

The Adjunct Academy at City Tech: Academic Support for First Year Engineering Students at an Urban College

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Abstract

Urban students in engineering programs can face certain challenges including: 1) Inadequate academic preparation for college 2) Family and work responsibilities and 3) Lack of in-school support in the formation of their academic/ professional identities. The Adjunct Academy at City Tech (CUNY) project was created to improve the lives of adjunct, engineering faculty and engineering students. These are two important groups at NY City College of Technology (City Tech, CUNY), a diverse school in the northeast. Program details and early first semester outcomes will be discussed.

Introduction

The under representation of minority groups in high end technical, engineering fields continues as an issue of concern for engineering educators and college administrators. According a 2002 report by the GE fund ¹, African Americans and Latinos make up less than 4 percent of the engineering workforce. Successful college programs are those that address institutional factors such as faculty involvement and its relationship to student achievement and performance. A new program, the Adjunct Academy at City Tech, has been created in order to improve retention and graduation of underrepresented students and improve the culture of faculty commitment to students.

The program, currently in its first three weeks of its first semester (i.e., as of this report) is a three-year federal government (FIPSE) funded effort. Details of the project's structure and early "results" will be shared and should be of particular interest to other schools of technology with diverse student populations and large teaching pools of adjunct instructors.

The adjunct experience

Throughout the 1990s, three out of four new faculty members were appointed to non-tenure positions². Despite this trend, studies have shown that informal student

interactions with faculty outside the classroom positively influence student persistence, college graduation, and graduate school enrollment³. Yet, as more adjuncts are hired, this strong relationship between faculty and student may decline since host institutions often make little commitment to foster the professional development of this teaching corps. Typically, adjuncts spend on average seven years at a specific college or university⁴.

Background: City Tech and its students

Our school, New York City College of Technology (City Tech), is the senior technical college of the City University of New York (CUNY) system. Its mission is to prepare its incredibly diverse student population of nearly 12,000 students for professional lives in technical fields. Sixty one percent of the students attend the commuter college full time, with 33% in baccalaureate programs. Its School of Technology and Design has an average annual enrollment of approximately 5,000 students (approximately 43% of the overall student population of the college) and houses a variety of majors, mostly in engineering fields, such as: Electromechanical, Electrical, Computer, and Mechanical Engineering Technologies as well as departments in Advertising, Graphic Arts, and Architecture.

Fall 2004 demographics of our students illustrate the diversity of cultures and complexities for students, balancing academics and employment while working towards academic degrees.

- 53% percent of our students were born outside of the United States and represent 110 countries, with most coming from Jamaica, China, Dominican Republic, Haiti, Guyana, and Trinidad.
- For nearly 60% of our students, languages other than English are spoken at home.
- Nearly 65% of our students are the first in their families to attend college.
- At least 50% of City Tech's students are employed work 20 hours or more a week.
- 30 % of our students report at least one dependent.

In addition to these demographics, many of our students did not have exemplary high school academic experiences and often arrive at college under prepared for the challenges of learning and applying engineering content.

The problems City Tech educators and administrators face

The achievement problem at our school was made evident when we analyzed the number of engineering students lost from year to year, class to class. We are defining loss as 1) students who fail and 2) students who drop out of classes. Both categories of loss reduce students' likelihood to persist.

The high rates of failure as well as withdrawals from first year engineering courses act as gatekeepers to the majors and are significant; hence these high-risk courses have been chosen as the point of intervention because students who either withdraw from or fail

these courses drop out. Also, students who do poorly in these gatekeeper classes are likely to drop out when faced with more advanced work.

In assessing our existing problems in the retention and graduation of our engineering students who are in danger of not graduating, we first determined the severity of the college experience for our Tech and Design students. Drop out and failure rates from fall 2003 and 2004 baseline are:

- The average drop out rate in first year courses was 45% for students majoring in the engineering technologies.
- The average failure rate for first year courses was 42% for students majoring in the engineering technologies.

Faculty-tutoring experience

The faculty-tutoring component of the Adjunct Academy began on February 7, 2005, one week into the spring semester 2005. Four engineering and two architecture adjuncts were hired as faculty-tutors to work 4 to 6 hours at the Tech Learning Center, currently a tutoring and resource center for students. To encourage department involvement, department chairs were asked for adjunct recommendations. The prospective faculty-tutors also filled out applications asking them to define the academic obstacles they see their students face and how to best address these challenges through the faculty-tutor experience. From the combinations of recommendations, interviews, and applications, selected faculty were asked to join the effort. The adjuncts were given an orientation to meet each other and to learn strategies and techniques they could use on one on one or small tutoring situations. We discussed the details of the project and ways to construct a faculty-tutor self as an academic coach, facilitating the learning process and coaching active student involvement in the sessions.

Promotional posters, fliers, and letter/ email contacts were sent to chairs and all engineering faculty to promote the faculty-tutor service. For this first semester we are focusing on developing partnerships with the faculty teaching the high-risk courses asking them to share an assignment with us which would promote all class attendance to the tutoring center with the adjunct-tutors.

The faculty tutors are also teaching at least two courses in their respective engineering departments. We believe that adjuncts will become more connected to their teaching experience at City Tech and will initiate innovative teaching techniques in their group sessions and possibly in the classes they teach. They will have opportunities to mentor students. Adjuncts will offer important advice and guidance for our students relating to students their experiences, giving an insiders view of the profession and opportunities and challenges within them.

Early results

Preliminary results from the first three weeks of our project are:

- 125 student visits to faculty tutors, 72% in engineering courses, 16% in architecture courses, 12% in math or science courses. Visual presentation of percentages:

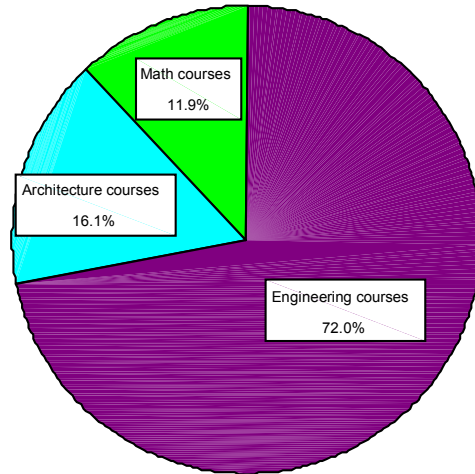


Figure 1. N=125, Percentages of the types of courses students received faculty tutor assistance.

- Creation of an e-mentoring pilot project with the Architecture Department with students signing up “on-line” to be mentored by professional architects. As of February 2005, 25 architects from Brooklyn and Manhattan firms have expressed interest in becoming mentors for our students.
- Our goal is to reach approximately 700 students enrolled in the high-risk courses and to examine which of the students persevered with tutoring.
- Focus groups at the end of the semester will be conducted to assess student satisfaction with the faculty-tutoring service.
- Midterms and final grades will also be included in the analysis in the coming weeks.

At the end of the 15-week semester, high, middle, and low levels of participation in tutoring will be compared to those students who did not attend faculty tutoring.

The mentoring experience

In addition to providing informal mentoring support for students who will receive tutoring in the adjunct academy, a mentoring network is being established with practicing engineers and technology experts who will offer to meet with engineering students to share real world experiences and offer guidance as students prepare for careers in engineering professions. The mentoring part of the Adjunct Academy will be piloted in spring semester 2005. The goal of the mentoring network will be to provide additional

ways for our college students to seek guidance and information about their chosen profession as they progress through their collegiate careers. This informal match making process will allow flexibility between mentor and student as they create conversations around the challenges in the profession. It will be an opportunity for engineers and other technology experts to help and guide current students and future engineers. For students, this will be a chance to look at the world beyond graduation and possibly develop a long-lasting relationship with a fellow practitioner. In addition to the informal program, a future goal is also to expand the current choice of internships and apprenticeships, to connect to professional organizations in the field and build stronger relationships with these organizations.

Conclusion

The Adjunct Academy project at City Tech holds promise for restructuring the ways we deliver educational opportunity at City Tech, particularly for engineering students from the gatekeeper first year courses. Adjuncts, an underutilized resource at the college, play an essential part. Students now have the opportunity to be tutored in their subjects by teachers, who have deep understanding of their topics. In addition to providing academic support, adjuncts are mentors to students, sharing the experiences in the field and giving students a glimpse into their future professions. Both adjuncts and students can participate more fully in the life of the college, improving academic and professional realities for both groups. In turn, we hope our efforts can serve as a model to address the national problem of first year drop out rates for minority students in engineering and technology programs.

References

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Elaine Maldonado

Elaine Maldonado is the Director of the College Learning Centers for New York City College of Technology (City Tech), providing academic support and services to all City tech students. Director Maldonado is the Principal Investigator and author of the Adjunct Academy grant.

Yasemin Jones

Yasemin Jones is the co-principal investigator of the Adjunct Academy, coordinating many of the operations of the grant effort at City Tech. Her research area interests include assessment of teacher knowledge and mixed method approaches for examining research on teaching.