AC 2009-1445: WHERE SUCCESSFUL LATINO/A UNDERGRADUATES FIND COMMUNITY AT A PREDOMINANTLY WHITE RESEARCH UNIVERSITY

Susan Walden, University of Oklahoma

Randa Shehab, University of Oklahoma

Where Successful Latino/a Engineering Undergraduates find Community at a Predominately White Research University

Abstract

The Research Institute for STEM Education conducts mixed-methods research seeking to identify the factors contributing to successful completion of an engineering degree by under-represented and under-served minority students at a predominately white, research institution. STEM stands for science, technology, engineering, and mathematics. Rather than treat these students as a homogenous population, we disaggregate students by different racial/ ethnic groups and by different life experiences as we uncover the obstacles encountered and the strategies employed to surpass them. Using a semi-structured, quasi-longitudinal interview protocol inspired by previous ethnographic or qualitative studies of college students, we asked 165 non-majority undergraduate engineering students to share their lived experiences as minority students in undergraduate engineering programs at this institution. Invitations to participate were extended to students in their sophomore, junior, or senior years and were repeated annually until graduation. Of the 165 students who participated in the study, 37 self-identified with Hispanic or Hispanic-American ethnicity. The 23 male and 14 female Latino/a students provided 56 interviews over five semesters. Even within this relatively small group of students, a variety of backgrounds are represented. Over one-fourth of the students consider Spanish their primary language and another 9% report Spanish as their first, but not currently primary language. One-fourth of the students are from rural areas or small towns, another one-fourth are from suburban communities, and one-half are from urban areas. Fifty-nine percent report at least one parent has earned a bachelor's degree or higher. Seven students are first-generation in the United States, whereas almost one-half were born in the U.S. to at least one immigrant parent.

With these varied personal and pre-college community experiences, it seems unlikely that a single academic community would fit the needs of all these students. Using a theoretical perspective based on Tinto's model of student engagement, we will examine the communities formed in student organizations and programs as described in the student interviews. This paper will address the research question: How do Hispanic students' personal backgrounds influence their sense of belonging and ability to find community within a predominately white institution?

Introduction

According to theories of student engagement, satisfaction with and to some degree success in college is dependent on feelings of belonging and acceptance and on finding a community for empathy, support and guidance.[1-7] For underrepresented minority students at large predominately white institutions, the isolation from low representation can make finding an ideal community difficult. A recent article Museus describes college campus cultures and sub-cultures and their importance in students' academic outcomes.[8] These sub-cultures can develop along a variety of dimensions including racial or ethnic identity, gender-based organizations, common academic experiences within majors or departments, religious affiliations, etc. This paper examines the interplay of personal cultural backgrounds and identities with the varied and changing collective cultures and identities within different student organizations on a predominately white, research university campus.

Methodology

The analysis undertaken here is part of the study "Portraying Success Among URM Engineering Majors," an interdisciplinary effort to identify, compare, and contrast the factors contributing to academic success in engineering of students from different underrepresented minority (URM) populations. While many of the study's publications seek to describe differences and similarities of experiences among the different groups,[9-12] this paper is one of several seeking to describe the nuanced differences found among students within the same racial/ethnic categorization.[13, 14] Using a semi-structured, quasi-longitudinal interview protocol inspired by previous ethnographic or qualitative studies of college students,[15, 16] we asked 165 non-majority undergraduate engineering students to share their lived experiences as minority students in the College of Engineering (CoE) at this institution. Invitations to participate were extended to students in their sophomore, junior, or senior years and were repeated annually until graduation. Of the 165 students who participated in the study, 37 self-identified with Hispanic or Hispanic-American ethnicity and had either graduated or were making satisfactory academic progress toward an engineering degree. The 23 male and 14 female Latino/a students provided 56 interviews over five semesters. Table 1 shows selected demographic and background data for these students.

Table 1. Distribution of participants in a variety of demographic variables

Item	number	Item	number
1st generation*	7	Rural community	2
2nd generation	10	Small town	7
2.5 generation	5	Suburban community	10
3rd generation	1	Urban community	18
3.5 generation	8	At least one parent college degree#	22
4th generation	6	One or more parent some college exp.	6
Spanish first and primary language	11	Parents graduated high school or less	5
English not first, but primary	3	Student works > 15 hours per week	14
English first and primary language	23	Student works < 15 hours per week	23

*1st generation means that student was not born or raised in the U.S.; 2nd generation = student born and raised in U.S., but both parents foreign-born; 2.5 generation = student and one parent born and raised in U.S., and one parent foreign-born; 3rd generation = student and parents born in U.S., 4 grandparents foreign-born; 3.5 generation = student, parents, at least 1, but less than 4, grandparents born in U.S.; 4th generation = student, parents, and all grandparents born in U.S. #We do not have parental education information for four participants.

The digitally recorded interviews were transcribed by a professional document processing center and coded using N-Vivo Qualitative Analysis Software[17] by a team of trained Latino/a undergraduate and graduate research assistants, using an iterative-inductive methodology.[18] Team review and consensus were used to ensure reliability of coding. The passages coded to the various student organizations and students' descriptions of their friends and sense of belonging in the college were reviewed to identify where each student found a community. This paper analyzes the intersection of the different dimensions of students' backgrounds and identities with the collective identities available from different academic communities.

In using quotes for this paper, students are identified by salient characteristics that preserve their confidentiality. Text added for clarification is contained in square brackets []. Where the audio was not completely clear, words contained in parentheses indicate the transcriber's best interpretation or (.) indicates no guess could be made. Finally, if the interviewer's question is added for context *I:* indicates interviewer speaking and *P:* indicates participant response. Quotes have been edited to remove verbal fillers (e.g. you know, umm) or text not relevant to the quote, indicated by an ellipsis.

Results and Discussion

College of Engineering Communities

The Society of Hispanic Professional Engineers (SHPE) works from this vision statement, "SHPE is the leading social-technical organization whose primary function is to enhance and achieve the potential of Hispanics in engineering, math and science."[19] With over 240 undergraduate student chapters across the U.S. and over 15,000 professional members, SHPE as a whole serves a broad diversity of Hispanic, Latino, and Latina engineers. At the local scale, however, the accomplishment of this mission seems to be variable. Only 22 of the 37 Hispanic students in the study mentioned or acknowledged knowing about the local SHPE chapter. Of those 22 students, nineteen reported previous or continuing involvement. However, neither the awareness nor the involvement was consistently predicted according to our different demographic sub-cultures. Of the 19 students experienced with SHPE, only two are classified as 1st generation in the U.S. Five report Spanish is their primary language, and another two learned Spanish as their first language; three of these seven Spanish-proficient students described substantial involvement with SHPE. Many students (six of 12) with little Spanish language ability have at times felt unwelcome or excluded from the organization while others with similar language abilities had no reports of discomfort or unwelcoming attitudes. What did seem to emerge as a common theme among those students involved with SHPE was the common identity of being and doing engineering as the basis of their involvement with the organization.

> *And just finding other people that you can relate to, that helps a lot knowing that you have something in common with others, and finding that support system, I guess just being able to talk to others and know your situation and having them relate to you. (sophomore, female, 4th generation, English-speaking)*

> *Yeah, SHPE. That's about the only one I did something with so far since I have been here. I guess I kept to myself too much to, so you know I never really got involved in anything. Probably SHPE is the only one that I been involved with since I have been here … Well, you just notice somebody, people from (engineering) doing something, so that has helped me just get to have something in common I guess, being engineers. (senior, male, 2nd generation, English not first, but primary)*

According to the participating students, the student leadership of SHPE defines a particular culture for the organization which includes some students while excluding others. When the organization's leadership has been dominated by native Spanish speakers, or students whose families come from Central or South America, those without the linguistic connection to their heritage, or whose families are from Mexico, were not accepted or accommodated.

It is like we should try to keep things in English because it does make people feel uncomfortable, especially with me. I usually end up having to talk in English and they will speak in Spanish and try to pick up what I can, because they are more comfortable with Spanish. I understand that they are more comfortable, but it makes me uncomfortable with the fact that I don't know Spanish. Sometimes I feel like I am penalized for that. (junior, female, 2nd generation, English-speaking)

P: SHPE was an on and off thing and then one year I had a friend in there, {W08}, he was really cool. He'd always stay with me, he was half Mexican but he didn't look it so we always like, but there were a lot of conferences with SHPE that I always went to a lot and that was fun. That was kind of odd, like last year I was more involved, this year I haven't done as much in SHPE … There's a lot of people, like in SHPE, Society of Hispanic Engineering Professionals, there's a lot of people, I didn't realize this until this last year but there are a lot of people that come from Latin America like Venezuela and Colombia that do not like Mexicans at all. Like I know a girl that didn't know I was [Mexican heritage] and she started going off about how Mexicans clean her house and that Mexicans are scum and later they are just like "oh you're not", you know did that whole thing. And when they found out I don't speak Spanish they're like, it's like "I cannot believe you don't know Spanish" and they just go off. I don't understand why it's such like a, I mean, I kind of understand them. I should know it but my dad didn't teach me. That's not my fault. I should have learned it but….
I: Do you feel comfortable at the SHPE meetings?
P: Not this year, I used to. (senior, female, 2.5 generation, English-speaking)

The student quoted above noted to the interviewer that she thought greater faculty oversight could aid in keeping the cliques under control.

Sophomore year - P: I went to Los Angeles five months ago for an engineering career fair and we went and it was eleven of us from SHPE and I was the only one [of the OU group] that couldn't speak Spanish. Like they could speak English and Spanish, both fluently, I was the only one who couldn't speak Spanish so the whole time I was hanging out with them like I had to listen to them speak Spanish and try to understand them? Which was really hard because they were like, it was like conversational Spanish, …
I: Does that ever affect you in anyway, I mean, how do you feel about that?
P: Sometimes, I mean like sometimes on a trip or sometimes just whenever I'm around them like that would really be awesome if they could speak English because then I could understand everything they're saying. I understand very little of what they say whenever they speak Spanish and so yeah a lot of the time it was frustrating and I was real quiet on the trip. And they were like "why are you so quiet?" And I'm like well when you speak Spanish I don't know what you're talking about so I can't say anything if I don't know what you're talking about.

Junior year - P: I guess the most involved I am with it is SHPE, and just the so things like activities we do with SHPE and the people I talk to in SHPE. That's as much as I ever get around.
I: SHPE, is like a link actually with the Hispanic side of your life?

P: Yes it definitely is because otherwise, you know, I wanted to minor in Spanish in the beginning when I first came to college, I just don't have time to take those classes if I want to graduate in four years. And it's been so long, I had four years of Spanish in high school, and but definitely SHPE is the link that I have to it. (female, 5th generation, English-speaking)

For some students the desire to participate for personal benefits out-weighed their discomfort, but for others a change in organizational climate was needed to prompt their participation. Finally, only four of the 14 students who attended more than one or two events are in the group of students who work more than 15 hours per week; yet these students are not the ones who claimed lack of time prevented their participation.

Although SHPE does not seem to be the place to find community for 1st generation students, it is not an entirely welcoming community for non-Spanish speaking students either. Neither high school community size nor parent education seems to influence who finds community with other Hispanic students through SHPE.

Discipline-based technical societies offer students the opportunity to find a community centered on the common experiences of studying and working in that field. These societies are based more on the developing identity as a *<discipline>* engineer as opposed to as a Hispanic engineer, although four students – all female – reported significant involvement in both SHPE and the relevant technical society. Examples of prominent technical societies appealing to the students in this sample are the American Institute of Chemical Engineers and the Society of Petroleum Engineers. Twelve of the 37 student participants described being part of a technical society community. Only one of these 12 students is a 1st generation student, only two are Spanish-speaking students, and only two students are from urban high school communities. The students who find community in their major's technical society stay involved as only 1/4th did not continue their involvement through school. Six of the 14 female Hispanic students in the analysis are heavily involved with their major's technical society, as opposed to three of 23 male students; three other male students described prior or more limited involvement in a technical society. For the first student who is in a major with a tightly controlled curricular progression, her leadership role in a technical society forces her to interact with students at other points in her major and in different majors' organizations:

I: Wow, yeah. What do you think are some of the benefits of being part of these organizations or these extracurricular activities?
P: It helps me to know a lot more people. Just being in, having the same people in all of your classes, you stick with them. And being an officer in an organization, you have to meet people in different classes and different organizations and branch out and network with people…. Most of the people are a pretty tight knit family. We're always together and we always hang out with each other. But, we do like to go out and see other people. (junior, female, 2nd generation, English-speaking)

The next student has found a way to build professional identity and interact with her major through the technical society and a student competition team:

I: What about your involvement with organizations? Are you…?

P: I'm involved in the different civil organizations - The Society for all Civil Engineers and the Honor Society for Civil Engineers. And they do the concrete canoe competition throughout the country and I'm involved with that, too.
I: Okay. How important is it to be involved in…?
P: Uh, I think it's important. Now that I know more people, I really enjoy it. I'm not the type of person that will go into something not knowing anybody or I wasn't really involved starting out, but as I met more people and had friends that are involved in different things too, I tend to get involved. (senior, female, 3.5 generation, English-speaking)

Although the organization is open to male students, the Society for Women Engineers did not benefit from participation by any of the male Hispanic students in this study. Less than one-third (4) of the female Hispanic students convey significant participation. All of these participants are English speakers and three do not have to work to pay for school. SWE is the only student organization for one student who works about 20 hours per week; she expresses that she would like to participate more, but that organizational rules effect to exclude some students.

So I think that way it opens doors career fair-wise, but being a part of the organization you're usually so busy doing course work and if you have a job it's just that much worse. You don't really have time to participate and hang flyers like they like to do. And this weekend SWE is going to a skating rink and they're meeting at the skating rink. So it would be really fun for kids who are in school who are probably 19 or 20, or maybe 21. But 27, it's like, I went to the skating rink when I was 18. I'm afraid I'm going to fall and break something now, you know? So, in my opinion, at my age, they have pluses, but I think the fact that now they're starting to keep points, you know, who participates and how much they participate and they're doing it all on the point system, that's a little bit harder now. So now it's sort of a drawback for me. (senior, female, 4th generation, English-speaking)

Although all students enrolled in an engineering major at our institution are considered a member of E-club or Engineering club, only a small handful of students actually participate in events or volunteer their time and energy to organize the club's activities. Only four male and three female students, all of whom are also involved in other engineering organizations, claim any active participation in E-club. A few other engineering organizations received one or two mentions by students. One notable observation is that only three students indicated that they had been honored with membership in one of the engineering honor societies, i.e. those organizations to which one is invited to join based on academic achievement, in spite of 12 students with grade point averages above 3.2 out of 4.0.

Outside College of Engineering Communities

The organizations outside of engineering that provide an accepting community for the students in our study are either religious or Latino/a/multi-cultural organizations. Seven students reveal strong ties to three Greek service and social organizations with ethnic foci.

Well, um, I was taking a class with, my MEP [multicultural engineering program] class actually, with one of the guys whose brother was an [fraternity member] and uh, like we were in the same class so I would go to his [house] and study …I would see all those

letters and I thought that it was like well, the fraternity stuff, oh man, they will probably get hazed. But then I met the guy and I was like there is no way that he is in a fraternity…. He's kind of like me, you know? He's shy and likes math so he's I guess a nerd back in high school too. And uh, like I started to just hang out with them more and I saw that they were doing community service a lot. And I saw that they were working in Oklahoma City in the Latino Agency. And I thought that was cool, you know.
...
I like the fact that I was able to meet more people, more people would know oh, you are pledging [fraternity]… You know I show up to the union and they would see that I was pledging [fraternity] and all ask like they would just start talking to me just because of [fraternity]. Where before it was like I would go to the union and I would just sit by myself like nobody cared. I mean I would see like a bunch of Hispanic people and nobody cared because I mean I guess they were waiting for me to talk to them. (junior, male, 1st generation, Spanish-speaking)

This student seems to believe that affiliation with this well-known Hispanic-serving fraternity gains him acknowledgement and recognition from other Hispanics. While all these organizations claim a multi-cultural identity, in practice, two are primarily Hispanic groups, the fraternity to which four male students belong, and a sorority that attracted two females.

Only four students, all 1st or 2nd generation Spanish-preference students, found community in the local Hispanic American Student Association (HASA). Eight students indicated that they had attempted or considered joining this organization but found (or heard) the environment to be too unwelcoming. These students include six primary-English speakers and two primary-Spanish speaking students. One female who came to the U.S. after high school did not find community in HASA; she prefers the Pan-American Student Association saying that

I felt more comfortable with people in Panam. I mean I don't have anything against people born right here but at times they're (not like) South America. I don't know I guess we are too different; like the culture here is way different than the culture there in our country. So that's kind of a point that's set apart. But we still speak the same language and we almost look alike, not almost but we look alike. We have the same (heritage) but still our culture's different. (senior, female, 1st generation, Spanish-speaking)

Most of the students expressing discomfort with HASA were not proficient in Spanish and felt their identity as Latinos or Latinas was under attack by Spanish-speaking members.

My dad didn't teach us Spanish. I find that to be a barrier. It makes me feel very uncomfortable with the Hispanic community, because not all of them are like okay, well you don't speak Spanish why don't you speak Spanish, but a lot of them are. A lot of them will critique. It is either your fault or your Dad's fault or parents fault for not teaching you. And it is like it becomes a fault that I have. I don't speak the languages. Yeah, I would love to be able to speak the languages, but that wasn't my decision. It was very difficult for my dad to be a single father, working military hours the way the military is, and teach us how to clothe ourselves let alone try to teach us how to speak Spanish and all the stuff that is involved with teaching kids to be bilingual. … I felt like I can't and won't necessarily be a part of those groups because there still is that kind of tension that I feel…. I know that of course people are going to want to speak their native

language, so then I will kind of like be okay. People say I shouldn't be afraid of that, but sometimes I am like I have been attacked so many times in the past. I am like reluctant. (junior, female, 2nd generation, English-speaking)

Three students find their support community with Christian organizations on campus. These students are not involved with any engineering communities but one student recognizes that decision may have had unwanted consequences:

> *I: How does that [being in Christ on Campus] affect or influence your school experience?*
> *P: I don't know if it really affects the school experience much. I should be involved in more groups and like I wish I was involved in SHPE now just because I know going to the conferences would help me get an internship and I haven't gotten one yet so. I think that's probably hurt my, as far as looking for a job and stuff putting my time towards trying something else but I don't know. (senior, male, 3.5 generation, English-speaking)*

Yet, a year later, he has quit this organization because of feeling burned-out from over-involvement and still has not joined any engineering organizations.

Six of the participants, five male and 1 female, have not participated in any organizations or activities with peers. For most of these students, job and family responsibilities preclude their involvement. As this student who is married and works full-time lamented:

> *I would actually be interested in joining the robotics club, and I'll probably join the Society of Hispanic Professional Engineers, but I can't ever go to any of their meetings because they are all in the evening and I'm at work. (senior, male, 5th generation, English-speaking)*

Conclusions

These 37 Hispanic engineering students arrived at the predominately white institution with a variety of background experiences. Some students acknowledge limited cultural knowledge or identity while others express very strong identity with their Hispanic heritage. All but six students have found at least one community of peers to facilitate their passage through the institution. Seventeen students are or have actively participated in more than one organization or group. In general, the female students are more involved in campus communities than male students with eight (of 14) female students indicating significant participation in more than one community compared with nine (of 23) male students. The organizations in which the students find a sense of welcome and belonging differ, however.

Barely more than half (19) of the students report any level of previous or continuing involvement with SHPE – the Society for Hispanic Professional Engineers, with only three-fourths of those describing significant involvement. The proportion of students having participated in SHPE is highest for 2nd and 2.5 generation students and for those who state that English is their primary language. Yet, students who have no fluency in Spanish described many instances of feeling unwelcome or pushed to the margins of the organization because of attitudes and actions from Spanish speaking members of the organization. By comparing student narratives with some records of SHPE leadership, there seems to be variability of the climate based on who is leading

the group. A few students were asked if they had discussed the situations with the organization's faculty advisor, but none knew who that person might be. Student organizations are a venue for students to learn and practice leadership skills, but faculty and staff advisors may need a more prominent, and stabilizing or democratizing, presence in the organizational activities.

The 1st generation and/or Spanish-speaking students were much more likely to find their support community in ethno-centric organizations outside the College of Engineering than either less culturally identified students or than within CoE. These students sought collegiality in both institution-level organizations such as HASA and in Hispanic-serving Greek-letter organizations.

Finally, the engineering technical societies, SWE, and student competition teams are pursued to a much greater degree by English-native, 2.5 generation or higher, or unemployed students than their counterparts. The Spanish-speaking, more recent immigrant, and working students sacrifice the professional development, networking, and career-focusing opportunities available through these venues. The only explanations given for not participating in these activities were from the employed students who either did not have available time or were working during the evening meeting times. As the costs of a college education continue to rise, more students will be in the working more than 15 hours per week category. Faculty and staff advisors for these student organizations will need to find ways to be more inclusive of the diverse students in their programs.

Given the extensive literature demonstrating the importance of student integration into the community of learners and the impact of feelings of welcome and belonging on persistence and positive educational outcomes, educational administrators and student advocates need to understand the ways student leadership and organizational practices can unintentionally exclude students the organizations are intended to include. Future studies might examine in more depth the diversity of students within a perceived homogeneous group and how sub-group cultures work to include or exclude certain members.

Acknowledgement

References

[1] Gloria, A.M., J. Castellanos, and V. Orozco, "Perceived Educational Barriers, Cultural Fit, Coping Responses, and Psychological Well-Being of Latina Undergraduates," *Hispanic Journal of Behavioral Sciences* Vol. 27, No. 2, 2005, pp. 161-183.

[2] Guiffrida, D.A., "African American Student Organizations As Agents of Social Integration," *Journal of College Student Development 44, no. 3* Vol. 44, No. 3, 2003, pp. 304-319.

[3] Huang, Y.-R., and S.-M. Chang, "Academic and Cocurricular Involvement: Their Relationship and the Best Combinations for Student Growth," *Journal of College Student Development* Vol. 45, No. 4, 2004, pp. 291-406.

[4] St. Omer, I., C. Sampson, and M. Lee, "Minority student retention: Importance of ethnicity based technical organizations for students at majority institutions," *Proceedings of the 1999 American Society for Engineering Education Annual Conference and Exposition,* Charlotte, NC, United States, 1999.

[5] Strage, A., "Social and academic integration and college success: Similarities and differences as a function of ethnicity and family educational background.," *College Student Journal* Vol. 33, No. 2, 1999, pp. 198-205.

[6] Terenzini, P.T., and T.M. Wright, "Influences on Students' Academic Growth During Four Years of College," *Research in Higher Education* Vol. 26, No. 2, 1987, pp. 161-179.

[7] Tinto, V., *Leaving College: Rethinking the Causes and Cures of Student Attrition*, 2nd ed., Chicago: The University of Chicago Press, 1993.

[8] Museus, S.D., "The Role of Ethnic Student Organizations in Fostering African American and Asian American Students' Cultural Adjustment and Membership at Predominantly White Institutions," *Journal of College Student Development* Vol. 49, No. 6, 2008, pp. 568-586.

[9] Flippin-Wynn, M., A.W. Lowe, S. Oosahwee, and J. Rogers, "Making it Through, Doing my Own Thing, Pulling from Within, Relying on my Homies: Coping Strategies of Engineering Students of Color," *21st Annual National Conference on Race and Ethnicity in American Higher Education*, Orlando, FL, 2008.

[10] Lowe, A.W., B.S. Norwood, S. Oosahwee, L. Rieken, and J. Rojas, "Challenges and Strategies Identified by Students of Color in Science, Technology, Engineering, and Mathematics (STEM) Classrooms," *20th Annual National Conference on Race and Ethnicity in American Higher Education*, San Francisco, CA, 2007.

[11] Shehab, R.L., T.J. Murphy, J. Davidson, C. Foor, T. Reed-Rhoads, D.A. Trytten, and S.E. Walden, "Academic Struggles and Strategies: How Minority Students Persist," *Proceedings of the 2007 American Society for Engineering Education Annual Conference & Exposition,* Honolulu, HI, June 2007.

[12] Walden, S.E., and C.E. Foor, "Is Transfer Credit a Strategy for Success or a Prescription for Failure?," *Proceedings of the 2008 American Society for Engineering Education Annual Conference and Exposition,* Pittsburgh, PA, June 2008.

[13] Foor, C.E., and R.L. Shehab, "'I Feel Like Forest Gump:' Mixed-Race Native American Students Find Community in a College of Engineering," *Proceedings of the 2009 American Society for Engineering Education Annual Conference & Exposition,* Austin, TX, June 2009.

[14] Trytten, D.A., and A.W. Lowe, "Racial Inequality Exists in Spite of Over-Representation: The Case of Asian-American Students in Engineering Education," *Proceedings of the 2009 American Society for Engineering Education Annual Conference and Exposition,* Austin, TX, June 2009.

[15] Margolis, J., and A. Fisher, *Unlocking the Clubhouse: Women in Computing*, Cambridge, Mass.: The MIT Press, 2002.

[16] Seymour, E., and N.M. Hewitt, *Talking about Leaving: Why Undergraduates Leave the Sciences*, Boulder: Westview Press, 1997.

[17] "N-Vivo, 2.0161," Melbourne: QSR International, 2002.

[18] O'Reilly, K., *Ethnographic Methods*, New York: Routledge, 2005.

[19] Society for Hispanic Professional Engineers, oneshpe.shpe.org/wps/portal/national/, accessed on: Feb. 3, 2008.