

Computer Science Majors For Minority Female

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ABSTRACT – *The minority status of women in computer science programs is well known, but some regional institutions suffer statistics that are even worse than the national averages. At Shippensburg University, only 7% of computer science undergraduate majors are female. Recently, they have banded together to form a Women in Computer Science (WiCS) organization with a unique mission. They started by researching why they are such a small minority. Our students feel a strong need to change the misperceptions that deter girls and are addressing them with a new video podcast that is targeted at girls in secondary school and designed to connect computer science topics to current issues. We are building a website around these podcasts in the hopes of creating an on-line community connecting our students to girls in secondary schools. This project has done an excellent job of creating a community for our female students clearly helping retain the few women we have. We are hoping that it will improve our recruitment of women and encourage girls to pursue computer science even if they enroll elsewhere.*

Index Terms – *Podcasts, Women, Computer Science.*

I. INTRODUCTION

At Shippensburg University, less than 7% of the computer science majors are female. This has two causes. First, we are a regional institution in a relatively rural section of Pennsylvania where many girls are not encouraged to pursue science and math. This means that we do not naturally attract many female students. Second, for reasons we do not yet fully understand, we have a very low retention rate among our female students. For example, in the fall 2006 class, we lost half of the female students. Of the four freshmen women who enrolled in the fall, two changed majors in the first semester and another will be changing majors this fall, so only one woman is left in that class.

While these numbers are worse than the national averages, the challenges we face are not unique. Women continue to be a minority across the U.S.[1][2] and Europe[3]. Recruitment and retention of women to computer science has been an ongoing issue. Many universities have created organizations for the female computer science students. Some have been student chapters of ACM-W and many include mentoring programs like Big Sister/Little Sister at Carnegie Mellon[4] and the WISE (Women in Science and Engineering)[5].

CREATION OF SHIP'S WICS

Three years ago, the female students in our undergraduate program began to band together. Initially, our department's efforts to support the female students were relatively unstructured; we held pizza nights and tried to set up a mentoring program. However, these efforts were not fruitful. We had a very difficult time getting them to participate, and with so few of them, even a little lack of enthusiasm was fatal.

In fall of 2005, we had 8.5% of our 187 majors were female and only 4 (25%) of the women actively participated in our WiCS group. By fall of 2006, only 7.6% of our 131 majors were female, but six (50%) of those women were regular participants in the WiCS activities.

The students decided that our Women in Computer Science (WiCS) organization needed a purpose and they began researching why they were in such a small minority. Their interest in this question underscores the fact that they are aware of and concerned about their minority status. They found, among other resources, the TechSavvy report from AAUW[6]. The research behind that report was based on interviews with teenage girls and underscored the fact that girls believe they are capable of pursuing technical careers, but that they are not interested in those careers.

PODCAST GOALS

While the TechSavvy report contained many interesting observations, our WiCS team picked up on two misperceptions that the girls in the study reported. First, the girls were looking for careers where they could make a difference, but they see computer science as games and the Internet. When they expressed an interest in

computers, it was in the use of computers to solve a problem, not in the development of the technology. Second, their image of a computer scientist is a white male who is lacking social skills and obsessive about technology. In fact, they perceive computer scientists as living an almost monastic existence that they do not find appealing.

Our WiCS team decided to address these misperceptions by producing a regular video podcast. The topics of the podcasts are computer science topics, but they are grounded in the context of solving a problem. For example, one of the early podcasts was on run-time analysis of searching and sorting algorithms in the context of finding a user in MySpace. In addition, the WiCS team is trying to show the creativity and problem solving strategies that computer scientists use. The team hopes that these topics will help show girls how interesting and relevant computer science is.

The second misperception is being addressed because the speakers in the podcasts are female computer science students. We are showcasing them as role models – capable and outgoing women who are truly engaged in computer science

Our department's goal for supporting these podcasts is primarily retaining the female students we have. In support of that goal, we have advertised the podcasts so the WiCS team members see that their efforts are recognized. In addition, we have asked alumni and local industrial partners to help the team develop the scripts for the podcasts and to promote the podcasts. As a result, the podcasts have given the team members opportunities to connect with people working in computer science in industry. Not surprisingly, this had made their coursework more relevant and increased the extent to which they are engaged in their classes.

RETENTION RESULTS

At this point, the strongest result of these podcasts has been the creation of a much stronger on-campus community of women. When asked about the results the podcasts have produced, one student said, "I think the most glaring ways they are helping is that they are giving the women involved a great way to build community with each other, the professors, alumni, and other students."

While our WiCS team is still small, the impact of that community has been surprising. As one student put it, "We have created an atmosphere of information exchange and encouragement for each other and, as a result, strengthened our own desires to pursue a career in computer science." In fact, without the podcasts, it is likely that we would have lost two of the six students who are participating this year. We attribute this feeling of community to a number of things:

- the women feel a common purpose and enjoy working on the project together,
- the women spend an average of three to four hours a week working on the podcasts and they have begun to specialize on different aspects of production as they learn more about each other,
- our university has done an excellent job of recognizing the team's work and the importance retaining them, and
- our team has been encouraged to think about other ways they can help us with recruitment and retention and they feel that our faculty is listening to them.

The communication among the WiCS team and its faculty advisors has produced some interesting observations. For example, three of the six team members have commented, independently, that she thinks the male students have better technical skills than she has. These students are generally in the top 10% of our classes and are very technically competent, but they continue to think that they are under-performing the boys. They begin to see how capable they really are only after specific examples of the boy's skills are pointed out to them. As our WiCS team grows and matures, they will help each other overcome these types of misperceptions.

ONLINE COMMUNITY BUILDING EFFORTS

While the podcasts are the primary focus of our WiCS team, the team members wanted to build a closer connection to their audience, so we have built a website around the podcasts[7]. It is a blog-like site that has discussion threads associated with every podcast. Users can view the podcasts without logging in, but simple logins allow anyone to participate in the discussions.

II. FUTURE WORK

At this point, our WiCS team and their podcast are relatively new. We have only been producing podcasts since October of 2006. However, they have generated significant energy that we hope to build upon. Our future work is based on the impact that the WiCS community has had on our female students, so our goals involve building more strong communities of female students who are interested in computer science.

Our first goal for the future is to promote the podcasts and the online community around them. To do this, we plan on advertising the podcasts and the website to junior high and high school math and science teachers through mailings. We hope that this will make more secondary school girls aware of the podcasts.

Once we generate some interest in the secondary schools, we'd like to add to the website resources that secondary school teachers could use to create clubs in their schools. For each podcast, we could create related activities that don't require programming skills that the secondary school girls could do together to further explore the topics. Creating such organizations in the secondary schools has the potential to give girls the momentum to persist in computer science the same way our WiCS community has done for our students.

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