Improving Retention by Mentoring and Tutoring Freshmen Students

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***Abstract*—In today's competitive global economy, six out of every ten jobs require some undergraduate college education and training. College retention therefore has long been the focus of research in education. The relationship between students and institutional characteristics, college graduation and retention rates has been a frequent topic in the academic literature.**

In order to increase the proportion of college graduates in the U.S., we must enable a greater percentage of our college-age population to enroll in bachelors or associates education (i.e. enrollment) and complete a degree in a timely fashion (i.e graduation and retention). Although we have made significant advances in our college graduation rates, improvement still is needed in our college retention rates. In this paper we address one cost-effective approach of improving retention in public four year colleges. This paper presents a successful practice at our college wherein senior students provide mentoring and tutoring for freshmen students. It has demonstrated improvement of retention as well as the performance of the freshmen. This work was funded by Perkins Grant.

***Index Terms*— Retention, Mentoring, Tutoring, Computer systems**

I. Introduction

Retention in public four year community colleges is a key concern for our universities. The advantages of a college degree are critical for students due to the employment and salary structure associated with different levels of education. In spite of this, graduation rates of low, and it has been shown statistically that only 52.4% of students graduate within four years where they began as First-Time-in-College (FTIC) students.

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The issue is twofold: attracting students to colleges, and retaining them so that they can succeed and graduate. In this paper we will focus on the latter and present one approach to increase college retention rates.

For a successful retention program in any college, there must be a team of individuals from across the department (including students, staff and professors) who are committed to student success and meets regularly to assess progress of the program. Changes to this program should be based on feedback from retention data and student satisfaction. This program should also be cost-effective and easy to implement in any public four year community college.

In this paper, we will address the above issues of retention by having a group of mentors and tutors (senior students) who will guide the freshmen who are new at the college. The format of the paper is as follows. We will first present a study of other related work in academia related to improving college retention. We then discuss our approach in Section 3. We then present our evaluations, discuss the results and conclude.

II. Related work about retention

Over the past four decades, while the college enrollment rates have risen dramatically, college graduation and retention has not kept pace [1]. Turner [1] has shown that while the percentage of 23-year olds with some college experience increased by 31 percent between 1971 and 1999, degree completion by this age increased by only 4 percent during the same time period. Part of this decline is due to students taking more time to complete degrees [1][2]. Although previously the U.S. led the world in the percentage of the population having bachelor's degrees, it has now lost that leadership. Over the last three decades, cohort-based completion rates have increased by 2-3 percentage points across cohorts in the US while other OECD countries such as the UK and France have seen 10-15 percentage point increases in completion rates (OECD 2007).

These concerns about low college retention and graduation rates have led to increased scrutiny of college completion and

movements to hold universities accountable for graduation rates. Over the last decade, policymakers have increased their focus on improving retention rates. President Obama's 2009, 2010 and 2011 State of the Union addresses have all touched on college completion, most notably in 2009 when he said, *"This country needs and values the talents of every American. That is why we will provide the support necessary for you to complete college and meet a new goal: by 2020, America will once again have the highest proportion of college graduates in the world"* [3]. This focus on completion rates is not new; universities have long been concerned with low completion rates and have actively searched for strategies to increase college persistence and completion. One such effort which is the focus of our paper has been the use of mentors and coaches to facilitate student persistence and completion.

College retention has long been the focus of research in different areas such as sociology, education, and economics, and the relationship between student and institutional characteristics and college graduation rates has been a frequent topic in the academic literature [4][5][6]. The academic literature has identified several obstacles which could potentially reduce retention rates. One direction of research has focused on obstacles such as financial barriers and liquidity constraints [7], or students' incentives [8]. These studies often focus on identifying the effects of additional financial aid on students' persistence and graduation [7][9]. Although this approach seems to work initially, it is not very cost-effective.

There are other lines of research which focus on college mentorship as a means to increase retention. College mentorship has elements of information gathering, academic preparation, and social integration. For example, one of the goals of a college mentor is to help a student academically prepare for their courses. Academic preparation has long been acknowledged as a contributing factor to college retention [11]. Studies of college remediation [12], [10] have attempted to identify whether academic remediation can improve students' college outcomes. In college mentoring, the mentors often counsel students on (a) how to acquire better study skills, (b) how to identify additional academic resources at their respective institutions and (c) how to assess their life outside of school.

Another related line of research comes from the field of behavioral economics. Recent studies have focused on the complexity of processes that students face and the information upon which they make decisions [10]. Students often need a "nudge" [13] to complete complex tasks. In higher education, it is often assumed that course requirements provide that nudge or that students are sufficiently self-motivated to not need external stimuli. College graduation rates show that that assumption might not be true; student coaching might be a mechanism to "nudge" students. One of the goals of student coaching is to motivate the students to complete tasks.

A final set of related research focuses on students' feelings of separation and exclusion and how perceived separation might contribute to drop-out rates. Tinto [4] articulated a theory of retention which suggests that feelings of separation lead to students dropping out. Researchers have attempted to identify ways to decrease students' feelings of separation [14]. Student mentoring and coaching may be a way for universities to reach out to students who may not otherwise be connected to their respective institutions.

III. New York City College of Technology (City Tech)

A. Need for Mentors for Freshmen Students:

Retention rates of first year students for City Tech's Computer Information Systems (CIS) program are quite low. The first two courses that the students are expected to be enrolled simultaneously in the first semester are CST 1100 (Introduction to Computer Systems) and CST 1101 (Problem Solving with Computer Programming) which are important fundamental introduction courses that guide students for better understanding and preparation for study in field of Computer Information Systems. Most students find it challenging to deal with these two initial courses. In our mentor model, a faculty coordinator would match students to potential mentors (senior students), and these mentors regularly contact their students to provide help and support as they take these two initial courses and as they continue through their first year in school.

Also, students must select a major upon enrollment and many students are not cognizant of the differences between Computer Information Systems (CIS) and Computer Engineering Technology (CET). In addition, City Tech offers various associate degrees in overlapping disciplines. It is often confusing for a first year student to choose the right major and disciple that is suited to his/her needs and interests. Discovering this after the first year causes students to be discouraged, they lose time and money in taking courses that were not needed. Having student mentors who have been through this journey would help freshmen students choose their major so that they can be prepared to make better decisions for his/her educational and vocational career. In mentors' interactions with students, they work to help students prioritize their studies, plan how they can be successful, and identify and overcome barriers to students' academic success.

Thirdly, the mentors focus significant time assessing the student's life outside of school - which one of the largest coaching services in the United States – InsideTrack, has found to be the leading influencer on student persistence and completion. Topics such as personal time commitments (work scheduling), primary care-giving responsibilities, and financial obligations are common during a student-coach interaction.

Inviting industry experts to meet with students and discussing how their academic success will translate into a career in the IT field will give the students additional encouragement to realize attainable goals.

B. *Need for Tutors for Freshman Students:*

Students in the first semester have to adapt to the college learning culture in addition to adapting to the new college life. Our students struggle with their classwork because of lack of exposure to the academic rigor. Additionally many students do not have role models who can guide them through the academic process or the career choices; Thus having tutors who are specialized in certain fields would help them considerably. Because of the tutor's background knowledge, conversations between tutors and students are both individualized and focused on success in school. Tutors would typically hold "office hours" in an open lab and help answer the specific questions by the students.

Considering the above two needs, we applied and received funding from Perkins grant where we try to meet the concerns of the students by:

1. Providing mentors who can guide the freshmen on their new journey in their first time at a four year institution. Each mentor would be assigned to a group of mentees, who would meet with them on a regular basis and provide them guidance on the courses to take, etc.
2. Providing tutors, who would help with the students with specific courses. They would help the students on the technical aspects of the courses. The tutors themselves would be experts in specific areas of computer systems such as networking, databases, security, etc.
3. Providing workshops to freshmen students from professionals in the industry. They would explain the requirements that corporate companies expect from graduates and prepare students from the initial years.

To summarize, we implemented a program that has mentors and tutors who contact students regularly to develop a clear vision of their goals, guide them in connecting their daily activities to their long term goals, and to support them in building skills, including time management, self-advocacy, and study skills.

C. *Hierarchical Chart*

In order to facilitate the above we developed the following four responsibilities:

1. *Faculty coordinator*: Oversees the mentors and the tutors. The faculty coordinator is responsible for scheduling the working hours of the mentors and the tutors. He also approves their time sheets. Invites guest speakers for the corporate world to address the freshmen.

2. *Mentors:* Mentors generally work with students over two semesters. There is a general outreach to all freshman students who have the option to participate or not when contacted by the mentor. Mentors contact students via phone, email, text messages and social networking sites. The goal of the college mentor is to encourage persistence and completion by helping students find ways to overcome both academic and "real-life" barriers and to identify strategies for success.

3. *Tutors:* Tutors also work with students over two semesters although they are not assigned specific mentees to them. They hold "office hours" in an open lab, where the students would approach them for technical questions regarding their courses. The tutors are interviewed by the faculty coordinator to ensure that the tutors are "experts" in their areas (Java, Database, Networking, Programming, etc).

4. *Guest Speakers:* They provide an opportunity for the freshmen students to hear, firsthand, about a particular occupation, the necessary preparation, required knowledge, and other interesting information from a current practitioner in that field. The visit typically lasts from 30-90 minutes. Students often have unrealistic expectations about careers and workplace requirements and need the insight that a business person can provide. Demonstrations and hands-on activities are always a real plus if applicable. Company video tapes are also excellent tools to use for demoing the real world to the students.

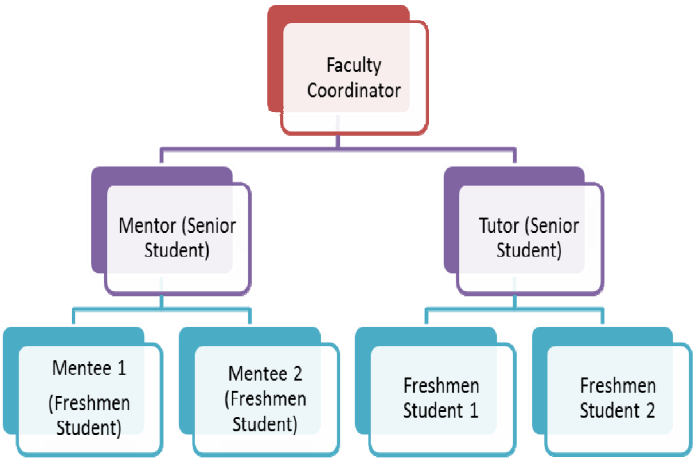

Fig 1: The hierarchy of the mentor/tutor model

In Fig. 1, the hierarchy of the mentor/tutor model is demonstrated. The faculty coordinator is responsible for hiring and maintaining the mentors and tutors, who are in turn responsible for the success of their mentees and students whom they tutor.

Mentoring and Tutoring also proved a more cost-effective method of achieving retention and completion gains when compared to previously studied interventions such as increased financial aid as already shown by Bettinger [9]. At CityTech, mentors and tutors were paid at the rate of $18/hr (working about 19 hours per week). We had about 6-7 mentors and tutors, and the cost to maintain them for an entire semester was estimated to be around $40,000. These mentors and tutors would be accessible to all the students of the computer systems technology department. On the other hand, increasing

the financial aid by even 10% to all the students would be more expensive than this program. We discuss the timetable of implementing this model in our college in the next section.

D. Timetable

We started implementing our mentoring system in August 2013, where we started advertising our new system of mentoring and tutoring. A lot of freshmen students showed interest in this system. We then interviewed mentors and tutors (seniors) for the program. We specifically chose those senior students who had successfully completed an internship so that they could train the freshmen on their strategies and share their journey. In September, we did the paperwork for hiring the mentors and tutors, developed the mentor/tutor schedules. We also matched the mentees with their mentors. The first round of tutoring and mentoring started at the end of September. We had several rounds of mentoring and tutoring in the following months. In the month of December, the faculty coordinator met a few students to get feedback on the new system. We received very positive feedback that from students who utilized the new system. The detailed timetable is shown in Fig 2.

Date	Activity
August	Audit students' schedule. Select Students Select Mentors Select Tutors
September	Hire and Train Student Mentors/Mentee Develop meeting schedules with mentor/mentee Hire Tutors/Develop Schedule Meet with the selected students, mentors, tutors as a group. Tutoring and mentoring begins.
October	Continue weekly meetings with mentees Meet with Mentors/Tutors Invite guest speaker from IT industry
November	Continue Weekly Meetings with mentee Meet with Mentors/Tutors Check students' mid-semester grades
December	Continue weekly meetings with mentees Invite guest speaker from It industry Wrap up meeting with students, tutors, mentors.

Fig 2: The timetable that was used to implement the model on a monthly basis.

E. Implementation at CityTech

This project was started and successfully implemented for the first time during the Fall 2013 semester, with great success. We initially held a number of sessions to introduce the mentoring to students. We interviewed the mentors and tutors, and hired them for one academic year (i.e. 2 semesters). We had a total of 7 mentors and about 30 mentees, and several students who would attend the open lab to talk to the tutors regarding their questions about the coursework. A sample of the schedule is as shown in Fig 3. For example, A student having difficulty in his Networking courses would visit the open lab and talk to any tutor on Wednesdays between 4PM and 5:50PM.

	Tuesday	Wednesday
9:00-9:50		
10:00-10:50		
11:00-11:50		
12:00-12:50		
1:00-1:50	[Starting at 1:30] Database, Java, Web	
2:00-2:50	Database, Java, Web	Database, Java, Web
3:00-3:50	Database, Java, Web	Database, Java, Web
4:00-4:50	Database, Java, Web	Database, Java, Networking, Web
5:00-5:50	Database, Java, Web	Database, Java, Networking, Web

Fig 3: A sample schedule of Tutors in Openlab who would be available to help students.

IV. Evaluation

To evaluate our program, we requested the academic records for all of the students who were invited to work with our program during the Fall 2013 semester. The mentoring program was introduced only in the Fall 2013 semester. We saw that during the Fall 2013 semester the grades of the students who took the introductory courses seem to improve and there were more students who passed the courses with C or better grade as compared to the Spring 2013 semester when this program was not in effect. We performed a Chi-square statistical analysis on the grades of students. The p values from these tests showed that CST1100 and CST1100 tests are statistically significant at alpha = 0.05, while CST1201 is just approaching significance (p = 0.05). The reports are shown in Fig 4 and Fig 5.

Spring 2013:			
Cource Code	%Pass (D or better)	%Pass (C or Better)	% Fail
CST1100	83.30%	77.60%	3.60%
CST1101	84.00%	81.40%	4.10%
CST1201	76.70%	72.00%	10.10%
Fall 2013:			
Cource Code	%Pass (D or better)	%Pass (C or Better)	% Fail
CST1100	86.30%	82.60%	4.70%
CST1101	86.80%	83.00%	3.30%
CST1201	80.00%	69.80%	6.50%

Fig 4: Comparison of grades before (Spring 2013) and after (Fall 2013) introducing our model.

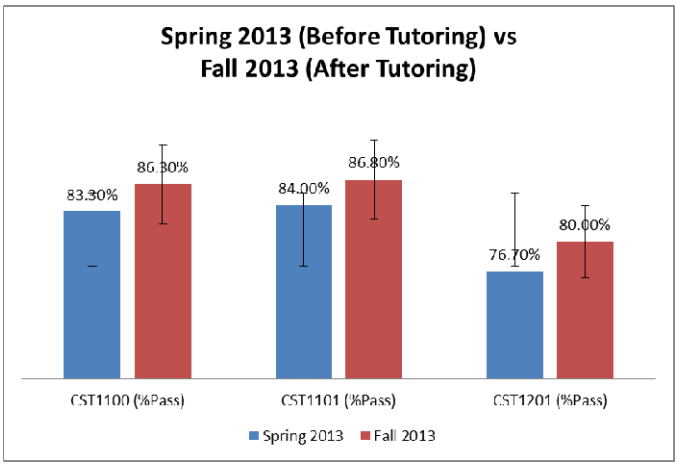

Fig 5: Graph with error bars comparing the % of students passed in the Spring and Fall 2013 semesters of students taking the 3 introductory courses.

V. Conclusion

In this paper we present a cost-effective approach which increases college retention rates at any four year public community college. We showed that mentoring and tutoring helped freshmen students get about 3-5 percentage points higher grades. The results were compared to the semester when this program did not exist. The results were shown to be statistically significant using Chi-Square statistical analysis. This would mean that they are more likely to persist in college. This represents a 9 to 12 percent increase in retention rate.

These results are highly supportive of the potential of student mentoring and tutoring. When we compared the costs and benefits of student mentoring to programs that target financial aid, we find that student mentoring leads to larger effects than financial aid and are much less costly to implement.

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