Developmental Relationships among Computer Science and Engineering Majors:
Implications for Professional Development

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Abstract

A qualitative study of 61 computer science and engineering majors showed that relationships with peers, faculty, and family and friends are linked to engagement in voluntary development activities outside of the classroom. Results show that peer relationships emerge organically and are most strongly associated with voluntary professional development activity.
Increasing retention in science, technology, engineering, and math (STEM) is a national priority. Given the characteristically impersonal and individualistic nature of the STEM environment, relationships are a promising avenue for improving retention in that relationships have an anchoring effect in challenging contexts. The goals of this study were to understand the nature of developmental relationships of computer science (CS) and engineering (ENGN) majors and how they influence voluntary professional development outside the classroom.

Interviews were conducted with 61 CS and ENGN students including 28 men and 33 women. Participants completed a survey assessing the quantity of participation in several professional development activities. Interview transcripts were coded for any development experience that included a relationship. In total, 30% of participants reported at least one relationship experience. These 28 developmental relationships included faculty and advisors (39%), other students (36%), and family and friends outside the university (25%).

In describing the origin of relationships with other students, at least half seemed to emerge organically (e.g., students were in the same class). The remainder was equally divided between those the participant initiated and those initiated by another. In contrast, 72% of relationships with advisors and faculty members were initiated by students. In most cases, the student sought a meeting to address a specific issue (e.g., help selecting courses). This initial meeting “opened the door” for a developmental relationship that became broader in focus. The majority of relationships with family and friends pre-dated the student’s interest in CS/ENGN. Once the student’s interest became known, the relationship began to include a professional development focus.

In contrast to relationships with other students, relationships with faculty and advisors yielded more concrete benefits, including internships, research experience, specific skills,
recommendation letters, and advice. In mentoring terms, these relationships provide some psychosocial support and motivation; however, they yielded relatively more career-related support. Benefits from developmental relationships with family and friends offered a combination of psychosocial and career-related benefits. Students received information about their career field, had the opportunity to discuss, learn and apply professional skills, and received encouragement.

The quantity of each type of relationship was coded and used to predict participation in voluntary professional development, $F(3,57)= 4.20, p<.01, R^2 = .18$. Peer relationships were the strongest predictor of voluntary professional development ($\beta = .42, p<.01$). Because peers share similar career timelines, peer relationships may be characterized by temporal embeddedness (i.e., they share a common history and are able to accumulate relationship-specific investments together).

Although CS/ENGN students received psychosocial and career-related support from their developmental relationships, 70% of the sample did not have such a relationship. STEM programs could foster developmental relationships by (a) providing additional opportunities for contacts with peers and faculty to be made, and (b) providing training about both the value of such relationships and techniques for developing them. In terms of anchoring students to STEM majors through participation in development activities, our research suggests that encouraging peer relationships would be especially fruitful. Additional applied and research implications will be discussed.