

# Mentorship: A Bridge to Retention

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## Abstract

It has been proven that mentoring benefits college students' lives on campus from numerous studies in the past decade. A survey was conducted at the beginning of the spring semester in 2009 to investigate the degree of assistance the students expected from their mentors. The population was selected from the computer science foundation course: CS146 - Introduction to Algorithms & Programming. 55 out of 59 students completed the Computer Science Mentoring Program survey. The results showed that the average student's willingness to join the mentoring program is 3.2 from a scale of 1 to 5, 5 being the highest. The results also showed that the students agree the mentoring program should be able to assist them in the following areas ordered from greatest to least: (a) success in their course work, (b) building a solid foundation in computer science, (c) embracing them as a family member of the department, and (d) guidance in selecting their future career. After reviewing the results of the survey, we suggested that the stakeholders of the vulnerable departments might need to consider maintaining a long term mentoring program to lead their students to success.

## Introduction

Mentoring programs have been shown to be a benefit to the learning environment. Mullen stated that mentoring reaches beyond individuals to nurture the potential of groups and communities (pp. 2). New and expanded ideas of mentorship have been created in undergraduate and graduate programs for the purpose of recruitment and retention. A few of the many examples, such as Carver et al., conducted the study of using pair programming for the laboratory exercises in the introductory programming course. Keathly and Akl reported an undergraduate mentoring program that used the Ambassador cohort, young women enrolled in the computer science and computer engineering programs that served in a form of outreach to area high schools and junior colleges. Keathly and Akl stated that the programs were derived for recruiting and retention for the women in the fields by providing opportunities to develop student-to-student relationships. Doerschuk stated that both industrial mentors and peer mentors were recruited to give the students advice and guidance on how to successfully complete their degree and become a computer science professional. To overcome the geographical limitations for the mentors and mentees, Clabargh, Barron, and Martin conducted a telementoring program. However, Henry et al stated that most research on recruitment and retention has focused on

underrepresented groups. They emphasized the importance of addressing the problems and needs of the general Computer Science student population.

To maintain a successful mentoring program, it is important to build a supporting relationship between mentors and mentees. Bowley stated that mentorship is complex, idiosyncratic, a function of the personal biographies, needs, interests, and dispositions of both the mentor and the mentee (pp. 21). Many researchers agree that developing a critical and progressive mentorship is critical for converting the scholarly curriculum into one that fosters vital skills (Mullen pp.15).

**Problem**

There are three computer science program tracks offered to the students at Sam Houston State University (SHSU): (a) Computer Science, (b) Information Assurance, and (c) Information Systems. Two of the Computer Science core prerequisite courses are the foundation of programming which including CS 146 Introduction to Algorithms and Programming and CS 147 Programming Algorithms and Data Structures. To maintain a stable enrollment status, we resolved to create some strategies to increase the retention rate in the Computer Science department. Thereafter, our Mentoring Program to assist the CS146 students in and out of lab time was proposed to the Texas Workforce Commission for the Texas Youth in Technology Program. This grant was approved and the projects started from Spring 2009 to Summer 2010.

**Program Implementation**

After four mentors were hired in March 2009, each mentor was assigned to CS146 labs assisting the lab instructor. In Spring 2009, there were 59 students enrolled. We conducted a pre- and post-survey to study and assess the students’ expectation from this mentoring program.

The survey was constructed with six Liker-scale questions (based on 5 scale system: 1 as being the least and 5 as being the most value.) and an open question (see table 1).

Table 1. Pre-Mentor Program Survey

A 5 scale-system: 1 as being the least and 5 as being the most value.
1. To what degree would you like to join the mentoring program in the Computer Science Department?
2. To what degree do you expect the mentor will be able to assist your success in CS146 course?
3. To what degree do you expect the mentor will be able to assist your success in your college life?
4. To what degree do you expect the mentor will be able to assist your success in selecting your future career path?
5. To what degree do you expect the mentor will be able to assist you with building a solid foundation in computer science?
6. To what degree do you expect the mentoring program to embrace you as a family member of the Computer Science Department?
7. Please share your thoughts of any other ways your mentor could assist you.

## Results

The pre-program survey showed that the students expected the mentor would be able to assist their success in different areas ranging from the score of 2.7 to 3.9. The most significant item was that they expected the mentor would be able to assist their success in the CS146 course. The least expected item was to assist their success in selecting their future career path. The comments the students shared included that the mentors would assist them in:

“Helping to get a good grade”; “Assisting for programming codes”; “Helping to understand the concepts of Computer Science”; “Providing information about CS fields, careers, & internships”; and “Managing my time and priority list”.

After 2 months of assistance from the mentors, the students were asked to complete post-program survey. Through the observations of how each mentor presented himself/herself in the lab and how each mentor approached to the students, two types of mentor personality and characteristics (Type A and Type B) were defined from this program. Type A was proactive and voluntarily assisting the students. Type B was passive and waiting for the students to ask for help. The post-program results showed a statistically significant difference between these two types of mentors.

The survey results from the students with Type A mentors showed that 50% of survey items met the students’ expectation from the mentoring program which including the students (1) valued the Mentoring Program, (2) valued that the mentor assisted their success in CS146 course, and (3) valued the mentor embracing them as a family member of the Computer Science Department. As Bowley stated, the high-performance mentors persist in their efforts to help others and recognize that building a mutually satisfying relationship does take two and that the mentees and the mentors should work together (pp.10).

From the post-program survey, there were many positive inputs shared by the students, such as:

“They did an awesome job!”

“I did not actually use the mentors, but they seemed to be very valuable to other members of the class.”

“They helped a lot!”

“I’m not really interested in becoming a CS major of any type, but the mentors helped me have a positive feel for the subject.”

There were three items that the students scored below their expectation scores from this Mentoring Program: the mentoring program could assist their success: (a) in their college life, (b) in selecting their future career path, and (c) with building a solid foundation in computer science. We found that the mentors were in need themselves in those areas. Those young mentors were not confident in providing the career directions for the mentees, neither did they manage their own time properly in their college life.

On the other hand, the survey results from the students with Type B mentors showed a controversial result. The overall post-program score was below the pre-program expected score for every item. Some negative inputs were shared about the mentors:

“I never saw the mentor.”

“I did not know who was our mentor.”

“The mentor communicated with me so little. I don’t even remember the mentor’s name.”

“I did not need the mentor...”

## **Recommendations**

It was evidenced that a proper training for the mentors is critical for a successful Mentoring Program. It would be of benefit for the students and mentors for such a training program to include the disciplines of social skills as well as programming skills. Moreover, the mentors need to become familiar with the different computer science program tracks and possible career paths suited for those tracks. The training program could prepare the mentors to be more confident around the students and to be competent in the assigned subject content.

Building a social network between the mentors and students can be a valuable tool to keep the mentors working collaboratively. The mentors should be able to share their experiences and understand the students’ needs. They could also support each other if some unexpected situations occurred. Bowley stated that the very best mentors understand that the mentees are developmentally different and consequently required different forms of communication (pp.103).

Offering a “One-on-One” tutoring session from a help desk would also be a valuable tool to assist the students who are not available after the lab sessions. The students could walk in and ask for help outside of their class and lab times when they need some assistance from the mentors.

## **Conclusions**

We are hoping that the Mentoring Program will become a main support system to guide Computer Science and Non-Computer Science students completing their basic programming course. Bridging to retention is the main goal of this Mentoring Program. We would like to see the retention rate increasing through this program, in order to obtain graduates to become the future workforce employees as computer scientists, software engineers, etc. Mullen stated, “Without a cultural approach to mentoring that is supported by colleges and departments and reinforced by leaders who are compensated for time and expertise, mentoring is left to chance” (pp.7).

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