A Faculty's Approach to Retention

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ABSTRACT

In the US and many other industrialized nations, far fewer females and minorities enter technical fields compared to majority populations. Research has revealed that unsupportive educational environments reinforced by obstructive societal norms and low expectations have often contributed to the lack of interest and involvement of these populations in Technology in the United States. This is seen in quality of education in predominately minority schools and in the low percentage of females and minorities in technical fields. This paper illustrates a department's approach in fostering an environment designed to increase the interest of young students, particularly women and minorities, in Technology. Quantitative and qualitative data collected during the series revealed that participants enhanced their understanding of the range of career opportunities in Technology and became aware of obstacles hindering gender and ethnic diversity in Technology fields.

Keywords: Retention, Employability, Historically Black Colleges or Universities (HBCU)

INTRODUCTION

It is noticeable that African Americans and women are underrepresented in science, technology, engineering and math (STEM) curriculums. The factors contributing to this for minority students include poverty, low expectations, lack of preparation and a lack of role models during their formative years [Russell, 9; Sibulkin, 10; Symonds, 11]. Darling-Hammond [12] confirms that the United States educational system is separate and unequal to minority students. With limited resources in many minority communities there are disparities in quality of teachers, quality of curriculum, and large class size for those schools. Data indicates that over sixty-six percent of minority students attend predominantly minority schools with thirty-thee percent of the minority students attend minority schools whose populations are at lease ninety percent. The majority of these schools are in property poor districts which interpret to low revenue through local taxes and state grants. Data correlates these factors as being directly related to low student achievement.

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The gender gap is based on societal expectations of roles and competences that have not been validated by data. At an early age, women are told-subtly or overly- that science and mathematics are not for them [Felder, 16]. Felder [16] also states that this message is received at home and school. Davis [13] relates the gender gap to access. Women make up fifty percent of the population but are unable to acquire knowledge, skills, and resources due impart to access. Henwood [14] states that female perception of engineering or technology as being a male career tract, potentially being in positions of authority over males and limited mentors contribute to the low numbers of women pursuing engineering careers.

Retention is an ongoing issue throughout higher education with approximates half the students dropping out. The majority of those dropping out do so prior to the start of their second year [Townsend, 15]. Drop out rates at Historically Black Colleges and Universities have traditionally exceeded the national average. As the largest producer of graduates in STEM curriculums for African-Americans, North Carolina A&T State University (A&T), a Historically Black College is also experiencing this trend. At A&T fifty percent of the total student population is from low income families. According to government statistics family income is a predictor of graduation for incoming freshmen [Hebel, 5; Douthat, 2; Symonds, 11]. The lower the family income the least likely the student will graduate in six years. These numbers do not take into account that students may transfer to other universities or community colleges, but it explains the added burden for A&T and other universities with similar populations.

Faculty in the department of Electronics, Computer, and Information Technology (ECIT) were inspired to write an on-campus grant titled "Retention and Employability, a by-product of Faculty and Corporate Collaboration" to address issues relating to retention and employability for their current student population. The approach focused on student persistence with proper decision making. Many of the issues discussed impacted students in their decision making, personal expectations, effort and making of oneself marketable. Reeducation is essential to correct or update what was taught during the students' formative years as well as their campus experience. Townsend [15] demonstrates that campus involvement increases the likelihood of minority students returning after their initial year. According to Tinney [17], type of employment and committed work hours impact student persistence and their overall grade point averages. Working in excess of 15 hours weekly off campus negatively impacted retention and overall grade point average. First year students working excessive hours were more likely to have grade point averages below a C average [Tinney, 17]. Working on campus with less than 15 hours weekly with faculty increased the likelihood for retention. Many full-time students in ECIT work more than 15 hours a week off campus. Many of those students do not participate in any on campus organization. These issues were also addressed. To aid in this reeducation, corporate representatives were solicited for on-campus presentations, programs and company visits. To introduce role models, the majority of the lead representatives were African American males and females with many being graduates of A&T. Participants responded favorably with students interacting with credible role models in prominent roles in corporate America. This increased their self-worth and optimism as a future contributor to the workforce.

METHOD

To spur awareness of students and faculties, the authors incorporated a series of company visits, guest speakers and an employees' fair for the School of Technology. The participants were students attending A&T in the 2005 academic year. The majority were in associated with the School of Technology with some by way of the student chapter of IEEE. It was not determined if the students were a true representation of the overall student body.

Company Visits and Colloquium Speakers:

To address non-academic issues such as motivation, sense of adequacy and opportunity, visits to companies and company representatives visiting classes were used. The company visits involved tours and panel discussions. The students and faculty gained a fresh perspective on future work environments, company expectations and desired technical skills required for future employment. The classes used were intended for academic and non-academic strategies for students to be successful. These classes, named colloquiums, allowed guess lecturers, company representatives, and university representatives to address students on relevant issues associated with their success. Freshman or sophomores traditionally enroll in these classes. Surveys in Appendices C and D were used to determine student response. Appendix C was for the company visits and D for guess representatives for the colloquiums.

Employees' Fair:

The principal components of the Employees' Fair were the roundtable discussion, Career Fair, and luncheon. At the roundtable discussion, students, faculty and company representatives dialoged on relevant issues that impact student employability. Issues of note include minimum GPA requirements, strategies to increase marketability and how companies view participation in on-campus student organizations. Survey data was collected from students, faculty and company representatives. Appendix A contains the student Survey and B the faculty survey.

RESULTS

Quantitative data collected during the events revealed that participants enhanced their understanding of the range of career opportunities in technology, became aware of obstacles hindering gender and ethnic diversity in technology, acquired skills and knowledge that increased their professional competence to enter the field, felt prepared to implement action plans to enhance gender and ethnic diversity in their schools, and appreciated the many useful resources (discussions, presentations, and fieldtrip) offered to them during the academic year. The data is expressed in percentages.

Data from table 1 indicates that ninety-four percent of the students realized a need to focus more on their academic studies**.** The visits emphasized potential opportunities if the right decisions are made early and often. According to all the students that chose to fill out surveys, the tours were an overwhelming success. The overall message received by students were company standards for employment, expectations of employees, opportunities within each

company, snapshots of the work environment, interpersonal skills, and presentations from resumes to interviews that if properly develop or carefully organized will enhance the student's employability.

Question 9: Did this trip encourage you to focus more on your studies?	
Visit 1	94% strongly or somewhat agreed.
Visit 2	100% strongly or somewhat agreed.
Visit 3	100% strongly or somewhat agreed.
Visit 4	85% strongly or somewhat agreed.
Overall	94% strongly or somewhat agreed.

Table 1: Student response to question 9 in survey for each company visit.

Speakers at colloquiums:

All students attending the colloquiums received surveys to evaluate the guest speaker, since it was voluntary, not all the students submitted completed survey. Table 2 indicates that the topics covered encouraged students to focus more on their studies.

Question 9: Did this presentation encourage you to focus more on your studies?	
Speaker 1	85% strongly or somewhat agreed.
Speaker 2	85% strongly or somewhat agreed.
Speaker 3	100% strongly or somewhat agreed.
Overall	89% strongly or somewhat agreed.

Table 2: Student response to question 9 in survey for each guest speaker

Employees' Fair

According to tables 3 and 4 the Employees' fair was a success for all groups of attendees. Table 3 represents questions from student survey in Appendix A. Table 4 represents faculty survey results from Appendix B. All the representatives that participated also rated the Employees' Fair a success.

Question	response
2	88% rate the employees fair excellent or good.
4	96% will recommend this fair to others
6	16% had GPAs less than 2.50

Table 3: Key data from Students Surveys of Employees' Fair

Question	response
1	100% Strongly agree or agree that the Employees' Fair was beneficial to the students
5	88% Strongly agree or agree that the Roundtable discussion was informative

Table 4: Key data from Faculty Survey of Employees' Fair

CONCLUSIONS

Based on quantitative and qualitative data collected, the student participants were inspired to better apply themselves in the classroom which will translate to higher retention and their increased overall employability. The use of credible role models with like backgrounds greatly enhanced the experience and education of the student and faculty participants.

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APPENDICES

Appendix A: Survey for Students attending Employees Fair

1. How did you hear about the Fair? ☐ Email ☐ Faculty/Staff ☐ Flyer ☐ Other_____
2. How would you rate the Fair? ☐ Excellent ☐ Good ☐ Fair - why: _____
3. Where you able to converse with Employers of interest to you? ☐ Yes or ☐ No
4. Would you recommend this Fair to others? ☐ Yes ☐ No - why: _____
5. What is your classification? ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior ☐ Graduate
6. What is your GPA: ☐ Below 2.0 ☐ 2.0-2.49 ☐ 2.50-2.99 ☐ 3.00-3.49 ☐ 3.50-4.00
7. What is your major: ☐ Manufacturing ☐ Construction ☐ ECIT ☐ Graphics ☐ OSHA
8. ARE YOU REGISTERED WITH OFFICE OF CAREER SERVICES: ☐ YES ☐ NO

Appendix B: Survey for Faculty attending Employees Fair

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	STRONGLY AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	STRONGLY DISAGREE
1. This Career Fair was beneficial to my students?	☐	☐	☐	☐
2. The Fair was helpful in matching company's needs with students from A&T?	☐	☐	☐	☐
3. I was sufficiently informed of the event.	☐	☐	☐	☐
4. Would you be willing to assist us with this fair in the future?	☐	☐	☐	☐
5. The round table discussion was informative?	☐	☐	☐	☐
6. The format of the roundtable discussion was well done?	☐	☐	☐	☐
7. The luncheon was appropriate.	☐	☐	☐	☐
8. The speaker was very informative?	☐	☐	☐	☐

Appendix C: Survey evaluating Plant Tour

	STRONGLY AGREE	SOMEWHAT AGREE	NO OPINION	SOMEWHAT DISAGREE	STRONGLY DISAGREE
1. Did this plant tour increase your knowledge of the disciplines in the Electronics, Computer, and Information Technology department?	☐	☐	☐	☐	☐
2. Did this company have jobs in my area of study?	☐	☐	☐	☐	☐
3. Was the tour interactive and interesting?	☐	☐	☐	☐	☐
4. Was the travel time to the plant was adequate?	☐	☐	☐	☐	☐
5. Would you like to visit this company in the future?	☐	☐	☐	☐	☐
6. Did the company seem interested in you as a student?	☐	☐	☐	☐	☐
7. Would you go on another plant tour with this department?	☐	☐	☐	☐	☐
8. Would you recommend future plant tours for other students?	☐	☐	☐	☐	☐
9. Did this trip encourage you to focus more on your studies?	☐	☐	☐	☐	☐
10. Did this tour exceed your expectations?	☐	☐	☐	☐	☐

	Below 2.0	2.00 – 2.49	2.50 – 2.99	3.00 – 3.49	3.50 – 4.00
11. What is your GPA?	☐	☐	☐	☐	☐

	Freshman	Sophomore	Junior	Senior	Graduate
12. What is your Classification?	☐	☐	☐	☐	☐

	Male	Female
13. What is your Gender?	☐	☐

14. What is your major? _____

15. What student organization are you currently a Member? _____

16. What did you like best about the tour? _____

17. What did you like least about the tour? _____

18. Do you have any suggestions? Other tours? Questions, etc. _____

Appendix D: Sample Survey evaluating Colloquium Speaker

	STRONGLY AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	STRONGLY DISAGREE
1. Did this speaker increase your knowledge of the disciplines in the Electronics, Computer, and Information Technology department?	☐	☐	☐	☐
2. Did this speaker motivate you in making decisions based on your future employability?	☐	☐	☐	☐
3. By following the speakers approach, do you believe it will increase your marketability and employability?	☐	☐	☐	☐
4. Was the presentation interesting?	☐	☐	☐	☐
5. Would you be willing to listen to the speaker again?	☐	☐	☐	☐
6. Do you feel more positive about your major after listening to the speaker?	☐	☐	☐	☐
7. Did the information shared by the speaker cause you to reevaluate your approach to becoming successful while at A&T?	☐	☐	☐	☐
8. Would you recommend this speaker for other colloquiums?	☐	☐	☐	☐
9. Did this presentation encourage you to focus more on your studies?	☐	☐	☐	☐
10. Are you willing to make lifestyle changes to insure that your marketability will increase?	☐	☐	☐	☐

	Below 2.0	2.00 – 2.49	2.50 – 2.99	3.00 – 3.49	3.50 – 4.00
11. What is your GPA?	☐	☐	☐	☐	☐

	Freshman	Sophomore	Junior	Senior
12. What is your Classification?	☐	☐	☐	☐

	Male	Female
13. What is your Gender?	☐	☐

	Yes	No
14. Are you currently registered at career services for internships, coop, or permanent employment?	☐	☐

15. What is your major?

16. What student organization are you currently a member? _____

Claude M. Hargrove

Claude M. Hargrove has been at North Carolina A & T at the rank of Assistant Professor since Fall 2004. He received his PhD at North Carolina State University in 1999 in Biological Engineering. Other degrees earned at North Carolina State University were MS in Computer Engineering, BS in Electrical Engineering and a BS in Computer Engineering. He has served as the Co-Advisor for the IEEE student chapter, Chair of Central Carolina IEEE section, member of Epsilon Pi Tau, and Graduate faculty for the Technology Management PhD consortium sponsored by Indiana State University. Interest includes biotechnology and STEM education. Submitted another paper to 2008 ASEE South East Section Annual Conference titled "A Method to Improve Course Instruction by Utilizing Teleconferencing Techniques".

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Mr. Rollins has been at North Carolina A & T State University as a full time Instructor since Fall 2003. He has been instrumental in providing the latest instructional methods of emerging technologies such as Cisco networking principles, Oracle Database Management and Ethics in Information Technology. He has also supervised and conducted lab experiments with departmental majors. He has been a key advisor for undergraduate and graduate students on appropriate courses to take to enhance their career trajectories. He has also provides students with hands-on training in all of his courses. Mr. Rollins has also written several research proposals to programs such as the North Carolina Space Grant Consortium and A&T's Futures program. In addition, he is serving on several departmental committees such as Dean's Faculty Council, Assessment Committee, Faculty Search and New Hire Committee, just to name a few. Mr. Rollins is currently attending North Carolina State University to obtain his doctorate degree in Technology Education with a minor in Higher Education Administration.