

# Computer Programming Instructor Saw Female Enrollment Increase by 65% and Retention of ALL Students by 45%

How Female Enrollment Increased 65% and Female Retention Went from 0% to 86% and Male Retention from 70% to 93% in Introductory Programming Courses

## SUMMARY

Associate Professor Barbara DuFrain **increased female enrollment in her Computer Programming classes by 62% and improved the retention of female and male students by 45% in less than a year.** Barbara—a pioneer herself as one of the first female programmers at NASA—has always cared deeply about increasing female enrollment and was dismayed when the few female students she had dropped out. She tried all sorts of strategies to change this picture, but nothing worked. It wasn't until she developed a robust plan during a WomenTech Educators Training and got Coaching Support for Implementation that she finally turned things around.



### DEL MAR COLLEGE

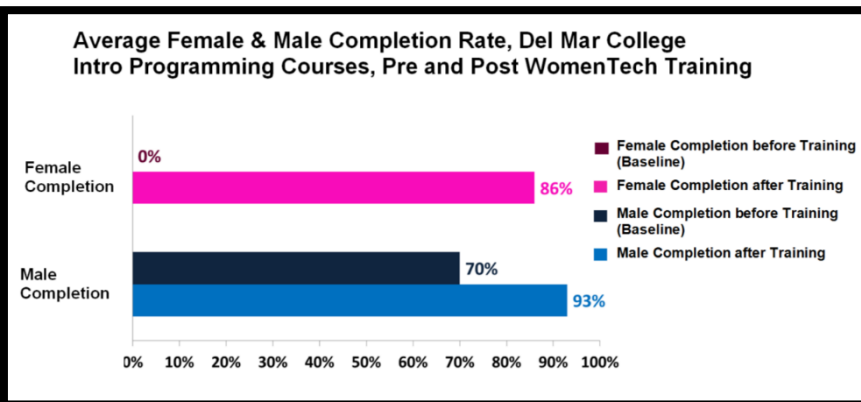
Corpus Christi, Texas (Urban Area)  
Hispanic-Serving Institution (HSI)  
Computer Programming

### RECRUITMENT RESULTS

- In less than 1 year, enrollment of female students **increased by 65%** in targeted Introductory Computer Programming courses

### RETENTION RESULTS

- In 1 semester, completion rates for female students went from **0% to 86%** and male retention went from **70% to 93%** in targeted Introductory Computer Programming courses—an **average increase of 45%**



### KEY ACTIVITIES:

- Developed a step-by-step Recruitment and Retention Plan
- Developed a Smart, Wonderful Women outreach campaign that included a Women in Programming Meet and Greet event
- Spoke personally with all female students in Computer Programming courses and used Welcoming Conversation talking points



“Before attending the WomenTech Educators Training I had a lot more success retaining women in my database class than in my introductory Programming classes—

actually, **I wasn't retaining any women in my introductory Programming classes. They were all dropping.**

**That was a big win for me, that I had an increase in retention of females in my introductory Programming courses."**

~ Barbara DuFrain, Associate Professor, Computer Science, Engineering and Advanced Technology, Del Mar College, TX

## CHALLENGES

Barbara—an associate professor in Computer Science, Engineering and Advanced Technology (CSE & AT) at Del Mar College—had tried in the past to increase the number of women in her required introductory Programming courses, but the recruitment strategies weren't effective and 100% of the few female students that came on their own dropped out. These introductory Programming courses are critical because students are required to complete them in order to get a certificate or Associate of Science degree in Computer Programming.

## ACTIONS THAT MADE THE DIFFERENCE FOR DEL MAR

- ☑ **WomenTech Educators Training: In Person**
- ☑ **Developing a Recruitment and Retention Plan**
- ☑ **Support for Implementation: Group Coaching Calls**

Barbara participated in a 2-day, in-person WomenTech Educators Training in July 2012 with other community college educators from around the country, during which schools created their custom Recruitment and Retention Plans from a template. Following the training, Barbara received Coaching Support for Implementation from Donna Milgram—Executive Director of the National Institute for Women in Trades, Technology & Science (IWITTS).

Barbara had focused on recruiting girls from middle school because that is what other gender equity workshops she had taken before recommended. **It wasn't until she attended a WomenTech Educators Training that Barbara saw the disconnect between recruiting middle school girls for her current community college Computer Programming classes when they wouldn't even be eligible to register as students for several years.**

**Barbara says it was the support of her colleagues in the Coaching Calls that kept her going after the training.** "[During the calls] I heard other people also encountered challenges," said Barbara. **"It's something that is a problem and that will really take a change in how we recruit and talk about programs...I realized it's incremental. I'm having success. It's going to take time."**

## RECRUITMENT STRATEGIES

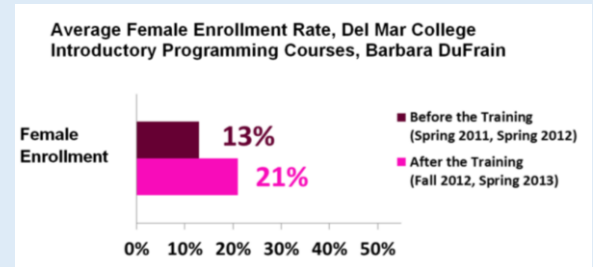
During the WomenTech Training, Barbara came to realize that her best target audience for recruitment was the many female students already enrolled at her college that did not have a clear career pathway. In her Recruitment Plan, she focused on in-reach rather than the unsuccessful outreach she had been doing to girls in middle school.



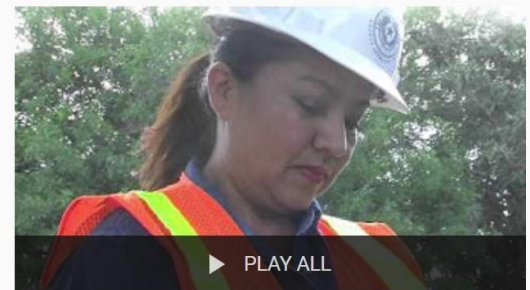
"I want to commend you [IWITTS] on the structure of the material and how when I walked out of the training, I had a plan."

If I had not had a plan, I would have gotten back and not done as much. Having a plan all laid out, when I walked in, gave me something I could work with."

~ Barbara DuFrain, Associate Professor, Computer Science, Engineering and Advanced Technology, Del Mar College, TX



**Figure 1. Increase in Female Enrollment from Baseline after WomenTech Training**



Smart, Wonderful Women Series

**Figure 2. Smart, Wonderful Women 5 Video Series on YouTube on Del Mar College Channel** ([Click to Watch](#))

### ☑ Smart, Wonderful Women Outreach Campaign

Barbara realized she would need to create an outreach campaign that would be vibrant and engaging after she participated in a group Coaching Call in which one of the other colleges had a recruitment email flop because it was dry and academic. Out of that insight, she and a colleague came up with the idea for the **Smart, Wonderful Women outreach campaign**. It featured relatable, real-life female role models.

### ☑ Smart, Wonderful Women Meet & Greet

According to Barbara, "I decided to hold a **Smart, Wonderful Women Meet and Greet for students in feeder courses**. The advanced students started telling the beginning students how great networking was or how much fun it was in GIS. Each one started selling their program to the other women. I just sat there and let them sell. [...] **I had more women in my Programming classes this spring than I've ever had.**"

To get women to the event, she distributed glossy postcards and full-page flyers featuring female role models to female students directly and to faculty to share with their students.

### ☑ Female Role Model Videos

Barbara developed [5 YouTube videos featuring female role models](#) in GIS and Computer Information Systems. She worked with the college to get them posted on the college's homepage and on its Facebook page.

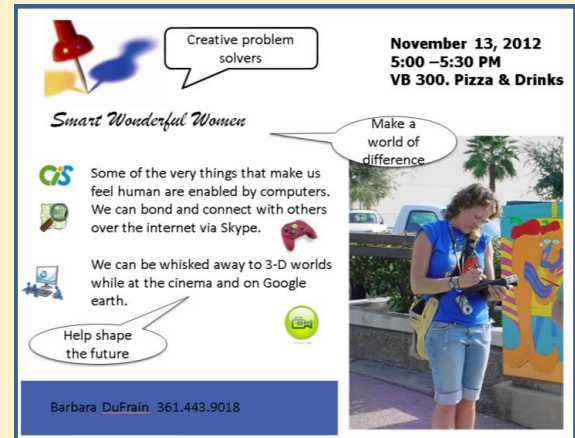
Her Recruitment Plan implementation started paying off in the spring semester when she had 5 women enroll in just one of her 4 Computer Programming courses. **Female enrollment increased from a baseline of 13% to 21% on average in her introductory Programming courses—a 62% increase.**

## COMMUNITY WOMEN & STEM CAREER EVENT

Barbara wanted to broaden the success she had had in her Computer Programming classes to other career pathways at Del Mar. She supported a half-day career event "Encouraging Women in STEM" which featured:

- A Keynote by a female Commander in the Navy who was both a chemical and civil engineer
- 8 female role models working in STEM careers in the community
- Exhibit tables by seven Del Mar College STEM programs
- 5 STEM companies from the college's career pathways

**Close to 250 students from Del Mar College and the surrounding high schools attended.**



**Figure 3. Postcard for Smart Wonderful Women Outreach Event** ([Click for Larger Image](#))



**Figure 4. Flyer for "Encouraging Women in STEM" Event** ([Click for PDF](#))



## RETENTION

- ☑ Welcoming Conversation Talking Points
- ☑ Teaming and Pairing

### CLASSROOM RETENTION STRATEGIES WORKED RIGHT AWAY

Barbara successfully recruited more female students to her Computer Programming classes only to have one drop out the first week of class without ever speaking to Barbara. After that, she got out the Retention Plan she had created in the WomenTech Training and decided she needed to start using the Welcoming Conversation Talking Points from the training before more women dropped out.

One of the women Barbara spoke with was the only female student in her daytime class and she described feeling like “a duck out of water.” Barbara expressed her confidence in the student’s ability to succeed and connected her with the 3 women in the evening class so this student had some female support. Barbara also used the teaming and pairing strategies she had learned in the WomenTech Training that made sure all students participated equally. Sure enough, that same woman persisted and became a leader on her team. Barbara retained all 4 of the remaining women in her introductory Programming courses for the first time ever.

**Completion rates for female students in the introductory Programming courses went from a baseline of 0% to 86% and male retention went from 70% at baseline to 93%. Thus, the retention of all students went from 61% to 88%—a 45% increase for all students on average.**

One of the many encouraging results of these retention strategies has been all the positive feedback from female and male students. Barbara reported that, **"Students have said that teaming has helped keep them in the class."** Several of her female students have also showed their appreciation for her efforts to help women in STEM at Del Mar College by presenting her with flowers and a plaque at a Faculty Recognition Ceremony during a Del Mar College Board of Regents meeting.



**“I send all the IWITTS emails to my faculty and key people at the college that can make a difference.**

The point is that when people say something, I have numbers. I give them IWITTS's statistics. That's really helped...having the discrete data that IWITTS talks about helps when I'm talking with engineers and people that want numbers. **Instead of saying 'my opinion' I say 'the strategy is this' and here are the numbers that explain why the strategy works."**

*~ Barbara DuFrain, Associate Professor, Computer Science, Engineering and Advanced Technology, Del Mar College, TX*



**Figure 5. Barbara DuFrain Accepts Flowers from her STEM Female Students at a Faculty Recognition Ceremony**



This material is based upon work supported by the National Science Foundation (NSF) under Grant No. 1102996. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF.