Geeks Are Chic: Cultural Identity and Engineering Students' Pathways to the Profession

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Nationwide, the need for US engineering talent continues to grow, yet enrollment in and graduation from engineering institutions continues to decline. If engineering educators better understand how students come to engage with their studies and chosen institutions as well as develop an identity with the profession, engineering colleges can adjust institutional climates to encourage more students to enroll in engineering studies and persist to completion.

Implications of Findings

The cultural identity of geekiness in its introversion, intensity of focus, and application of specific knowledge reveals something about the students at Mountain Technology Institute (MT)—and other engineering-education institutions. This intensity may be preventing students from engaging with other parts of their identities, to the detriment of the students and to the field of engineering. If embracing geeky aspects of oneself in the pursuit of an engineering degree forecloses embracing other aspects of one's identity, some students may opt out of engineering; others may avoid ever engaging with the geekiness of engineering, given negative cultural perceptions. This quality of engineering education possibly forces out students who could be highly competent practitioners in the engineering field. Allowing students to embrace the curious, intensive applied qualities of geekiness while making room for them to stretch beyond its narrow disciplinary constraints might well allow engineering-education institutions to improve their retention numbers, even while better meeting the nation's needs for more engineering talent.

Method and Background

The research described in this paper is part of the five-institution Center for the Advancement of Engineering Education (CAEE), an NSF-funded study that explores the experiences of undergraduate engineering students. The current study is based on data from student participants at MT, a small public university specializing in teaching engineering and technology.

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As part of a longitudinal, multiple-methods study, these data come from semi-structured ethnographic interviews. Interview questions focus on engineering students' decision-making processes, activities, and objectives. This paper investigates the emergence of engineering identity among first- and second-year students and addresses the question: What personal and institutional factors influence students' decisions whether to persist in completing a major in

engineering?

Data were collected by digitally audio taping interviews ranging from 1-1/2 to 3 hours in March or April of 2004 and 2005. Sixteen interviews each year were conducted. Audio files were transcribed and formatted for coding in ATLAS.ti 5.0. The codes for how participants discuss their identities and their relationship to engineering school include identity as the main category with identity-peers, identity-professional, and identity-self as sub-categories (for a full discussion of methods, please see the full paper via the link at the bottom of this page). This paper uses quotations from eleven of the seventeen students interviewed.

Geeks and engineers share many traits in common, according to MT lore, and verified by study participants and Wikipedia – "geek" describes a person who is good at math and science, possesses highly specialized knowledge in certain fields, and pursues personal practices such as role-playing games, computer games, and reading science fiction. Because individuals develop identity in context, if a student enrolls into an institution perceived as having a particular identity, s/he must engage with that identity and ultimately choose whether to accept or reject it as personally relevant and desirable or tolerable.

What We Found
We have learned that many of these undergraduates chose MT because they are "good at math and science." Most were in the top ten percent of their high school classes and identify strongly with high GPAs and past academic success. Recognition that everyone else at MT carries that pedigree is one of the first identity shifts MT matriculants must make. A certain pleasure that they are in the company of other smart people with similar pursuits was a common response. Anxiety was another common response when students recognized that they were no longer at the "top of the heap."

Perhaps by choice or circumstance, many MT students were absent from the center of their high-school social networks and may have been isolated to greater or lesser degrees because of their math and science interests or non-mainstream interests such as building robots or engaging in role-playing games such as Dungeons and Dragons. Painful shyness and/or introversion are recurrent characteristics applied to MT students, as are questionable personal hygiene habits and attire.

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<u>MT in the First Year</u> Because of MT's rigorous admission process and the climate of a STEM-centered curriculum, students tend to be academically focused, disciplined, and hardworking and students identify themselves and their peers according to these attributes. Students tend to identify their seriousness as being "nerdy" or "geeky" and are proud of this identity, although study participants allude to hierarchical differentiation within MT. Foregoing leisure time activity to study is one common behavior of many MT students, but can have a downside for some students. Virtually all of the respondents in the first-year interviews reported a love of and facility for math and science as principal reasons for choosing engineering as a major and MT as a college destination. Humor is a way MT students share their interest in math and science as well as define themselves as being different from students in other majors. Surrounded by students with similar interests, passions, and academic pursuits, MT students embrace the

cultural climate with some pleasure and satisfaction, although some aspects of life at MT pose challenges to students' emerging identities as engineers.

Institutional Navigation MT students have little choice in their academic pursuits because of the university's exclusive STEM focus. Among their challenges are adapting to the intensity of a pre-engineering curriculum and learning to adjust their expectations of themselves in relation to their peers. A common adjustment MT students must make is to recognize that not everyone can remain at the top academically in this new environment. Another point of adjustment MT students must make is that some material in certain classes in more accessible than other content and that someone else often sets the curve and seems to do so easily. The competitive environment and the introverted character of the other students can lead to a sense of loneliness.

Disciplinary Knowledge A tendency to apply math and science knowledge outside the classroom characterizes a number of MT participants. They see this practice as setting them apart from other college students/age peers. This attribute, they maintain, makes them geeks.

MT in the Second Year By their second year at MT, many students' attitudes toward the geek identity had shifted considerably. While still acknowledging that they possessed geeky or nerdy characteristics and behaviors, students exhibited a marked desire to distance themselves from the "geek" label. Participants wanted to talk about other facets of their personalities such as their friends, recreational interests, and artistic sensibilities. Second-year students frequently expressed their desire and need to offset study with play. Students also spoke of the richness of their friendships amongst peers who were willing or able to engage in a social way and that friendships with non-engineering students enrolled outside MT served as an important reality check against being too geeky. Participants considered their lives to be more socially rich and more balanced than those of the stereotypical geeks; they rejected identities defined entirely by schoolwork.

Findings reported in this paper are based on two years of data. Analysis of subsequent data has just begun and interviews for year four will soon be underway. At MT, our next step in data analysis is to develop a clearer picture of how campus culture fails certain students and what that might mean for changing recruiting and retention practices for our campus to improve the quality of personal and educational experience for MT's students.

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