

How a Hispanic-Serving Institution Increased Female Enrollment in IT & CS by 77 Women in One Year

Male Enrollment Also Increased by 258 Students

SUMMARY

After participating in a WomenTech Educators Online Bootcamp, Broward College—a Hispanic-Serving Institution (HSI) that offers both associate’s and bachelor’s degrees—increased female enrollment in the Information Technology (IT) / Computer Science (CS) Department by 77 female students, from **149 to 226 women in one year**. Male enrollment also increased from **751 to 1009 men**. The AS programs included IT, programming, web development, networking and cybersecurity.

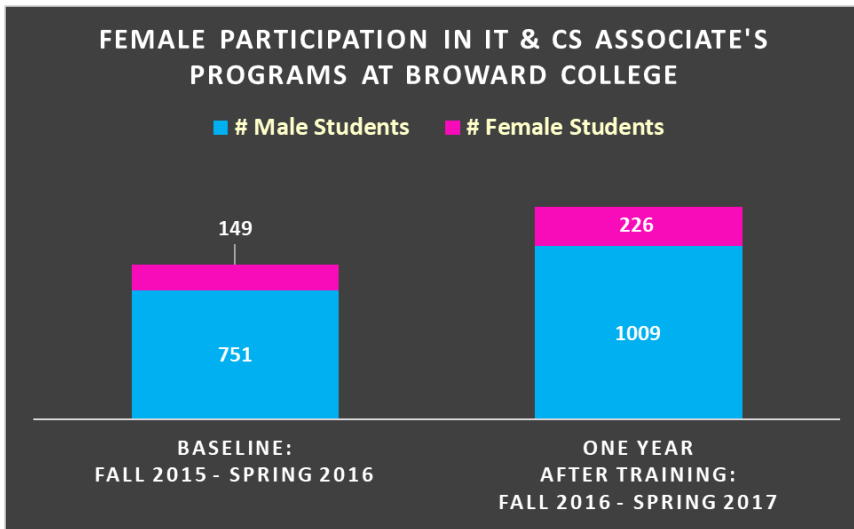


BROWARD COLLEGE

Fort Lauderdale, Florida (Urban Area)
Hispanic-Serving Institution (HSI)
Information Technology & Computer Science

RECRUITMENT & RETENTION RESULTS

- ☑ Female enrollment increased from 149 to 226 women in all IT and CS AS degree programs in only 1 year—77 women
- ☑ Male enrollment also increased from 751 to 1009—258 men
- ☑ In original targeted career pathway, Networking, female enrollment increased from 5 to 15 women in 1 semester and retention increased from 80% to 100%



“Inclusion is really important to us. Broward College has a very diverse population, but the gender gap is still huge in our industry—IT and CS. It’s very

important to us to make sure that we’re recruiting as many female students into our program as we can.

KEY ACTIVITIES:

- ☑ “Why Should You Study IT?” presentation to Computer Literacy feeder courses (~1,000 female students reached)
- ☑ Started an in Tech Club with a Women inTech chapter that helps Broward team with recruitment and retention events



The WomenTech Educators Training got us thinking intentionally about who we were going to target for outreach, how we were going to target them, and how we would follow up to make sure we had actual results linked to the different programs and events that we were holding. In a year’s time, we had increased female enrollment in our IT & CS Department from **149 to 226 female students** and male enrollment had also increased from 751 to 1009 male students. **Since then, it has grown organically and blossomed into something that our college just does naturally.”**

~ Michelle Levine, Interim District Director of Faculty Development, Broward College, FL

CHALLENGES

Broward's IT & CS Department has had **an ongoing commitment to increasing female participation**. They built a diverse team that included 4 female full-time faculty and a female Associate Dean—Annie Myers.

They have a history of holding a lot of recruitment events targeting girls in secondary school ranging from summer camps (ages 9 to 15) to Teen Tech Days where high school students participate in short interactive sessions on robotics, programming or 3D printing.

However, these were siloed long-term pipeline strategies. They did not have a Recruitment Plan with set goals and **they were not measuring** their outcomes to see if their efforts were paying off in the form of more female students. So, despite their efforts and passion for attracting female students to IT & CS, they weren't seeing results.

ACTIONS THAT MADE THE DIFFERENCE FOR BROWARD COLLEGE

- ☑ **WomenTech Educators Online Training: Bootcamp Version**
- ☑ **Bringing a TEAM together**
- ☑ **Developing a Recruitment and Retention Plan**

The turning point for Broward was when they participated in the Bootcamp version of the WomenTech Educators Online Training hosted by IWITTS in November 2015 with other colleges.

The Bootcamp required Broward to participate as a team, so that faculty and staff could collaborate, step back to take in the bigger picture and develop a deliberate plan for recruitment and retention. Their team was fortunate to have the leadership of Associate Dean Annie Myers, who encouraged team participation and facilitated their recruitment efforts and events. Michelle felt that this dedicated team time was a valuable opportunity that wouldn't have happened outside the training because faculty teaching schedules make meeting challenging.

She also felt that the WomenTech Training provided them with the tools to hold themselves accountable, **"These are our goals and are we really doing what we said we are going to do. I think we did."** Broward had a team of 11 IT and CS professors and administrators (see sidebar).

According to Donna Milgram—IWITTS's Executive Director, trainer and coach, "The critical, first step schools take in the WomenTech Training is to figure out which courses they're going to target and look at baseline numbers in our WomenTech data dashboard. After the training, they are now set up to track how they are doing each semester."

The WomenTech Bootcamp consists of two 5-hour days on recruitment and two 5-hour days on retention, during which schools create their custom recruitment and retention plans from a template.

© Institute for Women in Trades, Technology & Science

INSTITUTIONAL SUPPORT: WOMEN IN IT & CS LEADERSHIP TEAM

Participating in teams ensures that all the key stakeholders are represented and invested. Here are the job titles of the 10 Leadership Team members:

- Facilitator – Annie Myers, Associate Dean of Computer Science & Engineering
- Key Leader – Felicidad Archila, Computer Science Professor and Computer Information Technology Program Manager
- Co Leader – Michelle Levine, Interim District Director of Faculty Development and Former Computer Science Professor
- Computer Networking Professors
- Computer Literacy Professor
- Website Design and Programming Professor
- Cybersecurity Professor
- Computer Science Assistant Professor



"The Women Tech Educators Training helped us be more aware of our promotional materials and we realized that they weren't diverse or attractive to female students. **The training gave us an opportunity to collaborate as a team and do some deliberate marketing and recruitment.**

I think getting together as a team with intention—because we're all so busy—and developing a written plan that we could stick to was what made all the difference. It made us really think outside the box and get more creative about the ways we could reach different demographics and teach our courses. **I don't think we would have ever done that if it wasn't for the WomenTech Educators Training."**

~ Michelle Levine, Interim District Director of Faculty Development, Broward College, FL

Following the training, the team receives 2, hour-long Plan Feedback Calls from Donna, and coaching support for implementation. At 6 months, each school presents their outcomes to the other teams in the WomenTech Bootcamp. Everyone receives 2 downloadables as part of the training: a Women in Technology Outreach Kit and the *WomenTech Classroom eBook: A Treasure Trove of Hard-to-Find Women in STEM Resources for Educators*.

RECRUITMENT STRATEGIES

Broward initially test-piloted their new strategies in the Computer Networking career pathway. A semester later, once they had seen success in Networking (5 to 15 female students, 80% to 100% retention), they rolled their plans out to all IT and CS AS degree programs—IT, CS, programming, web development and cybersecurity.

☑ Presentation “Why Should You Study IT?” to Required Computer Literacy Classes

One leading plan strategy was a 20-minute PowerPoint presentation on “Why Should You Study IT?” that features female role models and incorporates videos such as “You Can Code.” **It emphasizes women are welcome in IT fields, that IT plays a key role in a variety of fields from fashion to health services, and that IT can really make a difference for others** (see Figure 1 to see some sample slides from presentation). Broward took a global approach with the goal of getting both female and male students excited about IT and enrolling in programs. It worked.

Associate Dean Annie Myers developed this presentation and trained all faculty and adjuncts to present it to both female and male students in the required Computer & Internet Literacy classes—approximately 1,000 female students saw it. Now according to Michelle, **“Every Computer Literacy instructor gives the presentation within their course.”**

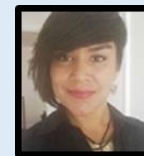
☑ InTech Club with a Women in Tech Sub Team: Students Recruit Students

Broward created an inTech club, a technology club for everybody with a **Women inTech sub team that focuses on holding female-focused events** such as the annual **Women’s Empowerment Symposium**—a day-long event that features strong female role models in IT speaking about the field and career success skills. **Three Symposium speakers have been female program graduates and female IT students recruit female students** from across the campus—the Symposium has become both a recruitment and retention event. (Men are also welcome to attend.)

- InTech hosted: 1) an Alumni Networking Event where most of the role models were **past students** (both female and male) including **some who have gone on to provide internships and jobs** to current Broward IT students; 2) a Cyber Day at the end of which students receive



Figure 1. Sample Slides from Broward’s “Why Should You Study IT?” PowerPoint Presentation



“A lot of the ‘Why Should You Study IT?’ PowerPoint presentation that our Associate Dean developed was targeting women based on what we learned

from the WomenTech Educators Training. The presentation shows that IT is not just Tech, there is IT in every field. There is IT in hospitals, in any kind of service learning, and in any kind of non-profit. IT is everywhere. That seemed to be a big win for us because a lot of times people think IT is limited to Tech, but really IT is infused into every field.

~ Felicidad Archila, Computer Science Professor and Computer Information Technology Program Manager, Broward College, FL

certificates of completion; and 3) a Red Chair day where women in IT have their pictures taken in a red chair and put up on a board— there are now hundreds of photos—as part of a nationwide campaign sponsored by the National Center for Women & Information Technology (NCWIT) to increase female participation in IT (see Figure 3).

- InTech sub teams include Diversity inTech, Robotics inTech and Computer Science inTech. The club started out with 5 members and numbers now hover at 20-25 students.
- **Michelle’s advice to other colleges:** Highlight one or two strong students that are leaders and have them go into the classrooms to promote the club. “We have in our learning management system an announcement module that we’ve now put in all our courses. It announces all of the events of the InTech Club as well as our Cybersecurity and Robotics Club.”

☑ **Broward College’s Annual 24-hour BC Hackathon**

[Broward College’s annual 24-hour Hackathon](#) brought in 100 students the first year and has had “good female participation” from the start. The first Hackathon was also attended by 4 of the female students that went on to enroll in Computer Networking (see Figure 4 for photo). Broward recently held their 4th annual Hackathon with the best attendance to date. Students who attend are a combination of Broward students, students from other colleges, members of the community and if there is room local high school students with chaperones.

According to Michelle, “I know students have joined our programs because of this Hackathon. It’s such a fun event. It’s very interactive. The students code all night and are very focused on their projects, but we also have all kinds of fun things going on like raffles for prizes.” Previous BC Hackathon winners included Waste Naught—a mobile application for sharing upcycling and recycling ideas; BC Robotics—an autopilot software for home automation; and, Wing M8—an application allowing users to network and find friends and interest groups.

RETENTION

☑ **Workshops Bridging the Gender Gap and IT Certification Bootcamp**

Broward learned in the WomenTech Bootcamp that many female students come with less IT background and thus less confidence than other students. The team **created supplemental instruction strategies to increase student confidence to address this—one of their required WomenTech Retention Plan elements.** As Felicidad explains, “We have workshops to bring students up to speed and to give them extra help to be successful in their classes. In the beginning, those workshops were faculty led and organized, now these workshops are being led by students.” According to Michelle, “All of the students who teach the workshops have previously taken that particular course, so they’re familiar with the courses and the expectations of the professor. The students work in correlation with the professors to come up with the material for the workshop.” There is still a faculty member who serves as the lead and liaison for the workshops.



Figure 2. Participants at Broward’s Women Empowerment Symposium



Figure 3. Broward SitWithMe Event



Figure 4. Michelle and Students at Broward’s First Annual Hackathon

How did Broward come up with the topics for the workshops?

Michelle explains that, “As directed by you Donna, we try to identify the challenging parts of the course that are often roadblocks for the students. For example, in Networking, subnetting is really difficult. We have subnetting sessions that coincide with the time that they’d be learning that in their class and this gives them an extra opportunity to work either one on one or in a smaller group on these targeted lessons. So that they can get over that one roadblock, and sometimes that’s the only thing holding them back from successfully completing the course. That’s just one example, but we try to find those roadblocks and target those particular areas in the course.”

Broward didn’t stop with teaching bridge skills, they created their own **Bootcamps to help students pass industry certifications** they need for their resume to get hired. “We have an IT Certification Bootcamp now at the end of the semester in May. It’s four days with 12-hours a day prep sessions for them to get certifications in the industry.” Felicidad takes the lead on Bootcamps with student assistance.

☑ **inTech Club Provides Hands-on Learning and Study Group Opportunities**

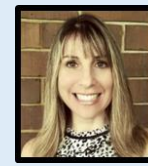
According to Felicidad, students are interested in getting as much hands-on knowledge as possible so they can apply what they have learned in their classes to real life. The club provides opportunities to do projects for nonprofits such as building a website, improving a computer network or doing a flyer in Photoshop. This engages the students, provides hands-on collaborative learning outside the classroom and helps them see they can make a difference.

☑ **Internships with Local Businesses and Agencies**

Broward provides industry internships to students at local city agencies—such as the police and hospitals—and private companies—such as Synchro and Ultimate Software, which are large IT employers in South Florida. These employers have been very happy with the interns and in some cases have even encouraged their own employees to take courses at Broward.

Faculty network and build relationships to obtain these internships for their students. Michelle, “We as a team have committed to helping our students get jobs. We’ve made that a priority. So, we spend a lot of time going to conferences, networking, building those relationships within the community. It has to be a very deliberate effort. You can’t think it’s just going to happen. You have to make phone calls, you have to give your card out at all opportunities. Any time you think something could be a possible opportunity, you have to make sure you exchange information and follow up with that. Most of the relationships we’ve built have been personally by our faculty.”

© Institute for Women in Trades, Technology & Science



“I want to share a story that I just absolutely love. Two of the strongest female role models amongst our current students just helped us with our recent Women

Empowerment Symposium. The story of how they met is so funny and such a good example of how our current female students are helping us get the word out.

Karen, who had just recently started our program, took an Uber ride and Erica was the driver. Erica told Karen she wasn’t happy with her current job and wanted to switch fields. Karen said, ‘You should come to Broward College and do the Computer Science program—they’re amazing there. I love the program.’ Ever since then, the 2 of them have been inseparable. They became leaders in our program and both successfully graduated in 2018.

This story really illustrates how our recruitment is starting to grow organically by word of mouth, and how having female role models in our program, like these two, encourages other women who may not have thought that IT was for them to go ahead and take that chance.”

~ Michelle Levine, Interim District Director of Faculty Development, Broward College, FL



Figure 5. Women Empowerment Symposium

Hiring

One of the things Broward implemented in the classroom in their Retention Plan was team-based learning. Graduates remember their team members and come back to look for new Broward students when their companies are hiring. According to Felicidad, they can't graduate students fast enough, especially in networking. "Every networking student has a job already. Students with AS degrees are starting at about \$50k and in South Florida that's a pretty high salary." According to Michelle, "some of the companies are now deliberately trying to find women to round out their team...I have definitely seen a shift in culture."

STUDENT SUCCESS STORIES

Tangy Frederick

Tangy Fredrick attended a Broward Hackathon before she was even a Broward College student. She enjoyed the Hackathon so much that she enrolled, fell in love with programming languages like Java and C++, obtained a degree in Software Development and then founded her own company Creative Dev Software. She and her team of Engineers develop Mobile Apps, web databases, software for IoT and websites. She now hires current Broward students. Her desire to help others enter the IT field, compelled her to write a book, [The Journey of a New Programmer](#), released on Amazon in 2018.

Rash Matamas

Rash Matamas was a business major at Broward when she took a programming class and fell in love with it. When Felicidad told her about the inTech Club, this really sealed the deal. She became a leader in the Club and switched her major to Computer Science. Upon graduation, she was hired by the city of Fort Lauderdale into an IT position.

Tangy Frederick
Software Engineer

CAREER QUICK LOOK
Years in Field: 2 years
City/State: Fort Lauderdale, FL
LinkedIn: [Profile](#)
Video Clip: [Watch on YouTube](#)
Ethnicity: African American
School: Broward College
Degree: AS, Software Development; BAS Software Development, 2020
Career Pathway: Software Engineering, Entrepreneur
Personal Time: Networking in nature, personal growth
Other: Founder: Creative Dev Software

How did you get interested in Software Engineering? What is your background?
I used to work in the Entertainment Industry in Los Angeles as a Film Editor. There I received some additional Communication Marketing. Many of my clients wanted me to build them a website to help grow on-line. I had always enjoyed computers and creating, but I was very nervous with them. I said there, "I have no idea how to build a website." One client replied, "Try it and if it works out, great, we'll pay you. If not, it's just a waste." So, I gave it a try and actually went pretty well. My client liked it and it helped them sell their books. I started building websites for my clients using WordPress - a template website builder.

At a certain point, I felt limited by the template and wanted to know what was behind it. I did some research and realized that there was a language behind it - PHP. If I could learn that language, I knew I could be more creative and customize my clients into web development.

Since I was self-taught, I decided to pursue a job as a Web Designer or Developer, so I could learn from others. Unfortunately, I couldn't make it past the interview stage because everyone wanted me to have a degree. That was when I decided to go back to school to get my degree and that I have ended up at Broward College, where I received my AS in Software Development.

I still had difficulty finding a job after I received my AS degree, so I decided to pursue a Bachelor's and start my own company - Creative Dev Software - which is almost 2 years old now.

Along the way I also wrote a book, *The Journey of a New Programmer: How to Code and Code with Being a Newbie* to help others with absolute beginner level skills in computer programming (you can find it on Amazon).

Simona Miulescu
Data Analyst

CAREER QUICK LOOK
Years in Field: 5 years
City/State: Miramar, FL
LinkedIn: [Profile](#)
Video Clip: [Watch on YouTube](#)
Ethnicity: Romanian
School: Broward College
Degree: AS, Computer and Information Sciences; BAS, CS & Tech Mgmt. Data Analytics Track, 2020
Career Pathway: Data Science
Personal Time: Time with daughter, engineering student
Other: Women in Tech Award, 2018

How did you get interested in Data Analytics and what has your journey been like so far? What is your background?
I was born and raised in Romania under a communist regime. At 22, I fled to the U.S. in search of freedom and a better life. I worked two jobs and took English classes at night. Eventually, I became a Human Resources Specialist, working for the same company for 12 years. At mid-career, I found that my job skills had become obsolete due to outsourcing and virtualization. Since my HR position included a great deal of Data Analytics, I applied for and was hired as a Data Analyst with Insight Packet Enterprises - another situation which is now with temporary, after a couple of years old now.

I believe a pivotal moment in my life was the fact that I went back to school and started the new job at the same time that my daughter was a senior in high school and was preparing for her future. She was and continues to be a tremendous inspiration for me. My daughter, Babi, my only child, is a Materials Engineering major at the University of Florida and hopes to last week to, having a daughter so passionate about science influenced my own career.

Why did you decide to attend Broward College?
I felt limited with my technical skills, so I decided to go back to school. I started my career at Broward that I was qualified for retraining under the Workforce Innovation and Opportunity Act (WIOA) and could receive a scholarship and Information Technology (IT) was one of the industries needing more professionals. I participated in an orientation, took a certification exam, was accepted into the program and then tested for placement. I was motivated by being able to college with and English, despite not having taken an academic test for many years.

Figure 6. Tangy Frederick and Simona Miulescu Broward Role Models
[\(Click for Program Graduate Profiles\)](#)

ABOUT IWITTS: CREATOR OF WOMENTECH EDUCATORS TRAINING SYSTEM

The Institute for Women in Trades, Technology & Science has been helping educators nationwide close the gender gap for women and girls in technology since 1994. IWITTS provides tools, resources, and professional development for educators to help them broaden female participation in STEM and CTE programs where they are underrepresented.

To discuss what type of professional development would be the best fit for your school, region, or state please

[Contact Us](#). Visit our website at: www.iwitts.org



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.