

**Distributed Mentor Project:
Comprehensive Participant Survey Analyses (1994-2000)**

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Distributed Mentor Project: Comprehensive Participant Survey Analyses (1994-2001)

The primary goal of the Distributed Mentor Project (DMP), funded by the Computing Research Association's Committee on the Status of Women in Computer Science and Engineering (CRA-W), is to increase the number of women entering graduate programs in computer science and computer engineering (CS&CE). The main strategy for achieving this goal is to involve female CS&CE undergraduates in research projects with a female mentor at a major research university, with the intent of exposing the undergraduates to academic career opportunities and inspiring them to apply to graduate school. Every year since 1994, DMP has matched about 20 female CS&CE undergraduates from around the country with mentors at various institutions to perform research for ten weeks during the summer. A total of 147 students have participated in the program, working with a total of 72 mentors. Based on grades and statements of purpose on graduate applications, students recruited into this program already demonstrated a high potential for success in graduate programs as well as an ability to make effective use of research and mentoring opportunities. Students may participate in the Project at any stage of their undergraduate program, but it is recommended that they wait until their third or final year.

In 1995, the LEAD Center was asked to evaluate the Distributed Mentoring Project over a four-year period, and then again for a three-year period. In view of the Project's goal of increasing the number of women enrolled in CS&CE graduate programs, the evaluation sought answers to the following research questions:

- 1) Do DMP participants attend graduate school at higher rates than similar non-DMP students?
- 2) Does the program have measurable effects on participants' goals, outlooks, feelings about themselves, and feelings about the field of CS&CE? If so, what are these effects, and how do they relate to the primary goal of increasing female enrollment in these graduate programs?

Answering the first question required LEAD evaluators to track DMP participants after they completed the program to determine their enrollment status and future plans. It also involved finding a non-DMP control group with which to compare DMP participants. LEAD evaluators attempted to locate and survey CS&CE female undergraduates at the institutions of DMP participants, but because collectively the non-DMP participants at these schools had significantly lower GPAs and substantially different reasons for majoring in CS&CE, they did not prove to be a suitable control group. Instead, evaluators used comparative data on graduate school enrollment for highly proficient female undergraduates in computer science and mathematics obtained from a nationwide one-year-after-graduation survey performed by the National Center for Educational Statistics in 1994.

To answer the second research question, LEAD evaluators interviewed 30 DMP participants from the first three years of the program (10 participants per year) before, immediately after, and one year after their participation in the Project. These interviews have been extensively analyzed and summarized in previous LEAD evaluation reports (see Evaluation Reports #1 and #2). All DMP participants from the last six years were surveyed by email in the fall following their DMP

experience.¹ These surveys allowed LEAD evaluators to quantify and check the reliability of the highly detailed data already gathered through participant interviews after the first 3 years. Preliminary analyses of the first three years of surveys have already been reported (see Evaluation Report #2). An analysis of the 1994-1997 survey data is also available. (Copies of previous reports are available on the project website, located at <http://www.cs.wisc.edu/~condon/mentor.html>.)

This report analyzes and summarizes the results of all seven years of student surveys conducted by the LEAD Center and illustrates the significant impact of DMP on the young women who participated in it. A total of 26 students did not fill out a feedback survey, and 23 students could not be tracked during 2001. Thus, the following tables appear with different student totals (N). However, the ‘N’ is always stated on the top of the table. In Part I, survey results are grouped topically, starting with a description of DMP participants and mentors. Part II presents an overall analysis of participants’ activities following their involvement in the Project. LEAD evaluators were able to reach 84% of DMP participants. Data was gathered on both their current and future plans with respect to their field of practice, work and academic status. Finally, in Part III, data on students' feedback about the program from 1994 to 2000 is analyzed and compared. For all years, the feedback data was gathered by surveying students right after their DMP summer experience.

I. Characteristics of DMP Participants and Mentors

This section presents the total number of project participants, where participants did their undergraduate work, where they went for the ten-week research program, the number of mentors in the program, and the number of students they mentored.

Table 1 presents the number of DMP participants per year. Column one gives the total number of participants. Column two shows the number of students from the previous year that re-entered the program. (Eleven students participated in the program twice.) In all, 147 female undergraduates participated in DMP between 1994, when the program started, and 2000.

Table 1. Number of DMP Participants Per Year

Year	New participants	Repeat participants	Total
1994	25	0	25
1995	25	3	28
1996	21	0	21
1997	23	2	25
1998	19	2	21
1999	16	2	18
2000	18	2	20
Total	147	11	158

¹ With two exceptions: the 1994 cohort was surveyed in the fall of 1995 and the 1998 cohort was surveyed in the fall of 1999.

A. Where Did DMP Participants Attend School?

DMP participants represented 104 different institutions in 36 states. The Carnegie classifications for these institutions appear in Table 2. Nearly half of the participants (44.2 %) were from large research institutions (Doctoral/Research Universities-Extensive²) with a variety of baccalaureate programs and a commitment to graduate education.

Table 2. Number of Participants by Carnegie Classification of Home Institution (N=147)

Carnegie classification*	<u>n</u>	Percentage
AA	2	1.4%
BA Gen	8	5.4%
BA LA	22	15.0%
MA I	27	18.4%
MA II	3	2.0%
DR Ext	65	44.2%
DR Int	16	10.8%
Engr	4	2.7%
Total	147	100%

*AA: Associate's colleges; BA Gen: Baccalaureate colleges-general; BA LA: Baccalaureate colleges-liberal arts; MA I: Master's (comprehensive) colleges and universities I; MA II: Master's (comprehensive) colleges and universities II; DR Ext: Doctoral/ research universities-extensive; DR Int: Doctoral/ research universities-intensive

DMP students came from all regions of the country, as shown in Table 3. Over one-third (38.1%) of participants were from schools in the Northeast. Approximately one-fourth were from institutions in the Midwest (26.5%), and one-fifth (21.8%) were from institutions in the South-Southeast. The West had the lowest percentage of students (13.6%), most of whom were from institutions in California.

Region ³	<u>N</u>	Percentage
Northeast	56	38.1%
Midwest	39	26.5%
South-Southeast	32	21.8%
West	20	13.6%
Total	147	100%

² Under the Carnegie Foundation's previous classification system, these schools were called Research I Universities. More information on the background and description of the new classification system can be found at: <http://www.carnegiefoundation.org/Classification/index.htm>.

³ The states in each region are as follows:

- Midwest: ND, SD, NE, KS, MN, IA, MO, WI, IL, IN, MI, OH
- Northeast: ME, NH, VT, MA, RI, CT, NJ, NY, PA, DE, MD, DC
- South-Southeast: WV, VA, KY, NC, TN, SC, GA, AL, MS, FL, AR, LA, OK, TX
- West: WA, OR, CA, MT, WY, ID, NM, UT, CO, AZ, NM, AK, HI

B. Where Did DMP Participants Do Their Summer Research?

Between 1994 and 2001, 72 female CS&CE researchers served as mentors in the Project, representing 48 institutions in 27 states. The Carnegie classifications of the institutions where the mentors and their DMP students did summer research appear in Table 4. The majority of participants (76.9%) worked with mentors at Doctoral/Research Universities-Extensive and Doctoral/Research Universities-Intensive.

Table 4. Number of Students by Carnegie Classification of Research Institution (N=147)

2001 Carnegie classification	<u>n</u>	Percentage
BA LA	1	0.7%
MA I	5	3.4%
DR Ext	113	76.9%
DR Int	25	17.0%
Engr	3	2.0%
Total	147	100%

*BA LA: Baccalaureate colleges-liberal arts; Engr: Schools of engineering and technology; MA I: Master's (comprehensive) colleges and universities I; DR Ext: Doctoral/ research universities-extensive; DR Int: Doctoral/ research universities-intensive

The DMP students spent their summer research time at institutions across the country: about one-third in the Northeast (34.7%) and the South–Southeast (31.3%), almost one-fourth in the West (23.1%), and a little more than one-tenth in the Midwest (10.9%). The five states most commonly attended were Massachusetts (15 students), New York (15 students), Georgia (11 students), North Carolina (10 students) and California (10 students).

Table 5. Number of Students by Region of Research Institution (N=147)

Region ⁴	<u>n</u>	Percentage
Midwest	16	10.9%
Northeast	51	34.7%
South-Southeast	46	31.3%
West	34	23.1%
Total	147	100%

Twenty-eight of the 147 students attended summer research at their home institutions, while 119 (80.1%) of the student participants spent their summer somewhere other than their home institutions.

C. Mentor participation

As stated above, 72 mentors participated in DMP between 1994 and 2000. Many served as mentors more than once. Table 6 indicates the number of mentors who participated in multiple years of the program.

⁴ See above breakdown of regions.

Table 6. Number of Mentors by Years Participated (N=72)

Years participated	<u>n</u>	Percentage
1 year	36	50.0%
2 year	21	29.2%
3 year	8	11.1%
4 year	4	5.5%
5 year	3	4.2%
Total mentors	72	100%

On average, a mentor worked with one or two students per summer. Some mentored a student in conjunction with another mentor. About one-third of the mentors worked with two or three students per summer session.

II. Tracking Data and Future Plans: Post-Graduation Outcomes for DMP Participants

LEAD evaluators attempted to contact all 147 DMP participants in the spring of 2001 in order to gather information about their educational status, current work, and future plans. Participants were contacted via email, mail survey or telephone. In some cases, parents or siblings of participants were reached. In all, 84% were successfully contacted. Table 7 shows both the number and percentage of students contacted for each year, as well as the total number of participants for that year. With the exception of one year (1996), over three-fourths of the students from each year were reached in 2001.

Table 7. 2001 Student Tracking Record (N=123)

YEAR	contacted N	Percentage contacted	Total participants
1994	19	76%	25
1995	22	88%	25
1996	14	67%	21
1997	19	83%	23
1998	17	90%	19
1999	14	88%	16
2000	18	100%	18
Total	123	84%	147

Table 8, below, summarizes what DMP participants from all years of the program said they were doing when contacted in the spring of 2001.

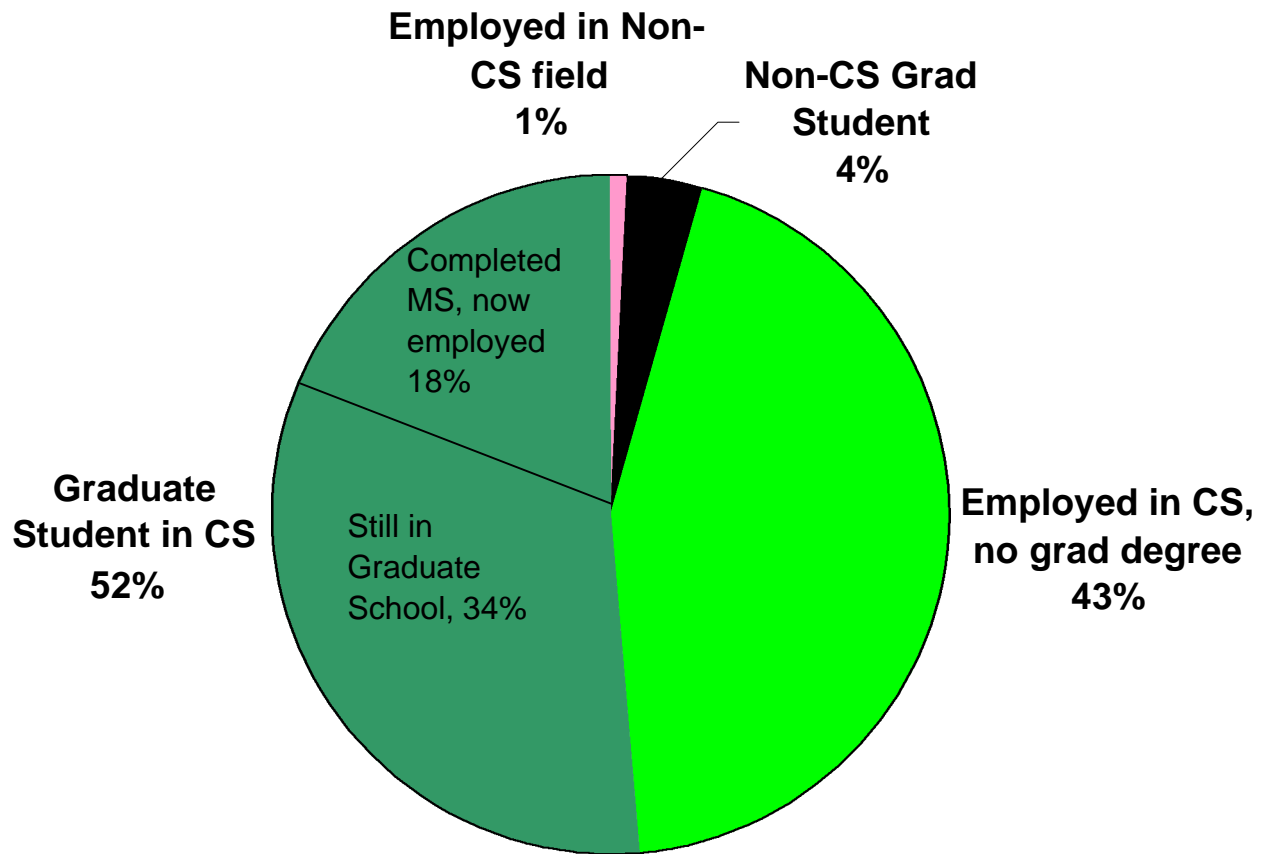
Table 8. Summary of Tracking Outcomes (N=123)

Tracking outcomes for '94 – '00 participants (in Spring 2001)	Total
Enrolled in graduate school in CS&CE, no adv. degree	25
Received Masters in CS&CE, still enrolled in CS&CE graduate school	14
Received M.S. in CS&CE	20
Enrolled in graduate school, but not CS&CE (here, math & cognitive science/neurobiology)	3
Working with Ph.D. in Physics	1
B.S. Working, with graduate school plans	19
B.S. Working, with no graduate school plans	32
Undergraduate with graduate school plans	5
Undergraduate with professional school plans	1
Undergraduate, no graduate school plans	1
Undergraduate, undecided about graduate school	3
Unable to be contacted	23
Total number of participants '94-'00	147

Table 9 illustrates the primary outcome of the DMP: the number of participants that have graduated with a Bachelor's degree that had enrolled in a graduate program in the CS&CE. Only 10 students had not graduated by the spring of 2001, and these were students who participated in DMP in 1999 and 2000. Of the 113 DMP students who were found to have graduated by the spring of 2001, 59 (52%) were enrolled in computer science (CS&CE) graduate programs or had earned advanced degrees in CS&CE. One student had already completed her Ph.D., but in Physics.

Table 9. Tracked Participants (2001) that have Enrolled in CS&CE Graduate School

DMP cohort	1994	1995	1996	1997	1998	1999	2000	Total
Number of participants since 1994	25	25	21	23	19	16	18	147
Tracked participants who graduated	19	22	14	19	17	11	11	113
Tracked participants who enrolled in CS&CE graduate school	9 (47%)	11 (50%)	11 (79%)	8 (42%)	9 (53%)	4 (36%)	7 (64%)	59 (52%)



A comparison comes from the Baccalaureate & Beyond longitudinal survey conducted by the National Center for Educational Statistics, which in 1994 surveyed 1,158,170 students who had received their baccalaureate degrees one year earlier. This nationally representative sample included 9,560 women with Computer Science degrees, and of these, only 2.94% were enrolled in graduate or professional school one year after graduating. If we restrict the sample to Computer Science women who, like those in DMP, had GPAs greater than or equal to 3.5, the percentage who enrolled in graduate or professional school falls to 2.53%.

By comparison, there were 17,680 men with Computer Science degrees in the B&B sample, and of these, 9.23% went on to graduate or professional school within a year. If you restrict the male sample to those with GPAs greater than or equal to 3.5, the percent going on to graduate or professional school is 29.19%. In other words, the best male CS majors are more than 10 times more likely to go on to graduate or professional school within a year than the best female CS majors! This gap between male and female enrollment in graduate school is higher than in any other field in the B&B classification. And this, as much as anything, illustrates the need for a program like DMP to encourage female CS&CE majors to consider graduate school and careers in research. (For an exploration of the reasons behind this huge gap between men and women, see our analysis of DMP interview data in Evaluation Reports #1 and #2)

Even if we add women with math majors to the B&B Computer Science sample and again look at those with GPAs over 3.5, the percent going to graduate or professional school within one year is only 15.45%, still far below the 51% of DMP participants who have gone to graduate school thus far.

Table 10 compares the reported plans of 1998 and 1999 cohorts (as tracked in 1999) with their actual activities two years later (tracked in 2001). In 1999, 91.6% of DMP participants expressed plans to attend graduate school, with 70.8% intending to do so immediately following graduation. Two years later, more than 50% of DMP participants had done so.

Table 10. Post-graduation Plans and Plan Fulfillment for 1998 and 1999 Cohorts (N=24)

Post-graduation plans	n	Percentage	Plan fulfillment as of 2001	n	Percentage
Immediate plans to attend graduate school	17	70.8%	Enrolled in graduate school	11	45.8%
Plans to work, then attend graduate school	5	20.8%	Enrolled in graduate school	1	4.3%
Plans unknown	1	4.2%	Enrolled in graduate school	1	4.3%
No graduate school plans	1	4.2%	Working	9	37.6%
---	--	---	Still enrolled as undergrad	2	8.3%
Total	24	100%	Total	24	100%

The 2001 tracking survey asked participants, “What is the highest degree you plan to pursue?” Table 11, below, summarizes the results. At least 46.6% of DMP participants planned to eventually obtain an advanced degree in CS&CE: 37.5% anticipated obtaining a PhD degree and 49.2%, a Master’s degree. At the time of the survey, 34 students (28.3%) were already enrolled in a PhD program.

Table 11. Highest Degree Students Planned to Pursue (according to 2001 tracking) (N=120)

Degree sought	1994	1995	1996	1997	1998	1999	2000	Total	Percentage
MS in CS&CE	0	1	0	3	2	2	3	11	9.2%
Ph.D. in CS&CE	6*	6	4	5	7	8	9	45	37.5%
MS or PhD									
Not in CS&CE	0	0	1	2	1	0	2	6	5.0%
Professional degree	1	1	2	1	1	0	1	7	5.8%
BA or BS only	9	10	6	7	1	2	0	35	29.2%
Undecided	1	4	0	1	5	2	3	16	13.3%
Total	17	22	13	19	17	14	18	120	100.0%

* one student already obtained a Ph.D. degree.

In summary, the results of the LEAD Center’s tracking surveys and post-program surveys suggest that DMP participants are likely to go on to graduate school in CS&CE. Already their rates of graduate school enrollment are well beyond the rates seen in a comparative national sample of female CS&CE graduates, and their stated future plans indicate that over half of participants ultimately plan to obtain advanced degrees in CS&CE. By this measure, the Project is meeting its primary goal. Of course, the women recruited into DMP already had a comparatively high potential for graduate school enrollment (based on grades and statements of purpose), so these numbers alone do not tell us what effect the Project itself had on participants. Did their experience in DMP increase the already high likelihood that they would enroll in graduate school? To answer this question, it is useful to know the demographics of the women who participated in the Project. Who were they, and what was their potential for success? It is also helpful to examine questions on the feedback surveys that specifically asked about the role of DMP in encouraging participants to enroll in graduate school. (Additional evidence of how DMP affected participants’ graduate school aspirations may also be found in the interview analyses presented in Evaluation Reports #1 and #2.

III. Feedback Survey Data: Demographics, Role and Evaluation of DMP

Each fall following their participation in DMP, students were sent an email survey that included demographic questions and questions about their experience in the program.⁵ With the exception of the first year of the program, survey response rates were high, with an accumulated response rate of 82.3% over seven years. It should be noted that three versions of the survey were used. One version was sent to the 1994 and 1995 students, a second version to the 1996 and 1997 students, and a third version to the 1998, 1999 and 2000 students. As a result, some questions reported in this section were only asked in the last 3 feedback surveys. The following section presents the analysis of the students' responses to their feedback survey or after-program opinions about DMP. They include reasons to attend graduate school and factors motivating them to stay in the field of computer science.

Table 12. Number of Students Per Year Who Responded to the Feedback Survey

	<u>n</u>	Percentage	Number of participants, by first year of participation
1994	12	48.0%	25
1995	22	88.0%	25
1996	18	85.7%	21
1997	21	91.3%	23
1998	15	78.9%	19
1999	16	100.0%	16
2000	17	94.4%	18
Total	121	82.3%	147

⁵ Copies of the surveys are included in the Appendix.

A. Demographic Information: Who Participated in DMP

Tables 13, 14, 15 and 16 report the race/ethnicity, year-in-school, overall GPA distribution, and average GPA of the women who participated in each year from 1994 to 2000:

Table 13. Race/Ethnicity of DMP Participants (N=121)

Race/Ethnicity	<u>n</u>	Percentage
White	93	76.9%
Asian American	14	11.6%
Hispanic	4	3.3%
African American	3	2.5%
Native American	1	0.8%
Indian	1	0.8%
Not reported	5	4.1%
Total	121	100%

Table 14. School Year DMP Students Where in While Participating in the Program

Year in school	<u>n</u>	Percentage
Freshman	2	1.7%
Sophomore	34	28.1%
Junior	60	49.6%
Senior	23	19.0%
Transfer	1	0.8%
Not reported	1	0.8%
Total respondents	121	100%

Table 15. Overall Undergraduate GPA of all DMP participants

Overall GPA	<u>n</u>	Percentage
3.0-3.19	3	2.5%
3.2-3.39	6	5.0%
3.4-3.59	11	9.1%
3.6-3.79	37	30.6%
3.8-4.0	60	49.6%
Not reported	4	3.3%
Total respondents	121	100%

Table 16. Average GPA for each DMP Cohort

DMP cohort	1994	1995	1996	1997	1998	1999	2000	Total
Average GPA	3.71	3.80	3.74	3.78	3.76	3.75	3.64	3.74

As seen in the tables above, DMP participants were for the most part White (76.9%) who were going into their senior year (49.6%) and had a GPA above 3.6 (80%). The least represented US minority groups are Native Americans and African Americans. Very few students (1.65%) were freshmen at the time they attended the program.

Table 17 shows students' commitment to majoring in CS&CE at the beginning of their career. As seen in the table committed to the field of CS&CE varied from year to year.

Table 17. DMP Participant's Commitment to Majoring in CS/CE

Were you considering majoring in CS&CE by your first year of college?	'96	'97	'98	'99	'00	Total	Total %
Yes	12	17	8	10	7	54	60.7%
No	7	5	5	4	10	31	34.8%
Undecided	0	0	2	2	0	4	4.5%
Total respondents	19	22	15	16	17	89	100.0%

Survey respondents were also asked whether they felt they "fit" in the field of CS&CE and whether they intended to stay in the field long-term. Participants' responses are presented in the next two tables. These questions were asked after their participation in the DMP, thus it is not possible to determine the potential impact of the program on their answers.

Table 18. Students' Perceptions of Fitting in CS&CE

I feel that I "fit" in Computer Science	1996	1997	1998	1999	2000	Total	Total %
Strongly agree	2	6	2	3	3	16	18.2%
Agree	11	10	6	8	8	43	49.4%
Neutral	2	3	2	2	4	13	14.8%
Disagree	4	2	4	3	2	15	17.2%
Strongly disagree	0	0	1	0	0	1	1.1%
Total respondents	19	21	15	16	17	87	100%

Table 19. Plans to Stay in the Field of CS&CE

Do you plan to stay in field of CS&CE long-term?	1996	1997	1998	1999	2000	Total	Total %
Yes	16	17	10	12	15	70	78.6%
No	1	0	1	1	0	3	3.4%
Undecided	2	5	4	3	2	16	18.0%
Total respondents	18	22	15	16	17	89	100%

Almost two-thirds of the participants (67.7%) strongly agreed or agreed that they "fit" in the field of CS&CE, and (78.6%) intended to stay in CS&CE long-term. However, since CS&CE is one of the few scientific fields in which it is not difficult to get a high paying job with only a bachelor's degree, it cannot be assumed that these same students were also intending to go on to graduate school in CS&CE. Indeed, according to the Baccalaureate & Beyond survey mentioned earlier, Computer Science graduates have among the lowest rates of graduate school enrollment of any major, and for women, they have the lowest rate altogether. The 2.94% of female CS students who enroll in graduate school within a year of receiving their baccalaureate degrees can be compared to 35.1% in the Physical Sciences, 19.9% in the Life Sciences, 16.7%

in Engineering, 15.4% in Mathematics, and 13.61% in Social and Behavioral Sciences.

According to participant interviews conducted in earlier evaluations, many DMP participants, who were fairly certain of their commitment to the field, were uncertain about going into research. The reasons why DMP participants entered the field of CS&CE in the first place were varied, but most were motivated by a strong inherent interest in computer science and by their abilities in math and science. When asked why they chose to major in CS&CE, survey respondents gave the following reasons (See Table 20).

Table 20. Why Students Choose to Major in CS&CE

Factors important in choice to study or major in CS&CE (N=120)	#1 reason		Top 4 reason		A factor	
	<u>n</u>	%	<u>n</u>	%	<u>n</u>	%
CS&CE is enjoyable and interesting	51	42.5%	90	75.0%	109	90.8%
I am good at math and science	30	25.0%	83	69.1%	101	84.1%
CS&CE is challenging	13	10.8%	78	65.0%	102	85.0%
CS&CE affords many career opportunities	9	7.5%	64	53.3%	89	74.1%
CS&CE jobs pay well	2	1.7%	31	25.8%	67	55.8%
A teacher encouraged me	1	0.9%	28	23.3%	53	44.1%
I like the idea of being a computer scientist	1	0.9%	27	22.5%	54	45.0%
A friend/relative is in computer science	1	0.9%	6	5.0%	24	20.0%

Table 21 presents the reasons students selected to explain why they applied to DMP. Students' answers give a more clear indication of their goals and interests with respect to CS&CE. Almost all of the student respondents cited as factors the desire to learn about research in CS&CE and hoping to learn whether graduate school was "right" for them.

Table 21. Reasons that Motivate Students to Attend the DMP Summer Program

*Motivation to apply for the DMP In 1998, 1999 and 2000 survey (n=48)	Reason		Top Reason	
	<u>n</u>	%	<u>n</u>	%
It would give me the opportunity to do research in computer science	31	64.6%	25	52.1%
It would give me an opportunity to learn about graduate school to see if it was right for me.	32	66.7%	16	33.3%
It would strengthen my application for graduate school	29	60.4%	12	25.0%
It would give me the opportunity to go to a different institution	27	56.3%	10	20.8%
It would give me the opportunity to work with a female academic researcher	26	54.2%	14	29.2%
It would be paid summer work	19	39.6%	10	20.8%
Other	4	8.3%	1	2.1 %

*This question was only asked of the 1998, 1999 and 2000 student participants.

B Role of DMP in encouraging participants to attend graduate school

The following is an analysis of two sets of survey questions that most directly address the effect

that the DMP program had on participants' desire to enroll in graduate school. One set of questions used a 5-point scale and asked participants to "describe their commitment to going to graduate school in the field of computer science." It is important to remember that the DMP survey was administered to the students at the end of their summer experience. In other words, students were asked after the program to compare their degree of commitment to graduate school before and after the program. The question allowed the researchers to understand whether participants' degree of commitment had changed over the summer as a result of their participation in DMP. The numbers with positive signs in Table 22 indicate increased commitment to attend graduate school. Adding these percentages, it can be seen that 59.1% of the participants increased their rating of their commitment to graduate school after participating in DMP, 26.7% indicated no change, and 14.2% had a decrease in their ratings.

Table 22. *Before Program and After Program Change of Ratings on Commitment to Attend

Graduate School

Change in commitment to attending graduate school (before DMP and after DMP)	1994	1995	1996	1997	1998	1999	2000	Total <u>n</u>	Total <u>%</u>
-4 (-decreased commitment)	0	1	0	0	1	0	0	2	1.7%
-3	0	1	0	0	0	0	0	1	0.8%
-2	0	0	0	0	0	1	1	2	1.7%
-1	1	2	1	3	3	0	2	12	10.0%
0 (no change)	3	5	5	9	2	3	5	32	26.7%
+1 (+ increased commitment)	5	5	9	7	1	3	7	37	30.8%
+2	3	5	3	1	6	6	0	24	20.0%
+3	0	0	1	2	1	3	0	7	5.8%
+4	0	0	0	0	1	0	2	3	2.5%
Grand Total	12	19	19	22	15	16	17	120	100

* (a one time question after the program)

Table 23. All years distribution of ratings for commitment to attend graduate school

Distribution of ranks for commitment to attend graduate school	Before DMP		After DMP	
1-- Not considering it	9	7.8%	4	3.5%
2--	37	32.2%	17	14.8%
3--	27	23.5%	23	20.0%
4--	27	23.5%	33	28.7%
5-- Very committed	15	13.0%	38	33.0%
Average	3.0		3.7	
Total number of respondents	115		115	

As the table above indicates, 61.7% were very committed (rankings of 4 or 5) to graduate school in CS&CE following their participation in the program, compared with 36.5% before the program. In short, for most students the DMP experience had a positive effect on their desire to attend graduate school. Further evidence is seen in participants' responses to a question which asked them to choose from a given list factors which they thought had encouraged them to enroll

Table 24. Factors Encouraging or Discouraging Enrollment in Graduate School

Factors to select (N=121)	Encouraged	
	n	%
Level of success in undergraduate CS&CE courses	97	80.2%
Distributed Mentor Project experience	93	76.9%
Career goals	81	66.9%
Advisor/mentor at home institution	72	59.5%
Technical interests	57	47.1%
Influence of family member	48	39.7%
Extra-curricular activity at home institution	46	38.0%
Work experience	32	26.4%
Pre-collegiate experiences	15	12.4%

Two factors related to motivation to attend graduate school in CS&CE are participants' understanding of graduate school life and their feeling of being prepared to attend graduate school. In the 1998, 1999 and 2000 feedback surveys participants were asked to rate their feelings with respect to these two topics. To compare their level of understanding and preparation before and after the program, they were asked these questions at the end of the program: Before Programs and After Programs Changes in Understanding of Graduate School and Preparation for Graduate School. The DMP in these two areas. On average the gains were of about 2 points.

Changes of the before and-after-	-3	-2	-1	0	1	2	3
Understanding of graduate school	0	0	0	5	11	23	9
Preparation for graduate school	1	0	1	3	17	22	4

*1998 , 1999 & 2000students only

Table 26 shows the overall ratings for the 3 years. Before participating in the program, none of the students had a thorough understanding of graduate school (ratings of 4 and 5), whereas by the end of the program, 79.2% had a better understanding (ratings of 4 and 5). Also, the results from table 27, which shows participants' degree of preparation to attend graduate school, indicate that before the program, more than half of the participants (60.4%) had little or no understanding of what graduate school was all about (ratings of 1&2). By contrast, at the end of the program 66.7% of the participants felt that they were very prepared for graduate school (ratings of 4&5). In both tables, the averages of the ratings are an indicator of the difference in the degree of understanding and preparation before and after the program. In both cases this average increased, suggesting that the program had a positive impact.

Table 26. Distribution of Ranks for Levels of Understanding About Graduate School

*Distribution of ranks for question on: To what degree did you have an understanding of graduate school n=48	Before DMP		After DMP	
	<u>n</u>	%	<u>n</u>	%
1—No understanding	8	16.6%	1	2.1%
2--	26	54.2%	0	0.0%
3--	14	29.2%	9	18.7%
4--	0	0.0%	32	66.7%
5—a thorough understanding	0	0.0%	6	12.5%
Average	2.1		3.8	
Total number of respondents	48		48	

*years 1998,1999, & 2000

Table 27. Distribution of Ranks for Degree of Preparation to Attend Graduate School

*Distribution of ranks for question on: To what degree did you feel prepared for graduate school n=48	Before DMP		After DMP	
	<u>n</u>	%	<u>n</u>	%
1—Not prepared at all	9	18.7%	1	2.1%
2--	20	41.7%	0	0.0%
3--	16	33.3%	15	31.3%
4--	3	6.3%	27	56.3%
5—Very prepared	0	0.0%	5	10.4%
Average	2.3		3.7	
Total number of respondents	48		48	

*years 1998,1999, & 2000

C. Evaluation of the DMP experience: Students' satisfaction and value ratings

This section looks at how participants rated various aspects of their DMP experience. The ratings are a good measure to understand which aspects of the program are succeeding and which need improvement. In addition, some cross tabulations are presented to help understand how different aspects of the program related to each other and helped produce positive outcomes. Table 28 shows participants' ratings of their satisfaction with the DMP experience overall:

Table 28. Overall satisfaction with DMP

Rate your overall satisfaction with DMP	<u>n</u>	%
1--Not at all satisfied	2	1.7%
2--	3	2.5%
3--	14	11.9%
4--	45	38.1%
5--Very satisfied	54	45.8%

Rate your overall satisfaction with DMP	<u>n</u>	%
Total respondents	118	100%

As seen in the table, the majority of DMP participants (83.9%) were highly satisfied with their overall experience (rating of 4&5), while only 4.2% where not satisfied (ratings of 1&2).

1. Mentor match

Participants’ satisfaction with their mentor was similarly high: 77.2% of the participants were very satisfied (ratings of 4 &) with the mentor assigned to them, and only a few 12.7% indicated low levels of satisfaction (ratings of 1 & 2).

Table 29. Satisfaction With Mentor

How do you feel about the match between you and your mentor?	<u>n</u>	%
1--Not at all satisfied	1	0.8%
2--	14	11.9%
3--	12	10.2%
4--	35	29.7%
5--Very satisfied	56	47.5%
Total respondents	118	100%

2. Value of female mentor

Participants were not only satisfied with their mentor match but with having a female mentor as well. The majority (68.1%) gave high ratings (ratings of 4 &5) to having a female mentor. Thus, some participants felt they could have had just as valuable an experience if their DMP mentor was male, but the majority felt that having a female mentor was important. This is consistent with the post-program interviews, in which the importance of having a female role model and seeing other women succeed in what is predominantly a male field were emphasized. An unanswered question is whether women who had few female faculty in their home departments would be even more likely to value having a DMP mentor who was female. See the ratings in Table 30.

Table 30. Value of Having a Female Mentor

Rate the value of having a female mentor	<u>n</u>	%
1--Not at all valuable	5	4.2%
2--	8	6.7%
3--	25	21.0%
4--	32	26.9%
5--Very valuable	49	41.2%
Total	119	100%

3. Research experience

The DMP research experience was highly valued by about two thirds of the participants (75.6%) (ratings of 4&5). Very few provided low values (4.2%). Ratings are presented in Table 31.

Table 31. Value of Research Experience

Value of DMP research experience	<u>n</u>	%
1--Not at all valuable	1	0.8%
2--	5	4.2%
3--	24	20.0%
4--	35	29.2%
5--Very valuable	55	45.8%
Total	120	100%

4. Cross- tabulations

The ratings of overall satisfaction with DMP, mentor match, value of having a female mentor and value of research experience were moderately correlated and significant. Most of these variables had an $r = +.40$ ($p < 0.001$). The table with the correlations is not shown because the cross tabulations presented in Tables 32 and 33 were more relevant. In summary, the high ratings for all variables were associated with each other. However, this was not the case for every student, which may explain why the correlations were not higher. For example, a few students who gave medium to low ratings to the value of having a female mentor gave a higher rating to their overall satisfaction with DMP. See Table 31. The table shows how some students were satisfied with DMP even when they did not highly value having a female mentor.

Table 32. Cross-Tabulation Between Overall Satisfaction with DMP and Value of Female Mentor

Value of having a	Overall satisfaction with DMP
--------------------------	--------------------------------------

	Blank	1	2	3	4	5	Grand total
1		1	2	2			5
2			1	3	2	2	8
3				7	9	9	25
4	1			1	18	12	32
5	1	1		1	16	30	49
Blank						1	1
Grand total	2	2	3	14	45	54	120

Another example is shown in Table 33. This table presents a cross tabulation between satisfaction with student-mentor match and value of DMP research experience. Notice that some students who gave low ratings to the value of the research experience gave a high rating to their satisfaction with mentor match and vice versa. However, for most students mentor match and value of research experience went together.

Table 33. Cross-Tabulation Between Value of Research Experience and Satisfaction with Student Mentor Match.

Satisfaction with student-mentor match	Value of DMP research experience						
	Blank	1	2	3	4	5	Grand total
1			1				1
2	1		1	8	3	1	14
3			1	2	4	5	12
4			1	8	13	13	35
5			1	5	14	36	56
Blank				1	1		2
Grand total	1		5	24	35	55	120

5. Aspects gained

The last table in this survey analysis summarizes what participants felt they gained from their DMP experience, what they valued most about it, and what they wanted but didn't get from it. This information should be useful in fine-tuning the Project to better meet participants' needs.

Table 34. Potential DMP Benefits

Of the following program outcomes which ones did you want, gain and value most....	n=103 % who gained this		n=71 % who valued this most (top 4)		n=103 % who wanted but didn't get this	
	n	%	n	%	n	%
Developing better research skills	78	75.7%	39	27.7%	12	11.7%
A letter of reference	75	72.8%	18	12.8%	12	11.7%
Professional contacts	67	65.0%	27	19.2%	20	19.4%
Career opportunities and options	66	64.1%	27	19.2%	23	22.3%

Of the following program outcomes which ones did you want, gain and value most....	n=103 % who gained this		n=71 % who valued this most (top 4)		n=103 % who wanted but didn't get this	
	n	%	n	%	n	%
Building self-confidence	53	51.5%	35	24.9%	20	19.4%
Publishing; making presentations	53	51.5%	17	12.1%	16	15.5%
Selecting a graduate school	59	57.3%	12	8.5%	22	21.4%
Applying to graduate school	56	54.4%	50	35.5%	19	18.4%
Succeeding in graduate school	54	52.4%	18	12.8%	23	22.3%
Finding other research opportunities	49	47.6%	8	5.7%	22	21.4%
Fellowship opportunities	43	41.7%	12	8.5%	16	15.5%
Selecting a thesis/research topic	31	30.1%	6	4.3%	18	17.5%
Balancing work and personal life	28	27.2%	6	4.3%	14	13.6%
Dealing with departmental politics	26	25.2%	6	4.3%	11	10.7%
Successful interviewing	8	7.8%	1	0.7%	11	10.7%
Dealing with sexual harassment	7	6.8%	1	0.7%	11	10.7%