

A 62% Increase in Female Introductory Computer Programming Enrollment and a 45% Increase in Female and Male Student Retention



Host: Donna Milgram, Executive Director, Institute for Women in Trades, Technology & Science

Presenter: Barbara DuFrain, Smart Wonderful Women CSE & AT Site Coordinator, Associate Professor of Computer Science, Engineering and Advanced Technology, Del Mar College

Interview Transcript:

Donna: Hello and welcome! My name is Donna Milgram, Executive Director of the Institute for Women in Trades, Technology and Science. I am so excited to welcome you to this session of the *STEM Success for Women Telesummit* funded by the National Science Foundation. We have an interview today with a very special guest.

Our guest today is Professor Barbara DuFrain of Del Mar College in Corpus Christi, Texas. Professor DuFrain is an Associate Professor in Computer Science, Engineering and Advanced Technology at Del Mar College, as I said, in Corpus Christi, Texas. She's also a past participant in our WomenTech Educators Training. Now, Barbara was actually one of my co-presenters at the National Science Foundation's advanced technology education conference this past October, in Washington, D.C., and she shared some strategies that you will hear about in this session. She increased her female enrollment by 62% and she increased the retention of both her female and male students by 45% in less than a year in her introductory computer programming classes. You can read a detailed case study about Barbara's success on the IWITTS website, www.iwitts.org. You can also find Barbara in our WomenTech Hall of Fame. We gave her that award.

Well, welcome Barbara. Thank you so much for joining us for the STEM Success for Women Telesummit.

Barbara: Well, hello Donna. It's great to be here. One of my passions is getting women involved in this, into the career in technology areas.

Donna: I wonder if you wouldn't mind just telling our listeners about your own background, what you did before you came to Del Mar and taught Intro to Computer Programming because I understand, this is your retirement job. What did you do before that?

Barbara: Before that, I worked in the field of hydrology. I worked for the Texas Water Development Board. We did studies there and I was a programmer for them and also for the city of Austin. There, I was more of an analyst and I got to work in more than 72 departments, working throughout the city installing computer systems. So I had a varied background to come in and have a retirement from.

Donna: Excellent, excellent. Do I remember correctly that you were one of the first women programmers at NASA?

Barbara: Yes, that's right. That was one of my first jobs.

Donna: So this was a personal passion of yours — to bring more women behind you. Can you tell me, why did you come to our WomenTech Educators Training? You are a woman in the field, so isn't that naturally just attract women to your classes? Why did you need to get training?

Barbara: Actually, I did have females that would come in my class, but I couldn't keep them in my computer programming classes. They would walk in the door and the few that did walk through the door never made it past the first two weeks in my class. I was taking other classes in the GIS program in database and some of the others, and I was successful in those. I was really looking for a way to keep the women in my programming classes.

Donna: So you really came because you wanted to learn how to retain them, since I think you told me that actually you had a perfect track record — that all of them dropped from programming.

Barbara: That's absolutely correct. It was a perfect 0.

Donna: Let's talk first on the recruitment side. I believe that you told me that you didn't have that many females even actually enrolling, and that you had tried some things but they didn't work. Could you talk a little bit about why you came on the recruitment side? Let's start with recruitment and then we'll go into the retention strategies.

Barbara: I had had several grants. I also had an NSF foundation on GIS and we had worked on building a GIS program. We went to the high schools and we did monthly career days in high schools in programming and in the geographic information systems, and we were not receiving any of those people moving on into our programs. So we had worked for four or five years, yet our enrollment was still stagnant in relation to the number of women in the field.

Donna: Okay. So you had been doing this program at the high schools and one of your goals was to have more female students enrolling in GIS at Del Mar, and it wasn't working. So let's talk about your numbers in recruitment first. So you came to the WomenTech Training, and did you actually have an increase in enrollment of your female students at Del Mar?

Barbara: Yes, we did. We went up 62%. We went from 13% to 21% in our female courses in the introductory courses.

Donna: How long did that take you?

Barbara: Well, I started that fall, and it was the next spring that I had the enrollment increase.

Donna: So less than a year's time. Okay. That is terrific. I know you tried the other strategies for five years, and they didn't work. Our listeners are going to want to know what caused that success. What

was your biggest takeaway on the recruitment side from the WomenTech Educators Training that made a difference?

Barbara: I realized I had the wrong target audience during the training. Now, I totally changed the strategy. I targeted undeclared female students who were already at our college in the feeder courses where they already have an A or a B in math and science.

Donna: Okay. So they were also already enrolled at your college and had an affiliation there.

Barbara: Yes, and that had helped tremendously.

Donna: Okay. So target audience is really key. That's why in our training, I talk about how to go after the low hanging fruit because we really want schools to have changes as soon as possible. Our experience is success begets success, and then it's easier to get others on board. Can you tell our listeners about the recruitment strategies that you used? I know they are going to want to be able to have that same kind of success. What recruitment strategies enabled you to have those kinds of changes in less than a year?

Barbara: As statistics pointed out at the Boston training, for females to be able to identify with the program, they need to see women succeeding. One of the first goals when we came back was how can we showcase the women that we have here in a positive light and let them see that they can be mentors to the other students and the other students are attainable? We had women who were excellent candidates. For telling their stories, we got together and we discussed holding a Smart, Wonderful Women's meet-and-greet for students in our feeder courses.

That was marvelous. The advanced students in our programs, the females, started telling about their program. They sold their program to the other students. I didn't have to do anything, I just sat back and let the students tell each other what they were doing in the other fields, and what they could look forward to in their job. Many of them used the key word "helping" – how they helped people by being able to do this. So it was an interesting experience for me to watch the students sell our program.

Donna: Let's back up a little bit. First of all, I just want to applaud you on coming up with the name Smart, Wonderful Women for your outreach campaign. I know that you didn't do that alone, that it was a team effort, but so effective. Often when outreach is done, what do professors talk about? Or schools? They will talk about STEM. Of course, most students don't even know what STEM is or when they hear about science, technology, engineering and math, it's not that appealing to them. But Smart, Wonderful Women – that is something that I can see everybody would want to get on board with.

So you came up with that name, and that was your branding for everything that you did. What you were describing in terms of your strategy was an event that you had. Can you tell me what kind of event it was? How many hours was it? I understand that of the female students you did have, they were role models there helping to recruit other students. What kind of event was this? How many hours? What day of the week? I'm sure our listeners want to know the details.

Barbara: Well, this was a low-key event. I had been listening to some of the webinars that were held afterwards, and they talked about how women are very hesitant about going to high-powered events.

So we sent out very friendly cards. They were passed out by the professors in the class; there was a personal connection. We would say "You are invited to attend the Smart, Wonderful Women". The event was from 5-5:30 because we had a lot of older females and they are in night classes. What we were trying to do was get them in our programs in the demographics age above 28. We held it from 5-5:30 and we provided pizza and drinks. It was an informal meet-and-greet, come ask questions, meet other people in the field. The basic was the word-of-mouth from professor to student, and also from the other students inviting students. We did it with an informal postcard. We put up two or three different kinds of flyers where they showed different ethnic women at work in the field, and then the individual invitation. This was your invitation to please attend.

Donna: I think it's so important that you had instructors actually pass out this invitation that you made. By the way, for our listeners, when you go to Barbara's case study, which is on our website, if you go to the training menu and browse down to the bottom, that's one of the places you can find the case study. We actually have the actual post card invitation itself. So that was a great way for the women to be invited and that was in the feeder classes, right?

Barbara: Yes.

Donna: So they would potentially feed in. Can you give me an example of what those feeder classes were?

Barbara: Well, we have an introduction to computers and we have a computer literary class. Those were the classes that we went with immediately. We also have an introductory to GIS that addresses some of the earth science people. So those are the three target areas we went with.

Donna: So those were the feeders. You said there was a second way that you invited women aside from the instructors. What was the second way again?

Barbara: The second way is that we actually went to our Institute of Technology and asked them to give us a roll call, a list of all the women in the math program and science programs who had completed it with A's and B's. We did a mail for that. It did not have the success rate that the individual handout had.

Donna: Okay, so that's important to know. Doing a mailing of the postcards was less successful than the targeted individual invitations by the instructions in the feeder classes. How many women showed up at the 5-5:30 meet-and-greet?

Barbara: We had 22 women and while this may sound small, if you see the program where we only had 1 or 2 women show, it was a success in that right. We had 5 people, 5 women who were in our program that participated, and the rest of them, we had 15 new people that came. All of those people then eventually joined our program.

Donna: You had a very high success rate with a very targeted group, which is excellent. So I'm wondering you had a few women who were already in your program at that point and they did the meet-and-greet. Were they in other courses? I know you said you had no women stay in. So who were the women that were the role models and the mentors?

Barbara: They were the ones who were from the GIS program, the GIS that I had. Those women stepped up to the plate. They had had the programming classes but they had taken them from other professors. There were some from the networking. I didn't teach the networking class in that regard, but I did database and I had them in the database analysis and design in there and they stepped up to the plate.

Donna: Now, this is so important because so often, I will have instructors say to me, "I don't have any females!" What you did was you had role models from similar courses. They helped. So that was such a great strategy.

By the way, I so appreciate that you are willing to say, "Hey, I wasn't able to keep them in" and you turned that around. I so appreciate your willingness to share that. Also your innovation in going to other classes to get the female role models — those were the students who were helping to recruit other students and were selling for you. Now, that was your main source of recruiting: female students. Did you have any other strategies as well that you knew worked?

Barbara: As far as recruitment? The most important on the recruitment that I can see is that we posted 8 x 10 posters of our women. We came up with what we said is what we needed to tell the women's stories. We came up with four videos, originally, and these were our role model students. We used the information that we had received from our Boston workshop where they gave the dialogue you would use on interviewing people.

We posted these role models up on the wall and we made 8 x 10s so we covered a whole wall of successful women. We labeled this big title at the top called Smart, Wonderful Women. We got them to play — this was huge — the videos off of the homepage, off of the Del Mar website. It broke a difference for us being able to do that.

Donna: That is huge. What you are referring to, in the WomenTech Educators Training, is the personal encouragement conversation. We actually have created talking points and a script and you actually practice it because information from our star evaluators has shown us that the personal encouragement of teachers and counselors are among the top 3 strategies for recruiting women.

The third is role model posters. So you had both posters and those videos which, by the way, on YouTube. If you look at Barbara's case study on our website, you'll get links to those YouTube videos. That is huge that Del Mar put them on their homepage. That's wonderful. Okay. So that gives us a really good sense of your recruitment strategies.

Now I have a question for you. One of the things that is important to us, yeah, is you know not only recruitment of women but also recruitment of women of color, minority women. And so, let me ask you: were any of the women that ended up coming into your program women of color?

Barbara: Yes, there were. And you know it's interesting because in our GIS program we probably are 50/50, male/female. As they were talking and when they did the flyers, they used women of color in them and in their flyers, which really helped give diversity that way.

Donna: That is such an important point, that some of the role models from the meet-and-greet were women of color as well as the images of the female role models. And if I'm not mistaken, I think Del Mar is a Hispanic-serving institution, is that right?

Barbara: Yes, ma'am. We are 82%.

Donna: Okay, good! Good, good. Let's now move to talk about retention. I know that you told us that you were not keeping any women in your computer programming classes. Could you be more specific about your numbers on the retention side with both female and male students?

Barbara: I guess a semester after the training, my female retention went from 0 to 86% and my male retention went from 70 to 93%. I had to stop and think about that. It's been a semester or two ago. The main part is I totally changed the way I handle my classroom management. There was a rework in my classroom management in my programming classes.

Donna: So that is a huge difference, and I'm so glad to see that you not only improved retention with your female students but also with the male students as well. I'm wondering, what is the biggest takeaway for you on the retention side? What did you do differently? And then we'll go into some detail on your retention strategies.

Barbara: That's hard. But the biggest I would say is that I flipped the class. I would have to go with that. The concept of flipping the class where I put people in teams to work together and the majority of their material that was already canned or lecture-type was put out, they did that at home. Then when they came into class, we worked on class projects together in class.

Donna: Okay. So, the biggest thing is that they were working in pairs and teaming, which is one of the things that we talk about in the WomenTech Educators Training. That's really key. Can you tell me about some other retention strategies that you used as well?

Barbara: The first one that I picked up and started with immediately was ice breakers. I used that and it was a strategy presented at the educator's conference that I wasn't aware of. It was a method to give a problem and let the students solve it. I use the simple one of the egg drop and it worked fine. Giving them raw eggs to drop off the building and that helped. I have found as I've done this several semesters that the classes that I have that I actually implement in my programs and classes and those I had programming classes that I felt justified to expand because of the nature of the topic, to expand it for three weeks over a couple of weeks where they do it. Those classes have almost 100%. They are very high in retention and success of students. The others are improved but not as much as those are. Really gives students the time to bond and work together and get to know each other.

Donna: So that's really your purpose for the ice breakers is for the students to connect with each other.

Barbara: Yes.

Donna: If you are a student, if you're one of a few then it can be harder to connect on your own. Maybe when there are teams, you don't get selected. Or maybe students are just less likely to talk to you. That ice breaker really helps in having that connection.

I think that you told me that you also had some other strategies that you used the welcoming conversation and that you hadn't don't that initially, and then you had a student drop out. Can you talk a little bit about that?

Barbara: Yes. Look, we have a welcoming conversation talking point and when I follow the script exactly, and I did, and set them up that way, and try to use it with each student and went through asking them what their major was and got to know them personally. It made a huge difference. In the way the students participated in the class, I would walk by and they say hello to me, talk to me, and be more comfortable asking me questions. And so I would say that that is continuing a one-on-one dialogue with the students is very important.

Donna: Okay. Do I remember correctly that there was a woman who was about to drop out and you know she was the only woman in the class and that you talked with her and turned that around? Can you tell me a little more about that?

Barbara: Yes, I can tell after about the second day in class, she was kind of looking around almost like, even though she had been in the ice breaker and worked with the team, it was like she was still by herself in the team. So I sat down and worked with the welcoming conversation and connected with her. Then I told her I had another class. There were three or four women in that class, would she like to come over and visit that class and attend at that time?

So she attended the class and she got to know the women there and see the difference in the dynamics. We actually talked about the differences in the dynamics in the class and she said, "Well, they respect the women in this class." I said "I have a feeling they will respect you, too. Just go ahead and express your ideas." So she, after she had been in the class she came back to me and she stayed back and took the other class. She ended up being a leader on her team. One of the team members, which at the very beginning had given her so much trouble, he said "You know, she really knows her stuff and she kept me out of trouble and she kept me on track for my programming and I can thank her for my good grades." He was really descriptive in his praises.

Donna: Wow, that is such a great story where you're using the talking points and the script that you developed in the WomenTech Educators Training and the welcoming, identified that she was feeling a little shaky and then enabled you to have her connect with the other female students and talk with her about how she could do it and she ended up becoming a leader. That's wonderful.

That brings up another strategy, we are hoping that after this STEM Success for Women Telesummit that folks will go out and do recruiting for their schools and won't have any classes where there is just one woman. Your strategy of connecting her with the other female students is also one of the strategies that we talked about in the WomenTech Educators Training. Community, both with the male students but

also if there are no other female students in the class, how to connect them if there are no other female students in another class. So I think that part is so important and I just wanted to call that out.

The other thing I want to ask you is as you mentioned, the retention strategies didn't just work for the female students; they also worked for the male students as well. Why do you think that was?

Barbara: Wow, that's interesting. I think that many of the men who come in are underprepared, just like the females. I think we're really talking about a population of underprepared students coming in and we have just not identified it in the men. However, the strategies that work for the women seem to work. I mean in my classes, they have worked very well for the men.

Donna: Okay, so these strategies, a lot of them, are specifically about helping students that might be less prepared in STEM, and so that is why you think they help both the female and the male students, is that right?

Barbara: Yes.

Donna: Great, okay. Good. So I am curious, are you still recruiting more female students? Are you still retaining both male and female students?

Barbara: Yes, I am. I will say on the negative side, I had one semester when I was out the first three weeks. In retention, it is critical that you be there and establish the contact. And my, that was not listed as one of my highest success rates. It makes a difference on being there and being prepared. Also, this fall we had a meet-and-greet again. They are informal, we keep them informal, get the women into the program, get them to come in and visit with each other, and then I chat with the women as I walk around. A lot of them come up and ask what class I'm teaching. Through the grapevine now, they hear I am getting ready to C sharp and unity class if I am teaching it in the summer or the fall. So I've had five or six women that have already graduated that have gotten work and come back in. So I should have a larger enrollment in the programming. Then again in the gaming class, by the way, I have zero women in the gaming programming that I have moved over to help right now.

Donna: Okay, so you've just moved over and you are going to change that, I know. What you said I think is also important to point out, which is that the word starts to get out. You don't have to work as hard. You're still holding your meet-and-greets but they are half-hour meeting groups. It's not a huge effort and that now it sounds like you have women who are coming to the class.

I know that once you reach a critical mass overall, and generally that's over 25%, you're not going to have to work quite as hard. The women are going to hear about it and then come to you and I know that you're going to be doing, using the same strategies for gaming. In the beginning, you do need to have active recruitment efforts.

The other thing that you point out that is so key is those first few weeks really are critical. You saw the difference when you weren't able to be there in those first few weeks. You know, this is really, really important for those educators who are listening. So Barbara, in ending, what advice do you have for the educators who are listening from their own schools who really want to have the same results as you?

Barbara: Okay. My number one is please attend the IWITTS training, and the reason is over the years, I have attended several trainings and I always return to campus and never have time to implement a plan, because I don't have a plan. I have ideas when I walk in the door and then life happens and you get caught up in the first or second week of school and in meetings and all. But at the Boston training, it is well-organized; it had a cookbook approach. It said this is what we know and I had good statistics and good numbers and those are the numbers I haven't spoken to before but I can use those then when I'm talking to management about recruitment. If we do this, this is the number we can be guaranteed, approximately. If we do this, this is showing us what we're losing.

And how to implement — how this works and this is how we can implement it. They had us write our plans before we left there. So when I walked into school, I already had a plan of what I was going to do, who my target audience is going to be, what my questions were. I had like a six-month strategy plan and I had to also deliver that to my dean to justify paying for me to attend this conference. So I also had the backing of upper management to move forward on the program.

Donna: Great, so you're talking about the WomenTech Educators Training that I developed and that I and other trainers give. You walked away with a recruitment plan and a retention plan that also helped you get the support of others. Great.

Well thank you so much, Barbara, for joining us for the STEM Success for Women Telesummit and providing us with the inspiration that this can really be done. Individual professors can really make a difference in the lives of their students, and I just want to say I see you not only as a role model in your field, as one of the first women computer programmers at NASA, but also showing other instructors that they really can increase the enrollment of female students in their STEM classes in a relatively short time and that they can also improve retention of not only their female students, but their male STEM students as well. Thank you so much, Barbara.

Barbara: Well, thank you. I have certainly enjoyed the association and my students have certainly benefited from it.

Donna: Thank you so much.