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

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Academic Pathways Study (APS)
Multiple-Methods Study

- Ethnographic observations/conversations*

- Structured interviews

- Semi-structured interviews*

- Online surveys

- Performance tasks

- Academic records

*data set used in this paper

Research Questions Addressed Here

- How do pre-engineering/engineering students navigate their educations?

- What elements of students' engineering educations contribute to changes observed in their skills and identities?

- What do students find difficult and how do they deal with the difficulties they face?

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Mountain Technical Institute

- Rocky Mountain West
- Public institution
- Research intensive
- 2700 undergraduates, 2003-2004
- STEM focus
- Most students enter from top 10 percent of high school class
- Competitive environment

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Analytical Strands

- How students navigate MT; particularly how competition with intellectual peers affects personal identity
- How students link personal identity to growing disciplinary knowledge
- How students identify themselves and others as engineers-in-training
- What this cultural identity could mean to persistence in engineering
- Initial findings of Y1 presented at AERA 2006

Institutional Navigation
Adjustment of expectations of self in relation to peers

"I think that my hardest problem right now is accepting the fact that I, I'm not the best and, and maybe I can be but I don't, realistically, I don't think it's gonna be, uh, happening for me." Christina

Institutional Navigation
"Genius Kids"

"I think it's just neat if somebody is just so brilliant and can, is able to just crank out numbers and see this and see that, and understand that, you know. I mean, oh, I wish I could do that." Grace

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Institutional Navigation
Isolation

"I talk to my dad about it a lot because he's an engineer, and he kinda understands. He's like, 'You know what? It's hard; I'm not gonna lie….At times you will feel like you're inadequate.' And so…it's kind of comforting to understand that…I'm not the only one that's struggling here….Sometimes I do feel like I'm the only one struggling because I don't really see it in a lot of people." Christina

Institutional Navigation
Hard Workers

"Kids who go here are in college to work, not to party....I can't really say engineering students versus other students because there's not other students running around here. I don't know how the engineering students at other state schools are but the kids who go here go to school to work, and the kids I see on the weekend [elsewhere] go to school to party."
Max

Disciplinary Knowledge
Applying STEM knowledge outside of the classroom

"We were sitting at breakfast yesterday discussing whether if you put salt on your pineapple, it would decrease the acidity of the pineapple, and we talked, I mean, we went into strong acids and weak acids and dissociation." Christina

Disciplinary Knowledge
Finding the perfect fit

"I went to the [working] mine for a tour....It was fantastic; I loved the atmosphere, I loved the people there because they could just stand around, and if there was nothing going on, could stand around and say, 'Um, we've got some extra explosives; I'll be back.' ((Laughs.)) And I loved it because it's like kids in a candy store; as long as they were blowing up explosives, they were smiling more. It's what they do. They blow stuff up; they get to drill holes. Hhhhh. It was great. I loved it because I could see myself doing that." Robert

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Geeks, Nerds, Dorks, & Engineers
A Lot in Common?

- Highly intelligent
- Passionate about specialized knowledge; diligent in pursuing it
- Good at math & science
- Drawn toward technology
  - Computer games, role-playing games, science fiction
- Socially idiosyncratic, perhaps

Y1: Embracing Geekiness

Participants refer to their intense academic focus as being "nerdy" or "geeky"

"I think we're all for the most part pretty serious about school, and we're pretty sure we want to be engineers.... So I think personality-wise, we're—we all realize we're kind of nerds and I think that's pretty cool, that we can like joke about it and have fun with it." Christina

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Y1: Embracing Geekiness
Geeks & engineers are drawn toward certain pursuits

"I'm drawn most towards fantasy, science fiction, and some action movies; there's some really nice action movies out there....I like science fiction, <u>Star Trek, Star Wars</u>....I like puzzles. That and <u>Deep Space Nine</u> is just so cool....I like to role play a lot. I do Dungeons and Dragons, online games; it's a break just to try and be something different and see how good other people are at making believe."
Robert

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Y1: Geeks Are Good

"Whenever we have visitors from other schools…we tend to talk more about our classes, about Physics and stuff than we do regularly.…We're proud of the fact that we're nerds, and so we kinda ((laughs)) like talking about that stuff in front of other people. It's so weird.…We enjoy those kind of things [t]hat would be considered dorky or nerdy." Leslie

Y2: Wariness of Geeky Identity
Breaking away from stereotypes

"Coming into MT, [I thought] a MT student, stereotypically, was somebody who sat in their room in front of a computer and did homework all the time. I do a lot of homework and sit at home and do my homework, but I also have to be active a certain amount during the week. On the weekends, I definitely go out and be physical. So I guess I don't fit with the considered stereotype of MT....I'm proud to go to MT, and I'm proud to be considered being smart enough to go to MT and to do engineering and stuff, but I don't find pride in being considered a person who sits in a room and just does nerdy stuff all the time." Kate

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Y2: Wariness of Geeky Identity
Drawing the line between "geeks" and "non-geeks"

"I think there's two kinds of engineering students. There's really nerdy ones that just don't have very many social skills and just do their homework religiously.... And then there's kids that think for themselves — I guess a little cooler kids. I don't know [if they] talk more, but they're more social....Nerdy kids are not any more smart than the kids who have social [skills], screw-off kids, I guess....I definitely do my homework, so I guess I'm a little bit nerdy, but I'm a social kid too, and I kind of screw off a little bit."
Michael

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Y2: Wariness of Geeky Identity

Balancing study & play

"There's definitely a lot of students here who are quote, unquote nerdier than me, [who are] really into some other stuff that we wouldn't really consider normal in the world. I mean, there's the engineering world and there's the out-of-engineer world. [Laughter.] My whole life I've tried to balance that. I know I've always fit into school. I know I've always been one of the smart kids and always studying, stuff like that. So when I was younger I tried to find a balance, just so I wasn't gonna be called a nerd or whatever, or a geek....It's kinda: 'Ooof, step back; that's too much for me.'" Roger

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Y2: Wariness of Geeky Identity
Social Interactions

*"It's really hard to talk about this. I feel I'm different from [my peers] because most of the[m]...are just so weird. They just don't have social skills....A lot of [MT] kids...all they do is school. They don't go out; they don't have fun. And I feel like I have a bigger picture. That GPA isn't the hugest thing in your professional life. I like to have fun. [*I: When you say they don't have social skills, what does that mean?] ((Sighs.)) Kids bark out the weirdest things. Walk around like their grandma dressed 'em. ((Laughs.)) You look at somebody...and it just makes you go: What?!" Max*

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Analytical Strands, redux

- How students navigate MT; particularly how competition with intellectual peers affects personal identity
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Further Analysis Needed

- How does this identity affect students in their third and fourth years of study?

- What does this identity mean for commitment to the profession of engineering?

- Are there gender implications in the identity of a geeky engineer?

- Are there ethnic/racial implications in the identity of a geeky engineer?

Conclusions & Significance

- MT students describe a strong identity correlation between engineers & geeks
- An intensely competitive learning environment, including application of new knowledge to daily life, is a feature of geekiness at MT
- MT students have a shifting & increasingly uneasy relationship to the geeky identity of engineering (Y1 to Y2)
- MT students who disengage from geekiness express strong dissatisfaction with engineering studies
- Perceptions of geekiness could be an inhibitor to expanded recruitment of engineering students