Increasing the Numbers of Science, Technology, Engineering and Math Students by Recruiting Students Into Graphic Communication System and Technological Studies

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Abstract – Graphic Communication Systems and Technological Studies (GCSTS) is increasing the numbers of Science Engineering, Mathematics and Technology (STEM) graduates by providing young women and men with quality competency-based instruction which will prepare them to enter the fields of technology education and graphic communication systems. The GCSTS faculty assists majors in developing critical competencies in communications, mathematics and sciences which prepare these students to secure positions in education, industry and government. This department is committed to providing these students with the skills needed to be successful in all areas of life.

The department is comprised primarily of African American students. There are currently 318 undergraduate students enrolled in this department. The ratio of men to women is roughly two men for every one woman. African American males comprise roughly 60% of undergraduates in this department. African American females comprise roughly 35% of students pursuing undergraduate degrees in this department.

Recent population reports revealed that the numbers of student pursuing degrees in this department have declined. In an effort to stem the tide of students turning away from this technological degree the department chair has instituted a recruiting committee. This committee is an action based group of faculty, who consistently devise and implement plans to attract interest and new students to this department. A few of the strategies this committee is involved in to help draw new students to this department include participation in outreach and recruitment efforts which are conducted both on campus and in the community.

Key words: recruiting, undergraduate, student, enrollment.

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INTRODUCTION

This paper is written in an effort to increase the number of students receiving degrees in Science, Technology, Engineering and Mathematics (STEM) related fields. One method of increasing the number of students receiving STEM related degrees is to increase the number of students pursuing these fields. This paper is intended to attract more students into the Department of Graphic Communication System and Technological Studies by making recommendations for improving the efficacy of recruitment efforts into the department. This paper describes some of the recruitment activities underway in this department, and evaluates the effectiveness of these strategies recruiting new students into the department; thereby increasing the numbers of students in STEM related careers.

There are disproportionately small numbers of women and minorities pursuing STEM related careers. Some of the factors which perpetuate this problem are inadequate preparation in advanced STEM related courses. Information gaps cause minorities to receive inadequate or incorrect information being regarding STEM fields. There is also the perpetual image that these careers are geared toward European American males [4]. Traditional socialization practices are another of the variables accounting for the continued under representation of women and minorities in STEM fields, [2].

Diversity in STEM careers is a goal worth attaining for a number of reasons. A report by Pfatteicher and Tongue [5] addressed the issue of the importance of diversity. One of the factors credited for creating a need for diversity was work-force demands. Work-force demands relate to the need for participants in a global market to interact with diverse populations. Another factor influencing the need for diversity is workplace deficiency. They stated that there will be insufficient numbers of traditional workers (European American and Asian American) workers to fill STEM related jobs [5].

A study presented to the House of Representatives conferred with the previous report on workforce deficiency and diversity [1]. This study revealed that America's economic well being and ranking in the global community was contingent upon its science and technology industries. The report went on to say that there is uncertainty if the number of STEM graduates will be sufficient to meet the future needs of this country [1]. There are a number of factors affecting the potential shortage of STEM workers in this country. First of all, during the past decade the percentage of American students receiving STEM degrees fell from 32% to 27% of all college graduates, despite increases in overall numbers of college enrollment. There has also been a Post 9/11 decrease in the numbers of foreign students seeking advanced degrees in this country. Additionally, the American workforce is aging including fields which are dominated by European American males. Finally, the percentages of women STEM employees in the workforce only experienced an insignificant increase from 38% to 39% over the past decade. African American and Hispanic American STEM employees still remain underrepresented in the STEM fields comprising 10% of these workers compared to 13% of the general workforce [1]. The department of Graphic Communications and Technological Studies can help turn the tide of under representation by recruiting more students into its ranks.

DISCUSSION

The Department of Graphic Communication System and Technological Studies (GCSTS) is one of the four divisions which comprise the School of Technology on the campus of North Carolina Agricultural & Technical State University. The department houses three degree programs. The first degree program offers a Bachelor of Science in Graphic Communication System with concentrations in: Computer Aided Design and Drafting, Printing and Publishing, and Integrated Internet Technologies. The second degree program offers Bachelor of Science and Masters of Science in Technology Education with concentrations in: Industrial Training and Development, Trade and Industrial Education (Teaching) and Technology Education (teaching). This department seeks to prepare students to secure positions a technologically advanced global economy.

There are currently 318 undergraduate students and 29 graduate students currently enrolled in this department. The numbers of students enrolled in undergraduate studies declined for the first time in nearly

a decade [3]. The data in Table 1 and Figure 1 reflects the numbers of undergraduate students pursuing Bachelors degrees in GCSTS. The data in Figure 2 reflects the percentages of GCSTS students based on ethnic origin [3]. To turn the tide of decreasing numbers of students enrolling in this department, the department chair has instituted community outreach programs, housed the technology summer institute and formed the GCSTS recruitment committee.

Table 1 GCSTS Undergraduate Student Enrollment

Year	1	2	3	4	5	6	7	8	9
	1997	1998	1999	2000	2001	2002	2003	2004	2005
# UG	148	156	191	229	246	276	290	320	292

Figure 1 GCSTS Enrollment Data
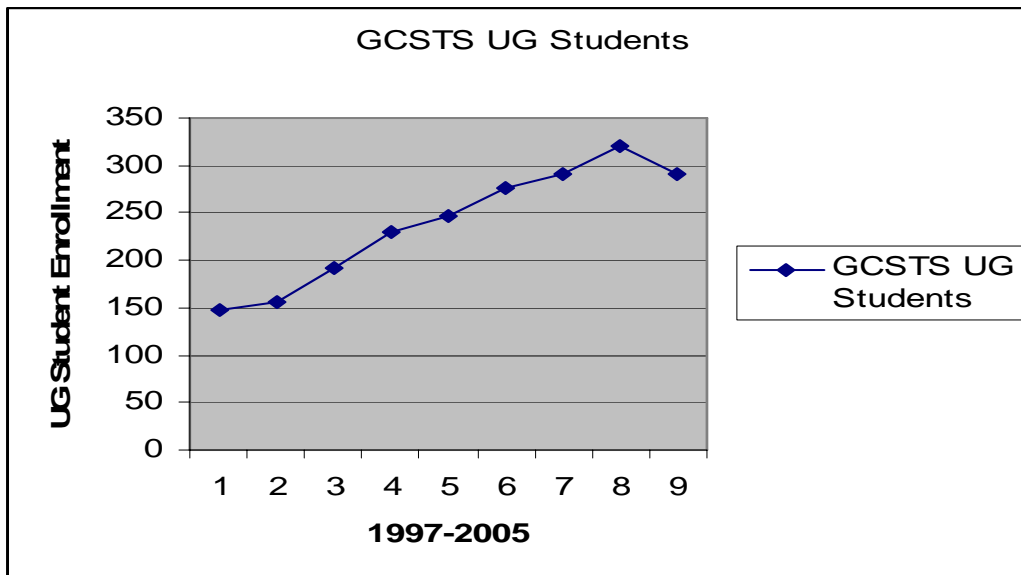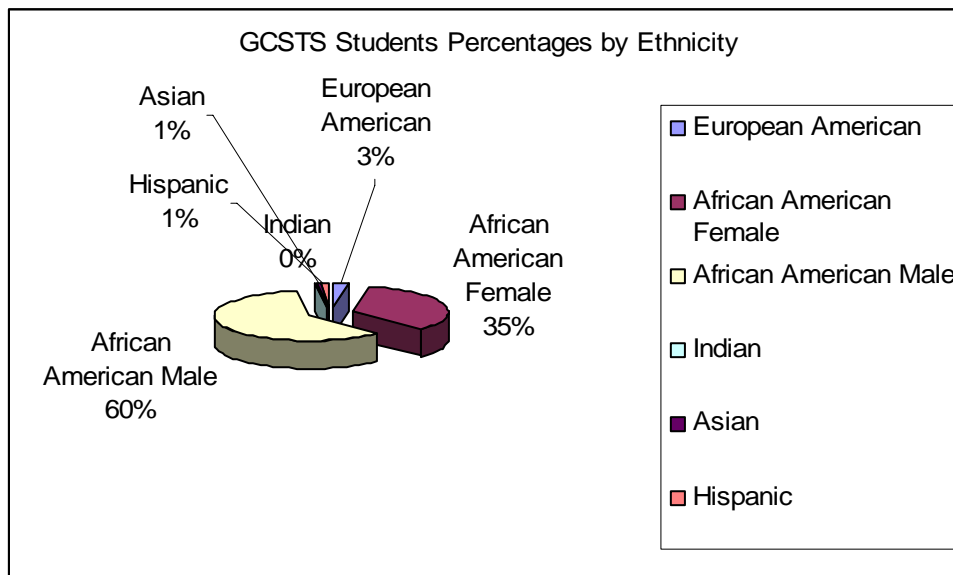
Figure 2 GCSTS Students Ethnic Origin

GCSTS Students Percentages by Ethnicity

The GCSTS department sponsors a number of events designed to garner community awareness and support. One such event is Graphics Day. This event provides industry professionals the opportunity to interact with GCSTS students and inspect some of the projects these students have developed. Graphics Day also provides students with the opportunity to demonstrate their technological and interpersonal skills necessary for embarking upon hi-tech career paths. Another event designed to gain community interest and involvement is the Technology Expo. The GCSTS faculty spearheaded this event which showcased the accomplishments of students from each division of the School of Technology (SOT). This event was geared to attract industry professionals, local high school students and other stakeholders within the community.   Additionally, GCSTS students interacted with the public and potential employers. The community outreach program was another opportunity for GCSTS faculty to present a plethora of technical workshops to the public. The GCSTS department is also host of the Technology Summer Institute. This summer program is designed to attract high school juniors and seniors. The activities utilized in the summer institute expose these students to technological career paths and devices.   The objective of the Technology Institute is to gain the interest of these students and to perhaps welcome them as future freshmen.

The GCSTS department was the first SOT division to appoint a formal Recruitment Committee. The committee is comprised of three faculty members. The faculty members collaborate to represent the department of GCSTS at a diversity of recruiting events. The events attended by the GCSTS recruitment committee include University sponsored events on campus and across the East Coast of the United States. The GCSTS recruitment committee also works with the Office of Evening and Weekend Programs. Other university sectors with which the GCSTS Recruitment Committee collaborates include Adult and Transfer Students and The Center for Student Success.

The recruitment committee members meet regularly to discuss upcoming recruitment events and decide who will be present to represent the department. The committee also discusses prior recruitment activities and ways of making future efforts more effective. One method intended to improve the efficacy of this committee is to gather data on Recruitment Review Forms, regarding these recruitment events. The committee has begun compiling data regarding its activities. The results of these data could be helpful in driving future recruitment activities.

The results from recruitment efforts are being gathered on a Recruitment Review Form. This form was adopted from a local non-profit organization which recruits volunteers to continue providing services. Some of the information gathered on this form includes: the type of event, location, approximate number of staff in attendance, and the form invites the recruiter to rate the overall value of the recruitment efforts. The form and the results gathered on events are listed below.

The GCSTS recruitment committee is a dynamic group of educators who also schedule times to participate in recruiting activities in and around the triad areas. The purpose of this committee is to initiate interest and introduce new students into the GCSTS department. The methods this committee utilizes to attract students include: Participation in events sponsored by the university, school department as well as events in the Guilford County community.
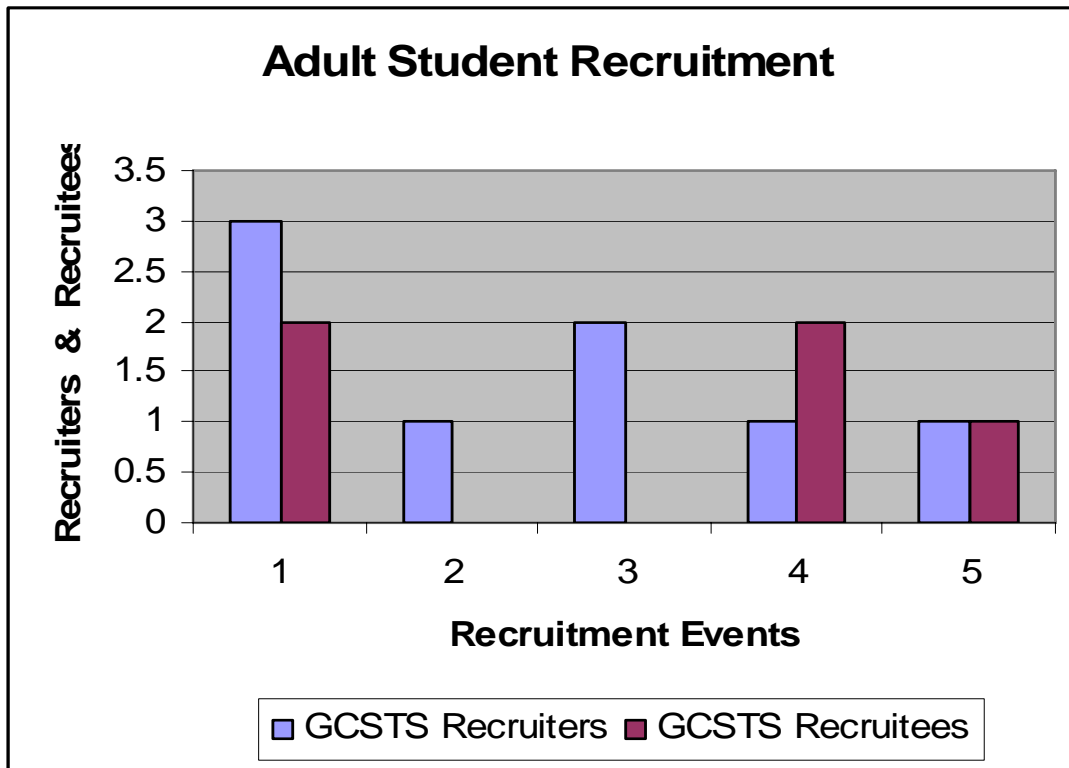
The events that the GCSTS recruitment committee participates in can be divided into five major categories. These categories include the general public, community college transfer students, high school students and undecided university students. An evaluation of the recruitment events over the past year yielded the following results.

One of the recruitment efforts attended by a GCSTS committee representative in an effort to attract adult students from the general public was the Piedmont Triad Business Showcase (PTBS). The purpose of this event was to provide a platform for area business to develop new business relationships in this business to business trade show. Another event attended the Greensboro News and Records (GN&R) Benefit Fair. The NC A&T SU New Years Resolution Party is an invitation for adult students to begin or continue educational aspirations. NC A&T SU Mall Madness were recruitments event at local malls which featured live performances and radio broadcasts in an effort to attract potential students. A summary of information gathered regarding recruitment efforts geared toward adults is listed in Table 2. A graphical illustration of the data is given in Figure 3.

Table 2 Adult Students from General Public

Recruitment event & location	Date	Target market	Location	GCSTS Recruiters present	GCSTS Recruitees	Event Strengths	Event weaknesses
New Years Resolution Party	01/05	Adults	NCA&T Smith Hall	3	2	Festive	During a holiday
GN&R	11/05	Adults	GN&R	1	0	None	None
PTBS	11/06	Adults	Coliseum	2	0	None	Slow traffic
Mall Madness	07/06	All	Mall: 4 Seasons	1	2	Music, prizes performances	None
Mall Madness	08/06	All	Mall:Oak Hollow	1	1	Music, prizes performances	None

Figure 3 Adult Students
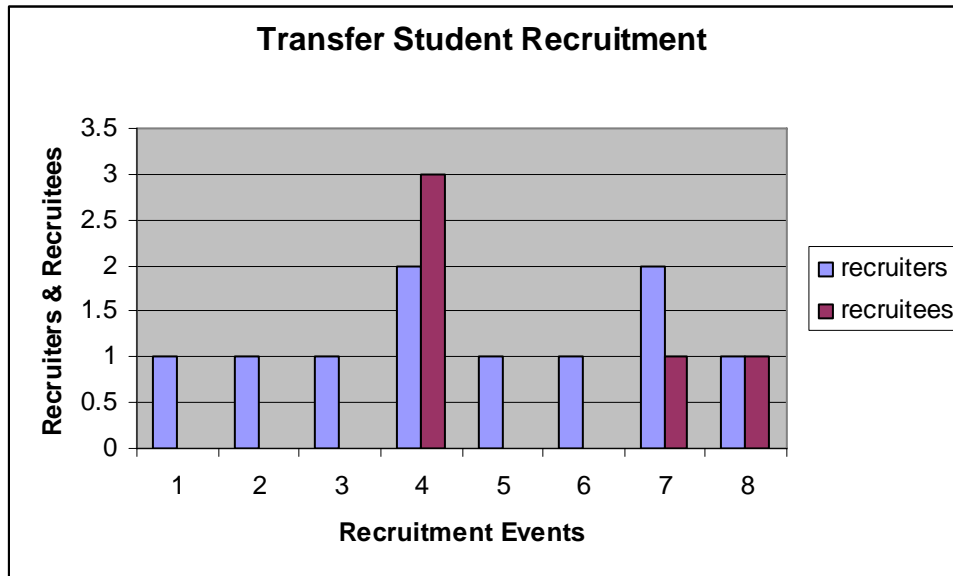

Adult Student Recruitment

The GCSTS recruitment committee also sought to attract adult transfer students. The recruitment efforts attended by committee representatives in an effort to attract these students from community colleges were; Guilford Technical Community College (GTCC), Davidson Community College (DCC), Rockingham Community College (RCC), Alamance Community College (ACC), Forsyth Technical Community College (FTCC) and the Adult & Transfer Student Open House (ATSOH). A summary of information gathered regarding recruitment efforts geared toward adults is listed in Table 3. A bar chart illustrating these events is included in Figure 4.

Table 3 Adult Recruitment Events

Recruitment event & location	Date	Target market	Location	GCSTS Recruiters Present	GCSTS Inquiry or Recruitees	Event Strengths	Event weaknesses
GTCC	10/05	Adults	GTCC	1	0	None	None
DCC	11/05	Adults	DCC	1	0	None	None
RCC	11/05	Adults	RCC	1	0	None	None
ATSOH	11/05	Adults	NCA&T	2	3	Nice accommodations	None
RCC	03/06	Adults	RCC	1	0	None	None
ACC	10/06	Adults	ACC	1	0	None	None
ATSOH	11/06	Adults	NCA&T	2	1	Nice accommodations	None
FTCC	11/06	Adults	FTCC	1	1	None	None

Figure 4 Transfer Student Recruitment

Transfer Student Recruitment

The GCSTS recruitment committee also sought to attract high school students. The recruitment efforts attended by committee representatives in an effort to attract these students from high schools included presentations on the career paths available through the GCSTS department at local high schools in Guilford, Alamance and Forsyth counties. Representatives from this committee also participated in a number of outreach efforts geared toward attracting these students. The activities include AGGIE Nites, (AN), which are recruitment efforts spearheaded by the NCA&TSU Admissions Office in an effort to attract in-coming freshmen. The Guilford County Schools College Nights (GCSCN), which is an opportunity for universities from across the nation to come and talk to seniors from Guilford County. A summary of information gathered regarding recruitment efforts geared toward adults is listed in Table 4 and illustrated in Figure 4.

Table 4 High School Student Recruitment

| Recruitment event & location	Date	Target market	Location	GCSTS Recruiters Present	GCSTS Inquiry or Recruitees	Event Strengths	Event weaknesses
GCSCN	10/05	HS	Coliseum	3	13	Well organized	None
Aggie Nites	12/05	HS		1	1	Convenient for students	Travel distance
Aggie Nites	13/13	HS	Wilmington	1	2	Convenient for students	Travel distance
GCSCN	10/06	HS	Coliseum	3	13	Organization	None

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Figure 4 High School Student Recruitment
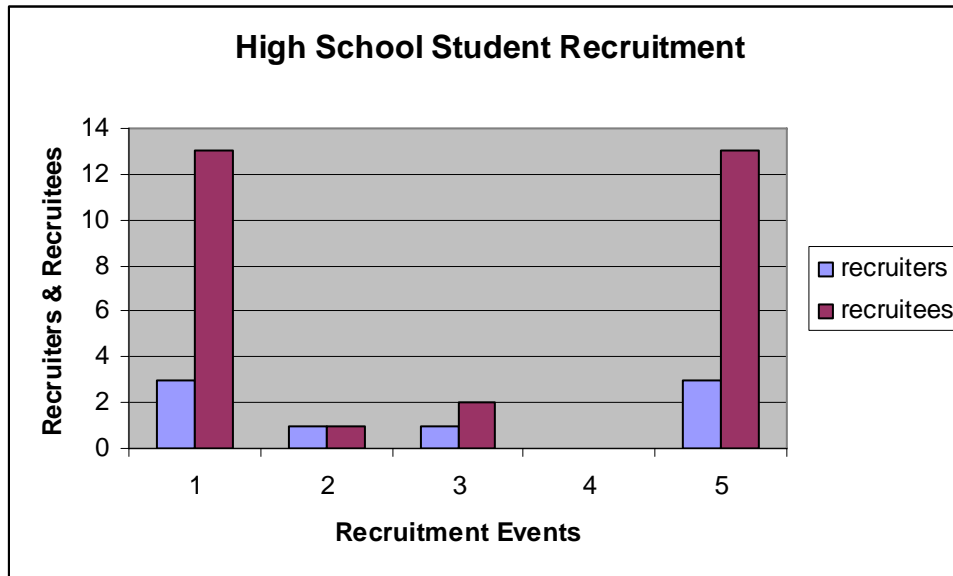
The GCSTS recruitment committee sought to attract undecided NCA&TSU students. The recruitment committee attended the Undecided Student Fair (USF). The results from this event are summarized below in Table 5. The bar chart illustrating the relationship between recruiters and undecided college students is given in Figure 6.

Table 5 NC A&T SU Undecided Students Fair

Recruitment event & location	Date	Target market	Location	GCSTS Recruiters Present	GCSTS Inquiry or Recruitees	Event Strengths	Event weaknesses
USF	2005	College students	Student union	3	20	Well attended Organized	None
USF	2006	College students	Student union	3 faculty 2 students	20	Well attended Organized	Both location

Figure 6 NC A&T SU Undecided Students Fair
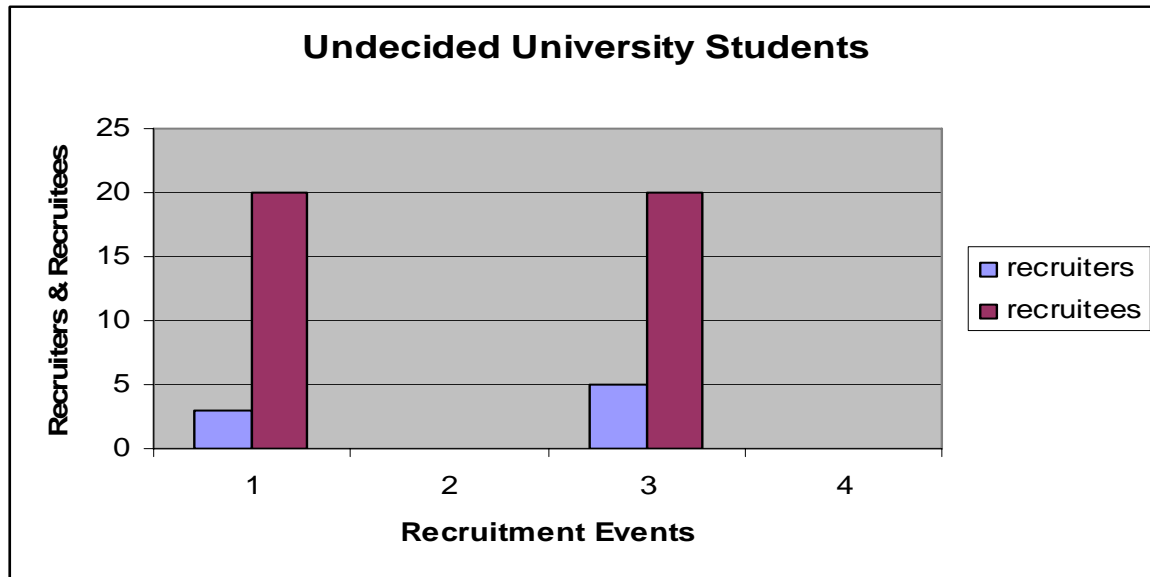
This evaluation of the recruitment review forms revealed which events generated the greatest amounts of interest and or recruitees. The activities yielding the most responses were found to be the Guilford County Schools College Night and the NC A&T SU Undecided student Open House. The numbers of students expressing interest in GCSTS at these events was considerably higher than the numbers of students at any other event. The past two years three recruiters represented this department at the GCSCN and thirteen students expressed an interest in the department. The past two years, three to five persons were present to represent GCSTS at the Undecided Students Fair, and there were 20 students who expressed an interest in GCSTS.

CONCLUSIONS

The results of this evaluation suggest that enhancing the departmental representation at two major events could help increase the numbers of students expressing an interest in GCSTS. These students expressing an interest could also choose to become freshmen into this department. There are a number of the techniques that could be incorporated into current efforts to increase the amounts of students expressing interest in GCSTS. A few of these strategies are; to include more faculty at high yield recruiting events. More faculty could be on hand to help students feel welcomed and help educate them regarding the benefits of GCSTS careers. Future outreaches should also include more students who are currently enrolled in GCSTS courses to help give potential students an inside look at the department. The GCSTS department could invest in more colorful and dynamic brochures, literature and electronic media in order to communicate with this generation in a style and language they relate to. Enhancing the recruitment efforts for high yield community events in order to educate potential students regarding the challenges and benefits of careers in GCSTS could help to attract the numbers of students needed to turn the tide for this department and the nations' STEM industries.

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