

2006-305: DESIGNING OUR COMMUNITY: EVALUATING THE SUCCESS OF A PROGRAM TO RECRUIT AND RETAIN AMERICAN INDIAN STUDENTS TO ENGINEERING

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Designing Our Community: Evaluating the Success of a Program to Recruit and Retain American Indian Students to Engineering

The Designing our Community (DOC) program at Montana State University (MSU), which is supported by the William and Flora Hewlett Foundation, has three goals: (1) Increase the motivation and pre-entry academic preparation of American Indian students who want to study engineering, (2) Help shape the engineering, engineering technology, and computer science workforce by increasing the number of American Indian students graduating from the College of Engineering, and (3) Improve access to quality engineering and technology to rural and underserved populations by returning highly educated professionals to these communities.

In two previous papers,^{1,2} we talked about the need for the DOC program and our program activities. This paper builds on previous papers by discussing program evaluation. In summer of 2004, we developed a comprehensive plan for assessing all aspects of the program. We have used this assessment plan and the data collected to evaluate our progress and to guide changes in the program. In this paper, we provide specific examples of assessment tools for programs that are geared toward increasing diversity in engineering education. Integrated with this discussion is a recounting of some of our results so far. We also report on which of our programs have been most supportive in helping students continue in engineering.

Background on Montana, Montana State University, and the College of Engineering

The 2000 U.S. Census reported the population of Montana at just under a million people. Ninety one percent of Montana's population is white; however, the largest minority group is American Indian, and this group is growing at least as fast as the overall population, which is particularly evident in Montana's K-12 schools. According to the Montana Office of Public Instruction, Montana's American Indian population comprises 11.3 percent of the total student population.

As the state's only land grant institution, MSU is dedicated to providing access to education for all of Montana's citizens, as is clear from the university's role and scope statement: "Montana State University, as part of its land grant mission, takes an active interest in enhancing the educational and professional opportunities for all protected classes and has a special dedication to developing progressive options for Montana's American Indian population." Training American Indian students in engineering and technologies helps MSU achieve its mission.

The College of Engineering (COE) at MSU is targeting the enhancement of American Indian education as a top priority over the next five years. Montana ranks in the top 15 states in graduating American Indians earning bachelor degrees in engineering and ranks in the top five states graduating American Indians with associate degrees in engineering curricula. MSU offers ten undergraduate degree programs and options in engineering.

There is no other single campus in Montana, Idaho, Wyoming, or the Dakotas that offers comprehensive (B.S. through PhD) degrees in computer science, engineering and mathematics, as well as the B.S. and M.S. degrees in engineering technology. The COE is developing programs that provide a pathway for American Indian students to achieve training in engineering and technology and that provide opportunities to enter the corporate world or return to their reservations.

Enrollment data for American Indian students shows that they have comprised 1.5 to 2.0 percent of the total enrollment in the COE prior to autumn 2004. Autumn semester of 2004, we saw a large increase in American Indian student enrollment in the COE, hopefully as a result of our recruitment efforts during the 2003-2004 academic year. This increase held steady autumn of 2005, and American Indian students now comprise 2.5 percent of the total COE enrollment.

The Engineering Schools of the West Initiative (ESWI)

In December 2001, the Montana State University College of Engineering was awarded a three-year grant from the William and Flora Hewlett Foundation to support the “Designing Our Community” Program (DOC).³ Nine public colleges and universities from nine western states were awarded grants as part of the Engineering Schools of the West Initiative (ESWI), and these schools have designed programs to improve the quality of undergraduate education in engineering and to increase the student numbers in engineering. These institutions, selected for a commitment to rigorous assessment and an ability to sustain long-term outcomes, collaborate to tackle such broad issues as best practices in recruitment and retention, faculty development, and program sustainability.

Designing Our Community Program Activities

DOC program activities are described in detail elsewhere,^{4,5} but are listed briefly below:

Recruitment Activities

- Outreach to Montana’s reservations, both at the K-12 level and the Tribal College level. This outreach includes contact with students, teachers, and advisors.
- Ongoing e-mail and phone contact with prospective students
- Montana Apprentice Program (MAP), a six-week summer program for high school students interested in science and engineering.
- Presentations and tours for visiting groups of K-12 students.
- Academic preparation sessions for K-12 students and teachers.
- A DOC web site and brochure.

Retention Activities

- Summer Bridge program, a week-long “super orientation” that includes (1) academic preparation sessions in math, chemistry, writing, and computers; (2) introduction to MSU resources, such as tutoring, the library, and the American Indian Club; (3) workshops on study skills; and (4) social activities.

- The DOC seminar, a one-credit course that features American Indian role models, information about engineering careers, and other activities.
- The Engineering Minority Program (EMPower) Student Center, which provides a place for students to build community, work in study groups, and participate in tutoring.
- A DOC student contract and stipend, which requires students to attend the seminar, spend time in the EMPower Student Center each week, meet with faculty and advisers, and maintain a certain grade point average. If students satisfy the agreement, they receive a monthly stipend.
- Tutoring, both in the EMPower student center and other campus resources.
- Mentoring by upper-class American Indian students in the program.
- Diversity training for MSU faculty and staff.
- Enhanced academic advising by DOC staff.

Professional Development Activities (students are required or encouraged to attend)

- American Indian Council student chapter
- MSU Career Fair
- Internships
- American Indian Science and Engineering Society (AISES) Conference
- Spring Native Conference Week

Evaluating the Success of the Designing Our Community Program

In summer of 2004, we developed a comprehensive assessment plan for the DOC program. This plan was organized around the program goals and objectives, and included, for each objective, the relevant program activities, what we would measure, how we would measure, who would collect the data, and any baseline data. Since summer of 2004, we have tracked these metrics and included in the assessment plan the data from academic years 2003-2004 and 2004-2005.

The remainder of this paper focuses on several of our program objectives, the methods we are using to assess our progress, and results so far. We have purposefully chosen to include both objectives on which we have documented progress and objectives for which progress has been more difficult.

Goal 1 is to increase the motivation and pre-entry academic preparation of American Indian students who want to study engineering. One of the objectives related to Goal 1 is to **raise awareness of the connections between engineering and the quality of life**. In order to collect some baseline data relating to this objective, we survey new American Indian students when they enter the Bridge program, prior to beginning their first semester at MSU. We include two survey items relevant to this objective: (1) Engineering is more concerned with improving the welfare of society than most other professions and (2) Engineers have contributed greatly to fixing problems in the world.⁶ The complete survey is included in Appendix A.

Students respond to the survey questions by indicating their level of agreement on a Likkert-style scale, with Strongly Disagree = 0; Somewhat Disagree = 1; Neither Agree Nor Disagree = 2; Agree = 3; and Strongly Agree = 4. The results for these two questions (on a 4-point scale) from 2004 and 2005 are shown below. Eleven males and five females completed the survey in 2004, and twelve males and six females completed it in 2005:

Table 1. Student responses to survey questions about connections between engineering and the quality of life. (4.00 is Strongly Agree)

Item	Average Males Only		Average Females Only		Average Overall	
	2004	2005	2004	2005	2004	2005
Engineering is more concerned with improving the welfare of society than most other professions	2.18	3.09	2.80	3.00	2.38	3.06
Engineers have contributed greatly to fixing problems in the world.	3.40	3.27	3.40	3.80	3.40	3.44

So far, the results seem to indicate that our females are slightly more likely to think that engineers have contributed to solving problems in the world (although our numbers are very small). In addition, in 2004, only 4 of 19 students indicated that they chose engineering because engineers can help solve important societal problems. In 2005, 5 of 18 students responded similarly. A planned exit survey will help us determine if studying engineering at MSU has changed students' attitudes in regard to the connection between engineering and solving societal problems.

Several program components are geared toward meeting the objective of raising awareness of the connections between engineering and the quality of life: (1) the Montana Apprenticeship Program (MAP), (3) the DOC Seminar, and (4) presentations at reservation communities, and for on-campus visitors.

The MAP program is a six-week academic preparation program for Montana high school students interested in math and science. DOC sponsored eight students in MAP in 2004 and nine students in 2005. Students participate in a number of activities, but the main focus is working on a research project with a faculty or graduate student mentor. At the end of the MAP program, students evaluate the program and complete a survey. By the end of their experience, most MAP students can connect the objective of the research project to an application in the real world. In addition, most of the DOC-sponsored students (an average of 3.71 on a 4-point scale) agree that they have a better understanding of the research process.

The DOC Seminar is one program component that is important in meeting the objective of increasing student awareness of the connection between engineering and the quality of life. The seminar, a one-credit course, is required for all DOC students, and includes presentations by American Indian role models, including engineers. Students are

surveyed at the end of the seminar, and in autumn of 2004, 15 of 15 students responded that the seminar increased their awareness of how engineering contributes to society and the quality of life. In spring of 2005, 11 of 12 students responding to the survey said that the seminar increased their awareness, and in autumn 2005, 11 of 12 students responded similarly.

Presentations at the Montana reservation schools and for on-campus visitors from the reservation schools is another activity we use to increase awareness of the connections between engineering and the quality of life. We do not, however, survey these contacts because of the context; rather, we keep track of the number of contacts. For example, from August 2004 through July of 2005, the DOC program Assistant Director talked to nearly 300 high school students through our Rockin' the Rez visits, and talked to nearly 100 students who visited MSU. In addition, MSU faculty worked with 300 middle-school students in math activities at their school, and we conducted a workshop for a dozen teachers at a Tribal College. The assistant director also made nearly 130 contacts via phone and e-mail.

Another objective related to Goal 1 is to **improve American Indian student preparedness in engineering-related topics**. One of the biggest stumbling blocks to increasing diversity in engineering programs is lack of preparation of entering students and inconsistent access to advanced math and science courses.⁷ At MSU, many American Indian students leave engineering after not being successful in initial math courses. In fact, MSU data from the last few years show that success in the first math course is more important for retention of American Indian students than it is for other students.

In order to collect some baseline data, we include some questions relevant to this objective in our initial program survey (Appendix A). When asked why they decided to study engineering at MSU, only 8 of 16 students in 2004 and 8 of 18 students in 2005 responded that they chose engineering because they enjoy math. Responses are similar for "I enjoy science."

Students are also asked about their level of confidence in regard to math, science, and succeeding in engineering at MSU. The results from these questions are shown below, for both 2004 and 2005. The averages shown are on a 4.0 scale, with Strongly Disagree = 0; Somewhat Disagree = 1; Neither Agree Nor Disagree = 2; Agree = 3; and Strongly Agree = 4. Eleven males and five females completed the survey in 2004, and twelve males and six females completed it in 2005. Table 2 below shows the results from these questions.

Table 2. Student responses to survey questions about confidence in ability in math, science, and engineering. (4.00 is Strongly Agree)

Item	Average Males Only		Average Females Only		Average Overall	
	2004	2005	2004	2005	2004	2005
I am confident in my ability in math	3.18	2.67	3.40	3.00	3.25	2.78
I am confident in my ability in science	3.73	3.08	3.00	2.00	3.67	2.72
I am confident in my ability to succeed in engineering at MSU	3.55	3.58	3.60	3.67	3.56	3.61

Our numbers are small, so it is difficult to draw conclusions from these data; however, it does appear that these female students are slightly more confident about their math ability than the males, and somewhat less confident about their science ability. Both females and males are fairly confident, prior to starting their first semester, about their ability to succeed in the engineering program.

Program activities geared toward improving American Indian student preparedness in engineering-related topics include MAP, the summer Bridge program, and academic preparation sessions at reservations, for both students and teachers. We are also collecting data on first semester grades in math, science, engineering, and writing.

In regard to the MAP program, six of seven students in 2004 somewhat agreed or agreed that the MAP math instruction improved their math skills, and most 2005 students agreed that they had a better understanding of the research process after MAP.

After the 2004 summer Bridge program, students rated the math sessions the highest of all sessions (3.6 on a 4.0 scale). After the 2005 sessions, students rated the math sessions 3.8 on a 4.0 scale. At the end of the 2004-2005 academic year, students were asked about the effectiveness of the first Bridge program in autumn of 2004, and all students commented that it helped in some way or another. Four students specifically mentioned the math sessions.

Students set academic goals early each semester at MSU, and we ask them, at the end of the semester, whether they reached those goals or not. Table 3 below shows the responses of students in regard to reaching academic goals.

Table 3. Number of students who met their academic goals, at least partially.

Spring 04	Autumn 04	Spring 05	Autumn 05
4 of 13 (31%)	10 of 21 (48%)	9 of 16 (56%)	11 of 21 (52%)

Although these numbers seem to indicate some improvement in academic success, they must be viewed in tandem with actual student grades. Student grades in science seem to be at least holding steady, but student grades in math appear to be deteriorating. This slump could be related to our larger population of American Indian students. However, we are currently seeking funding to add a supplemental instruction program in addition to our tutoring.

The second goal of the DOC program is to help shape the engineering, engineering technology, and computer science workforce by increasing the number of American Indian students graduating with undergraduate engineering degrees. One of the objectives related to this goal is to **enhance the sense of community for American Indian students in the College of Engineering**. Several program components target this objective, including the DOC Seminar, the EMPower Student Center, and the DOC mentoring program.

In regard to the DOC seminar, we developed a survey that relates to the objectives we are trying to achieve with the seminar, including enhancing the sense of community for American Indian students. The questions on the seminar survey are shown below:

DOC Seminar Survey

Please help us continue to improve our DOC Seminar by answering the following questions.

1. Did this seminar give you a better awareness of the College of Engineering community, faculty, and administration? Who else would you have liked to hear from?
2. Did this seminar increase your understanding of what professional engineers do? What type of information was helpful from the experience of the guest speakers?
3. Any career choices that were brought to your attention in this seminar? If yes what? If no, what career options would you like explored?
Would you say that the seminar increased your awareness of career possibilities in engineering?
4. Did the seminar increase your awareness of campus support programs outside the College of Engineering? Which campus support programs did you use during autumn semester?
5. What topic did you most enjoy hearing about this semester? Which was your least favorite topic?
6. Did the seminar increase your understanding of how engineering contributes to society and the quality of life? If so, in what way?
7. Any other suggestions for ENGR 200 (for example, topics you would like to have heard about or people you would like to have heard from)?

Nearly all students who completed the evaluation in spring 2004, autumn 2004, spring 2005, and autumn 2005 agreed that the seminar gave them “a better awareness of College of Engineering community, faculty, and administration.”

The DOC program survey, administered at the end of each semester, includes a question about whether students know someone in the College of Engineering whom they could turn to for a reference. Responses to this question have been inconsistent. Spring 2004, autumn 2004, and autumn 2005, about three quarters of the students responded positively to the question; however, in Spring 2005, only about one third of the students responded positively.

The program survey also asks students to estimate how many times they met with faculty (or instructors) other than their advisor during the semester. Spring of 2004, the student reported an impressive amount of contact with faculty, with the average number of meetings with faculty at 15, or one per week. Autumn 2004, spring 2005, and autumn 2005, students reported similar numbers, with several students meeting with faculty more than 20 times during the semester and some students commenting that they met with instructors so often that they lost count.

Another key community building program element is the EMPower Student Center, which opened its doors during spring semester of 2004. DOC students are required to spend four hours per week in the center. The center houses the office of the program's Assistant Director (who also serves as a student advisor), a small computer lab, and a conference room where study groups meet and tutoring sessions are held. Spring of 2003, DOC students spent about 200 hours in the center. Autumn of 2004, the number of hours increased to 2,293. That number decreased in spring of 2005 to 1,661 hours, likely because there were fewer students in the program as a result of fewer students qualifying due to grade and full time requirements.

The DOC mentoring program is also meant to increase the sense of community for DOC students. In autumn of 2004, we had 20 mentees and 12 mentors; in spring of 2005, we had 13 mentees and 12 mentors. This translated into about 230 hours of mentoring for the year. We have developed a web survey for our mentees and mentors, but have not yet administered the survey. Even without collecting data in regard to the effectiveness of the mentoring program, we can tell that we need to work on better training for mentors and a clearer understanding of responsibilities for both mentors and mentees. We will be working on these issues during spring semester of 2006.

Another objective related to Goal 2 is to **decrease financial barriers to American Indian student success in engineering at MSU**. The Hewlett funds are crucial to meeting this objective. In spring of 2004, we distributed \$17,000 in student stipends; however, during the 2004-2005 academic year, we distributed \$62,000 in student stipends. Students receive only \$250 per month, and in order to receive that stipend, they sign a contract that requires them to attend the DOC seminar, maintain a 2.5 grade point average, be a full-time student, meet with instructors and an adviser, and spend four hours per week in the EMPower Student Center.

Student response to the effectiveness of the small stipend has been universally positive. In spring of 2004, 8 of 13 students reported that the stipend contributed to their not

having to work during the school term. Even those students who did work during school reported that the stipend allowed them more study time. In autumn of 2004, only 4 of the 21 students had jobs while in school, and of the 17 who did not have jobs, 10 said that the stipend was the reason or one of the reasons. Six reported that the stipend allowed them to focus more on school. In spring of 2005, 7 of 16 students had jobs, and 8 of 16 reported that the stipend allowed them to not work at all or to work less. Several students related that the stipend helped to relieve financial stress, and one student noted that the stipend increased self confidence because it allowed for more independence from parental support. In autumn of 2005, only 6 of 21 students had jobs, and 7 of the students reported that the stipend contributed directly to working less or not working at all.

The third goal of the DOC program is to improve access to quality engineering and technology for rural and underserved populations by returning highly educated professionals to these communities. The main objective relating to Goal 3 is to **raise awareness of career possibilities in engineering, including those that would allow students to return to their communities.**

We are measuring our progress toward this objective in several ways, including:

- Number of visits to reservations, with presentations regarding engineering careers.
- Number of students entering engineering at MSU.
- Awareness of career opportunities, self reported by students.
- Number of students attending the MSU Career Fair and the American Indian Science and Engineering Society annual conference.

The number of visits DOC staff make to reservations has been steadily increasing over the past year and a half. In 2004, DOC staff, in conjunction with the centralized Rockin' the Rez' recruiting effort, made 12 recruiting visits to reservations and talked to approximately 326 students; in 2005, DOC staff made 26 visits and made contact with over 600 students. In addition, the number of students visiting MSU and talking to engineering staff and faculty has also increased.

These increases parallel the increase in the number of students entering engineering at MSU. In autumn of 2004, the number of new American Indian students in engineering doubled over the previous autumn (from 10 to 20). That number decreased slightly in autumn 2005, to 17, but we definitely think we are seeing results from increased outreach efforts, especially since many of the students who come have been contacted while in high school by DOC staff.

In regard to increasing awareness, as reported by students, Table 4 below shows the number of students across time who said that they learned something about engineering careers in the DOC seminar.

Table 4. Number of students who reported increased awareness of engineering Careers as a result of the DOC seminar.

Spring 04	Autumn 04	Spring 05	Autumn 05
4 of 13 (31%)	21 of 21 (100%)	16 of 16 (100%)	11 of 12 (97%)

The seminar appears to be meeting its objective in this area.

More than half of the DOC students attended the autumn 2004 MSU Career Fair and nearly all of those attending reported learning something useful. The DOC program also funds the attendance of several students each year at the American Indian Science and Engineering Society’s annual conference. Three students have attended each year for the past two years, and the response from students is very positive. One student noted that the conference “showed me all the opportunities I have. . . I will put forth more effort in my curriculum.” Another student commented that the conference “opened up doors for an internship.”

Overall Program Evaluation

Our comprehensive assessment efforts have helped us get a better picture of where we are succeeding and where we need to concentrate more resources. We have been successful at recruiting more American Indian students, but we have not been as successful at preparing them for and supporting them through the first year of the engineering curriculum, even though we have been able to raise student awareness about the many academic support resources available to them at MSU. We are studying different models of supplemental instruction, particularly for math, and are also investigating funding sources for this instruction.

We have been able to provide enough financial support to allow students to focus more on school, and we are also satisfied with our efforts at improving the sense of community for American Indian students. The EMPower Student Center often looks like a day care center, with young mothers and fathers bringing children with them when they come to the center to meet with their study group or a tutor. However, we have not given enough attention to our mentoring program, and, as a result, neither mentors or mentees have a clear picture about their responsibilities and how beneficial the program could be. The mentoring that is occurring is more informal, happening spontaneously in the EMPower Student Center. We are happy with this level of mentoring, but would like to establish a more formal program as well so that we can track the mentoring and give people in-depth training for mentoring.

Our efforts in the next year will be directed toward not only maintaining our successes but also making improvements. Meanwhile, we will be looking for funding sources for both of these efforts. Improvements include plans for supplemental instruction as well as increasing our outreach to Tribal Colleges and to K-12 teachers. The next year will be

crucial in building and sustaining the long-term program we will need to ensure that American Indians in Montana have the opportunity to study engineering at MSU.

Acknowledgement: The DOC program has been generously funded by the William and Flora Hewlett Foundation.

Appendix A: Entering Survey for Designing Our Community Students⁸

Please answer the following questions. Your answers will help us refine our current program and develop new programs for Native American students. Your answers will be confidential. Thank you!

1. Your gender
 - Male
 - Female

2. Did someone from MSU come to your high school to talk about engineering?
 - Yes
 - No
 - I can't remember

3. Which of the following people influenced your decision to enroll in engineering at MSU? Check as many as apply.
 - My parent(s) or legal guardian(s)
 - My brother(s) and/or sister(s)
 - Other relatives
 - Past math/science teacher(s)
 - Past other teachers
 - My high school counselor(s)
 - Other non-relatives (friends, co-workers)
 - Recruiters from MSU
 - Other, please describe:

4. Have you ever attended the Minority Apprentices Program (MAP) at MSU?
 - Yes
 - No

5. Which of the following reasons apply to why you decided to study engineering at MSU? Check all that apply.
 - There are a lot of job opportunities for engineers.
 - Engineers can help solve important societal problems.
 - Engineers make a lot of money.
 - Engineering sounded fun or exciting.
 - Engineering is creative.
 - I enjoy math.
 - I enjoy science.
 - I enjoy working with computers.
 - I enjoy working with people.
 - I enjoy solving problems.
 - I think I will do well in engineering courses.
 - Engineering is an occupation that is respected by other people.
 - I attended MAP and enjoyed the program, especially the engineering parts.
 - Other reason, please describe:

6. Indicate, with an “X,” your level of familiarity with the activities the following types of engineers are generally required to do in their work.

	Not at all Familiar	A little Familiar	Moderately Familiar	Very Familiar
Bioresources Engineer	_____	_____	_____	_____
Chemical Engineer	_____	_____	_____	_____
Civil Engineer	_____	_____	_____	_____
Computer Engineer	_____	_____	_____	_____
Computer Scientist	_____	_____	_____	_____
Construction Engineer	_____	_____	_____	_____
Electrical Engineer	_____	_____	_____	_____
Industrial Engineer	_____	_____	_____	_____
Mechanical Engineer	_____	_____	_____	_____

7. Indicate, with an “X,” your level of agreement with the following statements. If you have no basis for an opinion on the statement, leave it blank.

	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
I have strong problem-solving skills.	_____	_____	_____	_____	_____
I enjoy problems that have more than one answer.	_____	_____	_____	_____	_____
I prefer studying/working alone.	_____	_____	_____	_____	_____
I am confident about my current study habits or routine.	_____	_____	_____	_____	_____
Studying in a group is better than studying by myself.	_____	_____	_____	_____	_____
I am confident about my ability to succeed in engineering at MSU.	_____	_____	_____	_____	_____
Engineering is more concerned with improving the welfare of society than most other professions.	_____	_____	_____	_____	_____
I could return to my home town and find a job related to engineering.	_____	_____	_____	_____	_____
I am confident in my ability in math.	_____	_____	_____	_____	_____
I am confident in my ability in science.	_____	_____	_____	_____	_____
I am confident in my ability to communicate ideas in writing.	_____	_____	_____	_____	_____

	Strongly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Strongly Agree
I am confident in my ability to communicate ideas orally.	_____	_____	_____	_____	_____
I am confident in my ability to make the most of resources at MSU.	_____	_____	_____	_____	_____
I need to spend more time studying than I currently do.	_____	_____	_____	_____	_____
I think that studying engineering will be fun.	_____	_____	_____	_____	_____
Engineers are creative.	_____	_____	_____	_____	_____
Engineers have contributed greatly to fixing problems in the world.	_____	_____	_____	_____	_____

End Notes

¹ Sherick, Heidi M., Watson, Sheree J., and Plumb, Carolyn. Designing Our Community: A Report on Progress Toward Program Goals of Recruiting and Retaining American Indian Students in Engineering. *Proceedings of the 2005 American Society for Engineering Education Annual Conference and Exposition*. June 2005.

² Sherick, Heidi M., Watson, Sheree J. Designing Our Community (DOC): A Program to Recruit and Retain American Indian Students in Engineering. *Proceedings of the 2004 American Society for Engineering Education Annual Conference and Exposition*. June 2004.

³ Although the grant was awarded in December, 2001, the program didn't get off the ground until autumn of 2003.

⁴ Sherick, Heidi M., Watson, Sheree J., and Plumb, Carolyn. Designing Our Community: A Report on Progress Toward Program Goals of Recruiting and Retaining American Indian Students in Engineering. *Proceedings of the 2005 American Society for Engineering Education Annual Conference and Exposition*. June 2005.

⁵ Sherick, Heidi M., Watson, Sheree J. Designing Our Community (DOC): A Program to Recruit and Retain American Indian Students in Engineering. *Proceedings of the 2004 American Society for Engineering Education Annual Conference and Exposition*. June 2004.

⁶ Some of the items on our survey are from the Pittsburgh Freshman Engineering Attitude Survey. These items are used with the permission of Mary Besterfield-Sacre.

⁷ Landis, R.B. (2005). Retention by Design: Achieving Excellence in Minority Engineering Education. <http://namepa-e.org/documents/retentionbydesign.doc>, accessed 12/14/05.

⁸ Some of the items on our survey are from the Pittsburgh Freshman Engineering Attitude Survey. These items are used with the permission of Mary Besterfield-Sacre.