the team was able to complete a functioning submarine, compete at the ISR races, and have a successful experience. Unfortunately, however, the team did not perform as a single unit.

Though this project was challenging, many lessons were learned.

As faculty/advisors:

DO

- Get together with your counterpart from the other school early and often and share the inter-workings of your groups

- Lay out student expectations early and often. Make sure that if the students are receiving credit, they understand the requirements that accompany that
- Make weekly meetings between the schools mandatory for students receiving credit for the project
- Have team building events in the beginning to create a sense of cohesion within the group
- Encourage face-to-face visits between students and discourage email-only communication
- Make sure the entire team knows how much effort has gone into even the smallest of steps. This will ensure that everyone working on the project is appreciated for their efforts
- Encourage students to create a timeline for both schools early in the process and ensure that they are both realistic and that they coincide
- Remember that the entire experience is a great chance to learn real manufacturing, design, and project management skills for all involved
- Use the information and experiences described here for other collaborative projects

#### DON'T

- Allow for one school's students to believe they have carried the project – this harbors animosity
- Divide the workload inappropriately. If some students are receiving credit and others are not, make sure those getting credit are expected to do more
- Allow for the storming phase of the team formation<sup>6</sup> to cripple the team and render them unable to function – make sure to keep the storming in check
- Ignore subtle comments about the other students. Take every comment seriously Failure to do this could increase the frequency, severity, and number of these comments until the students are unable to function with the other team members
- Lose sight of the positive; every project has challenges and triumphs. Make sure to learn from the challenges and celebrate the triumphs

#### Conclusions

The joint effort between Edmonds and Everett Community Colleges provided both schools with valuable lessons about how to collaborate. Open communication is the most important aspect in any teaming situation and it is important for both sides to commit to ensuring it exists. Timelines and meetings need to be coordinated and scheduled as a mandatory part of creating the project, not as an afterthought. Advisors need to keep the project in perspective, remembering that all things that happen, both good and bad, can be learned from. They need to remember to have the team celebrate the good things and not just dwell on the negative. This will help the team grow together.

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