Fostering Technology Student Success through

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Abstract

The Community College of Baltimore County (CCBC) conducted a program from Fall 2010 through Spring 2014 that combined community building activities with financial support for technology students. The primary goal of the program, T4: Technology Training for Today and Tomorrow (T4 STEM), was to provide educational opportunities to low-income, academically talented CCBC students through scholarships and student support services to promote full-time enrollment and degree attainment in STEM technology disciplines. With funding provided by the National Science Foundation, 189 scholarships were awarded to a total of 68 students with 34% of the scholarships being awarded to females. The majors of the recipients were: Networking Technology/Information Systems Security (27 students), Information Technology (23 students), Engineering Technology (11 students), and Multimedia Technology (7 students). Minority groups that are historically under-represented in STEM fields constituted 58% of the awards, with 53% going to Black/African-Americans, 2% to multi-racial scholars and 3% to Hispanic/Latinos. Each T4 STEM scholar was assigned a mentor and required to attend workshops that included icebreaker activities, career presentations, and teambuilding exercises. In addition to providing the students with tools for success in school and career, participation in the workshops fostered bonding between the students and the mentors and has led to the formation of a "technology community" that extends beyond CCBC to the four-year institutions where the scholars have transferred. Program alumni frequently participated in the workshops, led discussions on the transfer process, and discussed employment opportunities. Student responses to survey questions about the effectiveness of the workshops were overwhelmingly positive. Between 92% and 100% agreed that the workshops had a positive impact on their understanding of T4 STEM careers, helped them understand and prepare for job searches and the college transfer process, were effective, and helped make them feel like they were part of the T4 STEM community.

Faculty mentors provided students with advice and guidance to ensure their academic success. Based on survey results, up to 96% of respondents agreed that having a mentor was important to their success and all agreed they had a positive relationship with their mentor. Awardees were encouraged to continue their studies at a four-year institution and were provided funding for up to two semesters after graduating or transferring, enabling them to reach greater success in their field. As of January 2015, 43 of the 68 recipients completed an associate's degree with 41 majoring in a T4 STEM technology or related field. Twenty-six of the graduates and 6 other scholars transferred to four-year institutions (all but two for a technology related major). Eight of them have completed a bachelor's degree in a STEM field and three are currently pursuing a master's degree. Ten scholars are currently taking classes at CCBC, 8 in STEM fields and two in business. Only ten of the scholarship recipients (15%) have not transferred or graduated from CCBC and are not taking classes in Spring 2015.

Introduction

The need for college graduates with technology degrees, particularly in Information Technology (IT), Networking Technology (including Information Systems Security) (NT), Engineering Technology (ET) and Multimedia Technology (MMT) continues to grow. According to The Georgetown University Center on Education and the Workforce, STEM will be one of the fastest growing occupations through 2020 with a 26% increase in employment in each category, creating 2.6 million job vacancies over the decade.[1] The largest increases are expected in computer systems design and related services which the U.S. Department of Labor projected to grow 3.9 percent annually from 2010 to 2020, compared with 2.6 percent for professional, scientific, and technical services and 1.3 percent for all industries.[2] Between 2012 and 2022, projections for growth in computer and math occupations remain strong at 18%.[3] To help meet the need for STEM technicians, The Community College of Baltimore County (CCBC) with funding from the National Science Foundation (NSF), conducted a program from Fall 2010 through Spring 2014 that combined community building activities with financial support for technology students in the IT, NT, ET and MMT fields. The primary goal of the program, T4: Technology Training for Today and Tomorrow (T4 STEM), was to provide educational opportunities to low-income, academically talented CCBC students through scholarships and student support services to promote full-time enrollment and degree attainment in STEM technology disciplines.

The T4 STEM program focused on recruiting and retaining women and minorities in technology. The need for quality programs to encourage and support pursuit of STEM fields of employment by these underrepresented groups has been well documented in both industry and education. According to the U.S. Department of Commerce, America's STEM workforce is crucial to the Country's "innovative capacity and global competitiveness," yet women hold less than 25% of STEM jobs even though they hold as many jobs as men in the U.S. economy.[4] In 2011, although women actually held the majority of jobs in social sciences and nearly half of the math jobs, they only comprised 27% of computer workers and 13% of engineers. Since 1990, the number of female computer workers has actually decreased and the number of female engineers has only risen slightly.[5] Blacks and Hispanics have been consistently underrepresented as well. Although the percent of Blacks employed in STEM increased from 2% in 1970 to 6% in 2011, STEM employment is well below the 11% representation of Blacks in the workforce. The percent of Hispanics employed in the STEM workforce is also about half of their representation in the total workforce with only 7% in STEM compared to 15% overall.[5]

A continued focus on vocational and technical careers has been identified as one of the top 10 state policy issues for 2014 by the American Association of State Colleges and Universities (AASCU). In 2013, governors and state lawmakers changed state financial aid programs and provided scholarships to students enrolling in career and technical programs to increase awareness of well-paying, available jobs requiring vocational and technical training.[6] A comparison of education requirements for new jobs created versus all job openings (which include new jobs from growth as well as openings due to replacement needs) between 2010 and 2020 demonstrates the need for continuing education. Over the decade, 24% of new jobs created are expected to require at least a bachelor's degree for entry and another 13% an associate's

degree or some college coursework. This compares to 20% and 10% respectively for all job openings.[7] The need for additional education in technology areas is even greater, however less than half of the freshmen intending to major in science and engineering fields nationally complete a bachelor's degree in these fields within five years, and underrepresented minorities drop out of these majors at a higher rate than other groups.[8] The T4 STEM program is designed to retain students in STEM technology fields, especially women and minorities, by providing them with the support they need financially, socially, academically, and professionally.

During the four years of the T4 STEM program, a total of $538,471 in scholarships was awarded to students with at least a 2.8 GPA, majoring in one of the four technology areas specified. Students received up to $5,000 per semester based on their unmet financial need and the total need of all scholarship recipients. The scholarship budget increased $15,000 each year to make funding available for new awardees while continuing to fund eligible returning scholars, including awardees who transferred to four-year institutions. While many technology students enter the workforce upon completion of their associate's degree filling industry's need for technicians, others continue on to get four-year degrees in technology or related STEM fields to become more qualified for higher level positions in their field. The T4 STEM program encouraged awardees to continue their studies by providing a scholarship for up to two semesters at a four-year institution in a T4 STEM major.

Social, academic and professional support was provided through: assignment of a mentor to each scholar; career and job search skills workshops; and the formation of a T4 STEM community which provided a social network and support system many community college students lack due to work and/or family commitments.

Methodology

Recruitment

A variety of actions were taken throughout the year to promote the T4 STEM program and ensure an ample pool of applicants. Professors within CCBC's School of Applied and Information Technology (SAIT), which houses the targeted technology programs, made students in their classes and advisees aware of the T4 STEM scholarship program throughout the semester by posting the application on their Blackboard site and distributing brochures. Several weeks prior to the application deadline, the Dean of SAIT issued a directive to all faculty within the School to notify their students about the scholarship opportunity. The grant Primary Investigator (PI) and Co-PIs on the NSF grant, who were the department chairs and coordinators of the four targeted technology programs, also encouraged faculty to promote the T4 STEM program. In addition, representatives from the four programs visited local high schools and met with students in technical programs that feed into CCBC to inform them about the T4 STEM scholarship and the opportunities available to them at CCBC. Brochures were also distributed by Financial Aid, Admissions, and Academic Advising on all three main campuses, and by administrative assistants and faculty in each of the technology areas. The application was posted on the CCBC T4 STEM website (http://www.CCBCmd.edu/t4stem/) which contained scholarship eligibility criteria, expectations of recipients, mentor log forms, application deadlines and contact information in addition to the application form. The PI on the grant was the main contact person

and responded to email and phone inquiries from prospective and returning applicants. Information about the T4 STEM program was also shared through The Society of STEM Scholars, a student led organization of which the PI was a faculty advisor, and by the current scholarship recipients.

Selection

The Steering Committee, comprised of the PI, Co-PIs and other representatives from the T4 STEM programs, a Financial Aid officer, the SAIT Case Manager/Academic Advisor, and SAIT's Director of Internships, meet after the spring and fall semesters to review applications and select scholarship awardees for the following semester. The committee reviewed student transcripts and the application essays of new applicants to verify they were pursuing a T4 STEM major and met the GPA, number of credits, and math requirements. New applicants that did not meet the program requirements due to extenuating circumstances and returning T4 STEM scholars who were close to meeting the requirements were considered for probationary awards.

Retention

Retaining more students in STEM fields is an expeditious, low-cost way to meet the growing demand for STEM professionals. Using data from the 2004/09 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) and the associated 2009 Postsecondary Education Transcript Study (PETS:09) that tracked students' attrition from STEM fields over the course of 6 years in college, the National Center for Education Statistics found that a total of 48 percent of bachelor's degree students and 69 percent of associate's degree students who entered STEM fields between 2003 and 2009 had left these fields by spring 2009.[9] To increase T4 STEM scholars likelihood of success, they were required to meet regularly with a mentor and attend workshops which included icebreaker activities, career presentations, and team building exercises. The workshops were designed to strengthen bonds between the students helping to develop a "technology community" and provide the students with tools for future success in school and career. Workshop evaluations and an attitude survey were conducted each semester to determine the impact of the workshops and the project as a whole.

Mentoring was an important aspect of the T4 STEM program. Upon selection as a scholarship recipient, each awardee was assigned a mentor from their area of study. The responsibilities of the student and faculty member were clearly communicated each semester at the first workshop. Awardees signed a Mentoring Agreement at the beginning of each semester and submitted mentoring logs at the end of the semester. T4 STEM scholars and mentors committed to meeting at least every other week for the first six weeks of the semester to make sure the student got off to a good start, and on a monthly basis thereafter. Mentors worked with the students to develop and manage an Individual Academic Learning Plan (IALP) which helped the student gauge the amount of time and coursework necessary to complete his/her studies by taking the courses in the proper sequence.

To maintain their scholarship, students were required to complete at least 12 credits with a minimum 2.8 GPA. A probation procedure was used for those who fell just short of completing the requirements giving the student one semester to regain their academic standing while

continuing to receive financial aid, albeit at a reduced level, while being tracked more closely. The reduction in a probationary student's scholarship award left more funds available for students who met all of the criteria and provided the scholar with additional incentive to improve their grades without encumbering them with the need to work extended hours to pay for school. Up to 20% of scholarship funds were allocated for probationary awards. The project also allowed for up to 20% of the scholarship funds to be awarded to T4 STEM scholars who transferred to four-year institutions to assist with completion of their bachelor's degree. To be eligible for a transfer scholarship award, a renewal scholarship student must have earned an associate's degree, or at least 45 credits at CCBC. Transfer awardees continued to work with their CCBC T4 STEM mentor via email, phone and in-person meetings.

Attitude Survey

In order to determine what influenced students to select and persist in a STEM field, an Attitude Survey Questionnaire, was administered to CCBC's T4 STEM scholars each semester.

Results and Discussion

Scholarship Applications and Awards

Response to the scholarship notifications was very good with a diverse range of students from three of the four disciplines submitting applications throughout the four years of the program. The Multimedia degree was integrated into a more general Computer Graphics and Visual Communication degree in 2013 so no new applicants entered the T4 STEM program from that major after the second year.

Over the four years of the NSF grant, the number of applications received per semester ranged from 24 to 42 and the number of awardees from 13 the first semester of the program to a high of 33 as shown in the table below. Many applicants were deemed to be ineligible due to lack of unmet need, low GPA, non-T4 STEM major, insufficient STEM credits to date, or less than 12 credits completed in the past two years. Data on the number of applicants and scholarships awarded is depicted in the following table.

T4 STEM Scholarship Applications and Awards					
Semester	Applicants	New Applicants	Ineligible	Scholarships Awarded	Scholarship Amount
Fall 2010	24	24	11	13	$441 to $5,000
Spring 2011	28	17	6	20	$692 to $4,825
Fall 2011	38	21	7	24	$1,080 to $2,950
Spring 2012	38	17	10	27	$181 to $3,350
Fall 2012	32	12	8	24	$665 to $4,000
Spring 2013	42	21	9	33	$507 to $3,047
Fall 2013	36	13	10	26	$1,884 to $4,150
Spring 2014	23	7	1	22	$981 to $5,000

The award amount varied based on the budget for the semester/year and the total unmet financial need of all scholarship recipients. Although the amount of money budgeted to be awarded increased from $100,000 the first year of the grant to $130,000 in the final year, student need exceeded funds available in all but the first and last semesters.

A total of 189 semester scholarships were awarded to 68 individual CCBC students over the four year period. As shown in the table below, the largest number of awards was for Network Technology students (38%) followed closely by Information Technology (35%). Only 17% of the awards went to Engineering Technology students and the fewest, 10%, to Multimedia Technology students. The percentage of awardees in each major was very close to the percentage of semester awards made within that major.

T4 STEM Semester Awards and Awardees by Degree Program and Gender								
	Semester Awards				T4 STEM Awardees			
Associate Degree Program	Female	Male	Total	% Total	Female	Male	Total	% Total
Network Technology	26	46	72	38%	8	19	27	40%
Information Technology	29	38	67	35%	9	14	23	34%
Engineering Technology	6	26	32	17%	1	10	11	16%
Multimedia Technology	3	15	18	10%	2	5	7	10%
Total	64	125	189	100%	20	48	68	100%
Transfer Awards	11	21	32	17%	6	14	20	29%

As can be seen in the following table, CCBC's student body enrolled in credit classes in Fall 2013 was 61% female with two-thirds of the students attending part time. In the T4 STEM fields however, female enrollment was much lower with only 24% pursuing these technical degrees. The percent of female T4 STEM scholars was 29% exceeding the college-wide enrollment in T4 STEM majors by 5% with the greatest differences in IT (12% greater) and MMT (13% greater). Also, while 63% of all T4 STEM majors attended part time, T4 STEM awardees were enrolled full time.

CCBC and T4 STEM Awardees by Degree Program, Gender and Enrollment Status							
Associate Degree Program	T4 STEM Awardees		CCBC Enrollment by Gender		Full Time	Part Time	Total
	Female	Male	Female	Male			
Network Technology	30%	70%	28%	72%	31%	69%	293
Information Technology	39%	61%	27%	73%	40%	60%	262
Engineering Technology	9%	91%	12%	88%	42%	58%	111
Multimedia Technology	29%	71%	16%	84%	41%	59%	56
Total	**29%**	**71%**	**24%**	**76%**	**37%**	**63%**	**722**
All CCBC Credit Students in Fall 2013			61%	39%	33%	67%	24,275

The following table provides a comparison of the distribution of the T4 STEM scholars by racial/ethnic group to all credit students at CCBC and to all students majoring in a T4 STEM program at CCBC in Fall 2013 as self-described at course registration. In 2010, CCBC began using new mandated classifications which vary from the NSF specified categories reported below for the T4 STEM awardees. Minority groups that have historically been under-represented in STEM fields nationally were well represented among the 68 T4 STEM awardees, 53% of whom were Black. This greatly exceeds the 39% representation of Black students in CCBC's credit student body (up from 37% when the T4 STEM program began) and the 41% enrolled in T4 STEM programs. Of the total awards made, 53% were to Black students. Asian students were also well represented in the T4 STEM program, comprising 10% of the total number of T4 STEM awardees, compared to an Asian representation of only 6% in CCBC's credit student body and 8% in T4 STEM programs. Just under 15% of the semester awards were made to Asian students.

CCBC and T4 STEM Awards and Awardees by Race and Ethnicity								
	Semester Awards			T4 STEM Awardees			T4 STEM Degree Programs	CCBC Fall 2013 Credit Programs
Racial/Ethnic Group	Female	Male	Total	Female	Male	Total	Total	Total
White	22	35	30%	7	17	35%	42%	46%
Black	31	70	53%	11	25	53%	41%	39%
Asian	12	16	15%	2	5	10%	8%	6%
Multiple Races	0	3	2%	0	1	1%	4%	3%
Other/Unknown							1%	1%
Total	65	124	189	20	48	100%	96%	95%
Hispanic/ Latino*	0	5	3%	0	3	4%	4%	4%

* The students declaring themselves Hispanic/Latino was classified as White for the T4 STEM program.

Mentoring

Since traditional CCBC students are not assigned specific academic advisors to guide them through college, the T4 STEM mentorship program is a major benefit for awardees. Between 86% and 96% of the respondents to the T4 STEM Program Attitude Assessment Questionnaire believed that having a mentor was important to their success. As the number of awardees grew, the number of professors acting as mentors for the T4 STEM scholars increased as well to allow faculty members to spend more time with their mentees and better focus on each student's situation and needs. During the first semester of the grant, only the five faculty members on the Steering Committee were assigned mentees. It was found that mentors and mentees who were primarily on different campuses had difficulty meeting in person and, in general, did not contact each other as often as others who were on the same campus. CCBC's two main campuses are 22 miles apart and are separated by a harbor. As a result of these findings and due to the larger

number of awardees, 15 additional professors became mentors over the duration of the program. New faculty members were matched with scholars from their area of study located on the same campus. Having more faculty participating in the grant increased awareness and recognition of the program, stepped up recruitment efforts on the part of the new faculty members, and provided students the opportunity to meet and interact with more faculty members from their field of study at the workshops.

Workshops

Scholarship recipients were required to attend workshops alternatingly held on the east side and west side of Baltimore on CCBC's two main campuses. With few exceptions, students only missed the workshops due to conflicts with classes at their transfer institutions, illness, or being out of town. The workshops were structured to include an icebreaker, career presentations, an interactive session on skills needed to find a job, and/or a team building exercise. During the pre-semester workshops, students also completed required paperwork including a consent form, a mentor agreement, and an online T4 STEM Program Attitude Assessment Questionnaire which was also given at the conclusion of the final workshop of the semester.

Starting the first workshop of the semester with an icebreaker-type activity required the students to interact and learn something about each other and the faculty mentors. Icebreakers included: identify the person bingo; finding a fun fact about all attendees; conversations between an outer circle of students rotating around an inner ring of students (and faculty); and building a story. Having the students subsequently work in teams with other students from their discipline also enhanced interaction as faculty and returning scholars reached out to the new awardees to make them feel more welcome. Teambuilding activities included: Myers Briggs personality types; becoming involved in the Society of STEM Scholars, a CCBC student organization; handling problems in team meetings; communicating about conflict; constructing a newspaper bridge; building a marshmallow and spaghetti tower; and solving riddles. The level of interaction between the students increased with each team building session. All prior T4 STEM scholars were invited to attend the final program workshop and participate in the last teambuilding activity, walking through a "minefield" blindfolded. Because of the trust developed between participants through the prior teambuilding activities and interactions, the exercise was successfully conducted.

To emphasize the importance of being part of a community, during one workshop, the Associate Director of the Center for Women In Technology (CWIT) at UMBC gave a presentation on the benefits of belonging to a community. Students were directed to write down the names of people who were part of their community, starting with those closest to them and expanding outward. When the students reported back to the group, each one discussed how the T4 STEM scholarship program was integral to their success and to the development of their community. For some students, every person in their community stemmed from the T4 STEM program. One student stated that if it were not for the T4 STEM program, he would have dropped out of school. Another student wrote, "Many in the T4 program are working adults and many have other obligations, so it is important to have a community who can empathize with what you are going through and that can help you prepare for the challenges ahead. Since many in the program come

from all walks of life, the T4 community has been crucial in helping to deal with different personalities and situations."

Sessions for finding employment were conducted by CCBC's Director of Internships and included: applying for a job; getting the most out of a job description when applying for a position; resume writing, interview techniques and internships; the importance of being thorough; and fielding interview questions. In addition, faculty members and guest speakers, including alumni and T4 STEM transfer students, discussed careers in the four T4 STEM technical fields, entrepreneurship, and transferring to four-year institutions.

Based on an evaluation form students completed at the end of each workshop, verbal feedback, and observation, it was clear nearly all of the scholars and the mentors enjoyed the interaction. Feedback was very positive and each aspect of the workshop, including every activity, was found to be very beneficial.

Retention and Student Success

The success rate for a community college can be defined as the percent of students who were retained (still enrolled at the community college), had graduated (obtained an associate's degree or certificate) and did not transfer, or had transferred to a four-year institution (with or without an associate's degree). Using this definition, the success rate for the 68 students who participated in the T4 STEM program is 85% with 43 community college graduates (61.8%) and 15 others actively enrolled at CCBC or a four-year institution. The success rate for students remaining in a T4 STEM major is 74% with 40 T4 STEM graduates and 10 others enrolled in a T4 STEM degree program. Including STEM majors, the success rate goes up to 79%. This compares very favorably to CCBC's 45.4% success rate after four years for students who enrolled in 2008, and to the state of Maryland's 46.5% success rate. Of the 68 T4 STEM scholars: eight have earned both an associate's and a bachelor's degree - all in T4 STEM fields, and three are now pursuing master's degrees; 35 others have earned an associate's degree, 32 in a T4 STEM major and one in a STEM major; 5 others transferred to a four-year institution and are pursuing a bachelor's degree, 2 in a T4 STEM field; 10 are at CCBC working on their associate's degree, 7 in a T4 STEM field; and 10 are not currently attending school due to poor academics and/or medical/family issues. The status of the T4 scholars at the end of January 2015 is shown in the following table. Several of the students who are not currently attending school and a number of the graduates who did not transfer to a four-year institution intend to return to college to complete their A.A.S. or B.S. degree.

Probation awards were used effectively to help struggling students regain their academic standing. Probation scholarships were awarded to 11 of the 68 students (16%) and accounted for 16 of the 189 awards made (8%). Multiple probation awards were made to two students, both of whom graduated with an A.A.S. degree, and a single probation award was made to 9 students, six of whom graduated and one is currently enrolled at CCBC in a T4 STEM program. As of January 2015, four of the graduates were enrolled in a bachelor's degree program and one a master's program. One student transferred unsuccessfully prior to completing his associate's degree but plans to return, and one dropped out due to personal issues.

Status of T4 STEM Awardees as of January 2015	
No. of T4 Scholars	Status of 68 T4 STEM scholars
8	Completed bachelor's degree in a T4 STEM major • 3 working on a master's degree part time while working in a T4 STEM career • 3 working in a T4 STEM career • 1 looking for a job • 1 unknown
18	Graduated from CCBC and attending a four-year institution pursuing a bachelor's degree • 15 in a T4 STEM degree • 3 in STEM fields (2 computer science and 1 engineering)
5	Transferred to a four-year institution pursuing a bachelor's degree without associate's degree • 2 in a T4 STEM degree • 2 in a STEM degree (1 occupational safety and 1 science) • 1 in film
17	Graduated from CCBC and did not transfer • 10 working in a T4 STEM career (4 plan to pursue a bachelor's degree) • 5 seeking employment in a T4 STEM career and planning to pursue a bachelor's degree • 2 Unknown (1 with a general studies degree)
10	Attending CCBC • 7 pursuing AAS degree or additional certification in a T4 STEM major • 1 pursuing a science degree • 2 pursuing a business degree
1	Transferred to a four-year institution without an associate's degree – was unsuccessful and plans to return to CCBC to complete A.A.S.
9	Not currently attending CCBC • 4 left in good academic standing due to family or medical issues • 5 did poorly academically 3 due to personal/family issues (2 are within a semester of graduating)

Providing awardees with an opportunity to transfer their T4 STEM scholarship along with their credits to a four-year institution enables them to reach greater success in a STEM field. With support from the T4 STEM program, eight students have gone on to complete their bachelor's degree, of whom three of are now pursuing a master's degree, and 17 others are currently at a four-year institution pursuing a bachelor's in a T4 STEM major. The distribution of transfer students by gender was nearly the same as for all awardees with 30% female and 70% male students receiving transfer awards.

The success rates of students by age, gender and race were fairly consistent with only a few exceptions. Not surprisingly, the mean and median age of the currently enrolled students and

those that transferred without a degree are lower than the overall mean age of 30 and median age of 29 years old, and the mean age of students who are no longer active (35 years) is higher than the overall mean for the program. In addition, the percentage of inactive students who are female (44.4%) is higher than the overall representation of females in the program (27.9%).

Of particular note is the success of Black students participating in the T4 STEM program. The 25 Black students who graduated or transferred without a degree comprise 51% of the 49 successful T4 STEM scholars, which is very close to the overall representation of Black students in the program (52.9%). The 86% overall success rate for Black students in the T4 STEM program is two and a half times the 34.4% rate for African American students at CCBC.

Student Success by Age, Gender and Reported Race												
Student Status	Mean Age	Median Age	Male	Female		Black		White		Asian		Total
Graduated	31	29	31	12	27.9%	21	48.8%	15	34.9%	5	11.6%	43
Transferred without degree	26	25	5	1	16.7%	4	66.7%	1	16.7%	1	16.7%	6
Enrolled at CCBC	27	25	8	2	20.0%	6	60.0%	3	30.0%	1	10.0%	10
Not active, did not transfer	35	30	5	4	44.4%	5	55.6%	4	44.4%	0	0.0%	9
Total	30	29	49	19	27.9%	36	52.9%	23	33.8%	7	10.3%	68

T4 STEM Attitude and Program Assessment Survey

The T4 STEM Attitude and Program Assessment Survey provided insight into the participating students' outlook on STEM careers and the impact of the T4 STEM program on their pursuit of a T4 STEM degree. An analysis of the survey results from each semester shows that the vast majority (up to 86%) of the scholars did not consider a T4 STEM major until college and teachers had the greatest influence on their decision to pursue a T4 STEM career. Students identified two factors that most influenced their consideration of a T4 STEM career: affinity for and academic success in STEM studies; and connections to a community of like-minded individuals. All of the students agreed that they excel in T4 STEM subjects, that T4 STEM subjects are interesting to them, that they have a positive T4 STEM role model, and that they intend to pursue a career in a T4 STEM field. With respect to their careers, all agreed that their job prospects in the T4 STEM fields are very positive. At the end of the program, 83% of the respondents responded that they intend to continue their studies at a 4-year institution while only 17% intend to pursue a career immediately after receiving their associate's degree.

Responses to questions about the effectiveness of the T4 STEM program were overwhelmingly positive. Receiving the scholarship was instrumental to between 77% and 100% of the students staying in a T4 STEM program with up to 91% strongly agreeing. Participating in the workshops also influenced nearly all of them to remain in a T4 STEM program with up to 100% strongly agreeing. More specifically, in the final year of the program, 96% agreed that the workshops had a positive impact on their understanding of T4 STEM careers and 92% agreed that the workshops helped them understand and prepare for job searches. In terms of illustrating

the importance of team-building concepts, 96% agreed that the workshops were effective, and everyone agreed (80% strongly) that the workshops helped make them feel like they were part of the T4 STEM community. Finally, 92% agreed that the workshops helped them understand the college transfer process.

In addition, nearly all of the students responding agreed that having a mentor was important to their success (most of them strongly) and all agreed that they had a positive relationship with their mentor. These findings support the T4 STEM project's conceptual design, which is built around the premise of creating a learning community through individual mentoring from T4 STEM professionals and focused cohort team-building activities. The external evaluator concluded that the T4 STEM program is very important to the participants and provides career guidance, mentoring, and appropriate supports that help facilitate students' feelings of confidence in academics.

Conclusion

The T4 STEM program has been successful in a variety of ways. Designed to do more than provide financial aid to needy students, the program has successfully created a community of STEM technology students and helped them to succeed. Results of the T4 STEM program to date demonstrate that it has been very effective in encouraging students to select Engineering Technology, Networking Technology, Information Technology or Multimedia Technology as a major; retaining students in the T4 STEM majors; and enabling awardees to graduate with an associate's and/or a bachelor's degree.

The recruitment methods utilized resulted in a qualified pool of applicants from each of the targeted T4 STEM majors. Pairing the selected scholars with a mentor had a very positive impact on the students who agreed that having a mentor was important to their success. Enlisting additional mentors enhanced the program by increasing faculty involvement in the program and providing more individualized attention for the students.

Most importantly, the ice-breaker and teambuilding exercises included in the mandatory workshops resulted in the formation of a T4 STEM community. Through the interactive activities, students developed a network of friends and faculty to whom they could go for assistance, academic collaboration, information and/or support. Being a part of the T4 STEM community has influenced the scholars to remain in a T4 STEM program and to graduate.

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