Impact of Mentoring on Student Success

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Abstract

Formal mentorship programs aim to educate, encourage, and support individuals with less experience, less resources, etc. in achieving their personal and professional goals. Crisp and Cruz provide a comprehensive review of college student mentoring research from 1990 to 2007. A key conclusion was that many mentoring studies have not been theoretically-based. This deficiency had been recognized in a similar review by Jacobi in 1991. One consequence is a lack of common definition of mentoring in the literature. Another is difficulty in identifying the key components of the mentoring relationship that are most critical in supporting students' academic success. Crisp and Cruz point out that 'mentoring' may not be generalizable across student populations (4-year vs. 2-year, majority vs. minority, different majors/career tracks, peer vs. faculty mentoring, etc.). Thus, continued investigation of potential links between mentoring attributes and student success is warranted.

The College of Engineering and Applied Sciences at Western Michigan University implemented a new, alumni mentoring program for the 2022-2023 academic year. Initially conceived as being focused on first-year students, the program evolved to include students from all undergraduate levels. The structure, development, and challenges for implementation of this program will be discussed. In addition, data will be presented from a study focused on first-year students to understand potential correlations between participation in mentoring relationships and positive academic, self-efficacy, and career awareness outcomes for the students. The College Student Mentoring Scale was used to understand the presence of a mentor-like presence in students' life. Additional questions related to self-efficacy were included in the survey. All new domestic students in the College of Engineering and Applied Sciences were invited to participate in start-of-semester and end-of-semester survey administrations. Results show that correlations between survey responses and student academic performance are stronger for the end-of-semester survey compared to the start-of semester survey. Higher responses on mentoring scale averages tended to correlate with higher first semester GPAs, but at varying levels of confidence. No correlations were identified between mentoring responses and second semester enrollment.

Background

Crisp and Cruz[1] and Jacobi[2] provide comprehensive reviews of college student mentoring prior to 2007. Both studies concluded that, at that time, many mentoring studies (and, by extension, many mentoring programs) had not been theoretically-based. In the past decade or so, multiple attempts have been made to create a theoretical basis for mentoring interventions. One challenge in this regard is the lack of a common definition of 'mentoring' in the literature (i.e., are there common components even if the structure is peer-to-peer vs. faculty to student vs. supervisor to employee vs. alumnus to student, etc.). Another is difficulty in identifying the key components of the mentoring relationship that are most critical in supporting students' academic success. Crisp and Cruz[1] point out that 'mentoring' may also not be generalizable across student populations (4-year vs. 2-year, majority vs. minority, different majors/career tracks, peer vs. faculty mentoring, etc.).

A variety of mentoring assessment instruments have been developed that claim a theoretical basis and on which statistical evaluation has been performed. Chen et al.[3] present 28 instruments for assessing mentoring, of which 24 ostensibly linked themselves to a theoretical framework. Three of these instruments that appear to have supporting psychometric data and are applicable to general mentoring and/or college student mentoring are the College Student Mentoring Scale[4], the Mentorship Measure scale[5], and the Mentoring Functions scale[6]. Both of the latter two were developed primarily for mentorship in a professional setting, but can be adapted for a student/professional mentoring relationship.

Many mentoring studies related to college students have focused on mentoring of student research by faculty, peer mentoring, or mentoring by other university-affiliated staff[7-10]. However, several studies have investigated the outcomes of alumni mentoring programs[11-15]. Newton and Glover[11] found that a combination of career exploration and mentoring from faculty and alumni helped improve outcomes for underrepresented minority students in technical disciplines. Davis and co-workers[12] found that virtual mentoring (provided via MentorNet) seemed to have positive outcomes on STEM students at an HBCU (historically black college and university). Dollinger et al.[13] looked at three alumni mentoring programs within the same institution (one for underrepresented or marginalized groups, one for upper-level business students, and one for law students). They found that participation in the mentoring program increased student satisfaction with their student experience and their confidence in future employment. They also stressed the importance of ensuring expectations were clear for both mentors and proteges. Skrzypek and co-workers[14,15] found that additional structure was necessary to improve outcomes for an alumni mentoring program in social work. While students were split about whether the program helped them academically, a majority of students thought the program helped strengthen school/community connections.

The current work has two facets – describing the development and implementation of an alumni mentoring program and presenting results from a study of first-year students using the College Student Mentoring Scale (CSMS)[4]. Motivations and challenges related to the alumni mentoring program will be described. Correlations between survey results and academic outcomes will be explored. Implications for future work related to both the alumni mentoring program and understanding the impacts of mentoring on student success will be discussed.

Alumni Mentoring Program – Development and Implementation

The alumni mentoring program was conceived as a means for increasing support for first-year students in the College of Engineering and Applied Sciences while also deepening ties between alumni mentors and their alma mater. Specific goals for the program were to:

- Increase protégé (student) confidence in their choice of major/profession,
- Increase protégé knowledge of their chosen major/profession,
- Broad the professional network of protégés,
- Improve protégé academic success and retention, and
- Increase mentor connections to the college.

Students (protégés) were recruited from the pool of new students during summer orientation sessions prior to their first semester on campus. Interested students were asked to complete a web form with information about their motivation for wanting a mentor, any previous experiences working with mentors, their personal and professional interests, and special populations with which they identified (first generation, international, military veteran or active duty, etc.). Survey questions were intended to help with the protégé/mentor pairing process as well as to understand and help manage protégé expectations for the program. Over 50 students completed the survey. Serendipitously, all students were able to be paired with interested alumni based in interest provided in the student survey and similar information provided by the alumni. Each mentor was tentatively assigned 1-3 student protégés.

Expectations for the program were incorporated into virtual training sessions for both alumni and protégés. The training made clear that the program was intended to be protégé-driven, with mentors providing guidance and input but students having the responsibility for steering the conversation and deciding on appropriate discussion topics. Protégés and mentors were expected to communicate at least twice per month with at least one of the meetings being in-person (if the mentor was local) or via Zoom, Webex, Skype, etc. if in-person meetings were not geographically feasible. Agendas for each meeting would be constructed by the protégé and circulated to their mentor at least two days prior to each meeting. Sample discussion topics and suggestions for meeting structure were also included in the training materials. All protégé s and mentors were encouraged to establish short, medium, and long-term SMART goals (Specific, Measurable, Attainable, Relevant, and Timebound).

Separate trainings were established in late August/early September for both mentors and protégés based on best practices for mentoring relationships[15,16]. Of the 50 students who had previously expressed interest, only about 10 signed up for the trainings despite multiple outreaches. The reasons for the drop-off in first-year student interest are not clear. One hopeful possibility is that students found other commitments around campus (e.g., student organizations) to which to devote their time. Regardless, the end result was that a significant number of interested alumni no longer had protégés assigned to them.

Protégé recruitment was then opened up to all undergraduate students in College of Engineering and Applied Sciences via mass email. This resulted in additional protégé/mentor pairings but

also raised new issues like students who were planning to graduate during the fall semester wanting to be connected with a mentor and additional interested students who did not match with available alumni. Follow-up, targeted emails to students in specific departments coinciding with the interest areas of the available alumni resulted in several more protégé/mentor pairings but a number of interested alumni remained unpaired.

All interested students were finally able to complete the required initial training for the program by late October, approximately two months later than planned. Email follow-ups to both protégés and mentors in late November found about two-thirds of the pairings working well, and about one-third of the protégés needing additional guidance or encouragement to maintain their responsibilities in the program.

Methods – Understanding the Impacts of Mentoring

The research component of the project was initially conceptualized as comprising two separate survey instruments – one based on the College Student Mentoring Scale[3] for all new students and a second integrating items from the Mentoring Functions Scale[6] and the Mentorship Measure[5] targeted at protégés in the alumni mentoring program. Due to complications with getting the alumni mentoring program up and running, the research was shifted to focus only on the first-year student survey using the CSMS.

The CSMS consists of 25 items proposed to relate to various aspects of mentoring and associated relationships. Crisp[4] hypothesized that the items could be broadly grouped into four categories: Psychological and Emotional Support, Degree and Career Support, Academic Subject Knowledge Support, and Existence of a Role Model. Previous validation work related to the CSMS has been promising but has been limited in terms of the specific traits of students involved. In addition, two questions related to self-efficacy (i.e., the student's confidence in graduating) were included at the end of the survey.

All new first-year and transfer students in College of Engineering and Applied Sciences were invited to participate in the start-of semester survey during the first three weeks of the semester. Recruitment occurred via email and the survey was administered via Qualtrics. Similar email recruitment was performed for the end-of-semester survey (final three weeks of the term) which was identical except for the addition of a 'what do I know now that I wish I knew at the start of the semester' question. Responses from the two surveys were combined with student demographic and academic information (Fall 2022 GPA, Spring 2023 college of enrollment).

Results and Discussion

Table 1 shows the demographics of the students invited to participate in the mentoring survey. The total number of students was 456 – 348 first-year students (beginners) and 108 new transfer students. Responses were received from 84 students on the start-of semester survey (70 beginners and 14 transfers – response rates of 20.1% and 13.0%, respectively. Response rates for the end-of semester survey were lower, 36 responses (10.3%) for beginners and 2 responses (1.9%) for transfers. Due to the lower response rates for transfers, all presented data will focus on beginner students.

Table 1: Demographics of Fall 2022 new first-year and transfer students in College of Engineering and Applied Sciences

	Male	Female	White	Non-white
First-Year	271 (77.9%)	77 (22.1%)	250 (72.0%)	98 (28.0%)
Transfer	87 (80.6%)	21 (19.4%)	72 (66.7%)	36 (33.3%)

One-way ANOVA tests were conducted to identify correlations between the outputs Fall 2022 GPA and Spring 2023 college of enrollment, and a variety of demographic, academic, and survey items. All correlations were evaluated at the 95% confidence level.

Following the approach of Crisp[4], response items from the CSMS were grouped into four mentoring factors:

Factor 1 (MF1) – Psychological and Emotional Support (8 items)
Factor 2 (MF2) – Degree and Career Support (6 items)
Factor 3 (MF3) – Academic Subject Knowledge Support (5 items)
Factor 4 (MF4) – Existence of a Role Model (6 items)

Survey responses for each item were averaged with the responses from other items in the same factor to produce an average factor score (e.g., F1 average, F2 average, etc.). Students were also asked to rank their confidence in graduating from college in general and their confidence in graduating from Western Michigan University specifically. Factors that were found to be correlated to Fall 2022 GPA are listed in Table 2. Factors that were found to be correlated to Spring 2023 college of enrollment are listed in Table 3.

Table 2: Statistically significant correlations (95% Confidence Interval) for Fall 2022 GPA for beginners in College of Engineering and Applied Sciences; + = positive correlation; - = negative correlation; o = mixed correlation

	All Beginners	Male Beginners	Female Beginners	Surveyed Beginners
N	348	271	77	70 (Start) / 36 (End)
H.S. GPA	+	+	o	o (Start)
F22 Credits	o	o		- (Start)
Gender	+			
MF1 Avg				+ (End)
MF2 Avg				
MF3 Avg				+ (End)
MF4 Avg				
Grad college				+ (End)
Grad Western Michigan University				+ (End)

The first takeaway from Table 2 is that a comparison of identified correlation between high school GPA, Fall 2022 credits, and gender on Fall 2022 GPA show significant differences between the overall population of beginners and the surveyed population. As a result, any conclusions may not be representative of the overall beginner population in the College of Engineering and Applied Sciences.

No average mentoring factor responses were found to be correlated with Fall 2022 GPA from the start of semester survey. Statistically significant correlations were found for seven individual CSMS survey items from the pre-survey. In most cases, students reporting average responses (3 out of 5) were statistically more likely to have a higher Fall 2022 GPA than students with highly positive responses (5 out of 5) on these items but no overall trends were observed. From the end-of-semester CSMS, both Mentoring Factor 1 (Psychological and Emotional Support) and Mentoring Factor 3 (Academic Subject Knowledge Support) were found to be positively correlated with increased Fall 2022 GPA. Confidence in graduating from college and confidence in graduating from Western Michigan University were both found to be positively correlated with Fall 2022 GPA when the data was taken from the end-of-semester survey.

Among students completing the start-of-semester survey, taking 12-15 credits during the first semester was correlated with a higher first semester GPA compared to taking more than 18 credits. For all beginners, taking 12-18 credits was correlated with a higher GPA than taking 18 credits. For all beginners, each half-point of high school GPA increase correlated to a statistically significant increase in Fall 2022 GPA (i.e., 3.0-3.5 vs. 2.5-3.0); no clear trend was identified among the surveyed population. Among all beginners, female students were statistically more likely to have a higher Fall 2022 GPA than their male peers. This trend was observed among the surveyed population but at a lower than 95% confidence level.

Table 3: Statistically significant correlations (95% Confidence Interval) for Spring 2023 college of enrollment for beginners in College of Engineering and Applied Sciences; + = positive correlation; - = negative correlation; o = mixed correlation

	All Beginners	Male Beginners	Female Beginners	Surveyed Beginners
N	348	271	77	70 (Start) / 36 (End)
H.S. GPA				
F22 Credits	o	o		- (Start)
Gender				
MF1 Avg				
MF2 Avg				
MF3 Avg				
MF4 Avg				
Grad college				
Grad Western Michigan University				+ (End)

Fewer correlations were identified with regards to second semester (Spring 2023) enrollment. No CSMS average factors were found to be correlated for either the start-of-semester or end-of-semester survey. Correlations were found for three of the individual CSMS survey items on the start-of-semester survey, two of which corresponded to items found to be significant for Fall 2022 GPA on the same survey. A strong positive correlation was measured between a student's confidence in graduating from Western Michigan University and their being enrolled for the Spring 2023 semester. Unlike the Fall 2022 GPA, general confidence in graduating from college was not significantly correlated to Spring 2023 college of enrollment.

Conclusions and Future Work

Results of the current study do not appear to support the idea that the College Student Mentoring Survey (CSMS) is an appropriate tool for understanding the impacts of mentoring relationships on the beginner student population in College of Engineering and Applied Sciences. While some statistically significant correlations were identified for individual survey items from both the start-of-semester and end-of-semester survey administrations, the broadly conceptualized mentoring factors showed limited correlations. Future work will include additional screening of potential instruments to understand the importance of mentoring on engineering student success, particularly early in students' academic career. Work from Baier[17] with students at a mid-western commuter school showed significant impacts from both mentoring relationships and self-efficacy on student persistence to the second semester. While a correlation was observed with second semester enrollment for self-efficacy in the current work, limited correlations were evident from the mentoring instrument.

Additionally, feedback from students participating in the College of Engineering and Applied Sciences alumni mentoring program will be used to restructure the program for the future. Feedback will be used to determine if the focus on new students to the college is appropriate and if the program is achieving the desired impacts for these students.

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