

## Appendix B

### SURVEY METHODOLOGY

#### The Universe

The universe consisted of participants from 1991 to 1997. The following table shows the numbers of workshops in each year, the numbers of workshops that reported data to NSF, and the numbers of participants they reported. The final column shows the estimated total number of participants.

Year	Number of Workshops Funded	Number of Workshops Reporting Data	Number of Participants Reported by PIs	Mean Number of Participants per Workshop Reported by PIs	Estimated Number of Participants for all Workshops, Adjusted for Missing Data*
1991	54	49	1,182	24	1,303
1992	89	88	2,243	25	2,268
1993	112	74	1,897	26	2,871
1994	113	106	2,308	22	2,460
1995	140	129	3,016	23	3,273
1996	124	118	3,231	27	3,395
1997	125	118	3,630	31	3,845
Total			17,507		19,416

\*Imputed by using the mean number of participants as reported by PIs for that year.

To check the extent to which the participants reported by PIs for all years contained duplicate counts and/or participants who were not undergraduate faculty, we examined all participant lists that NSF furnished for 1996 and 1997. We found that:

- Approximately 10% of the participants reported by the PIs were not undergraduate faculty (many were high school teachers; some were preservice teachers; others were from industry; etc.).
- 6.22% of the participants reported in 1996 and 6.39% of the participants reported in 1997 were duplicated names (for an average of 6.3% across the two years).
- 6.10% of the 1997 participants had also participated in at least one workshop in 1996.

Using these figures, we estimated the number of unique faculty participants for each year and across all years as shown in Exhibit B-2:

<b>Exhibit B-2. Nonduplicated Faculty Participants, by Year</b>								
	1991	1992	1993	1994	1995	1996	1997	Total
<b>Total participants (using adjusted figures from Exhibit B-1)</b>	<b>1,303</b>	<b>2,268</b>	<b>2,871</b>	<b>2,460</b>	<b>3,273</b>	<b>3,395</b>	<b>3,845</b>	<b>19,416</b>
Nonfaculty at 10.01%	130	227	287	246	328	340	385	1,944
Within-year duplicates at 6.30%	82	143	181	155	206	214	242	1,223
<b>Eligible, nonduplicates within each year</b>	<b>1,090</b>	<b>1,898</b>	<b>2,403</b>	<b>2,059</b>	<b>2,739</b>	<b>2,842</b>	<b>3,218</b>	<b>16,250</b>
<b>Cross-year repeats*</b>								
Repeats from previous year		66	116	147	126	167	173	795
Repeats from 2 years previous			53	93	117	100	134	497
Repeats from 3 years previous				43	74	94	80	291
Repeats from 4 years previous					34	59	75	168
Repeats from 5 years previous						27	47	75
Repeats from 6 years previous							22	22
<b>Eligible and nonduplicated faculty</b>	<b>1,090</b>	<b>1,832</b>	<b>2,234</b>	<b>1,777</b>	<b>2,388</b>	<b>2,394</b>	<b>2,686</b>	<b>14,402</b>
*We assumed that the probability that workshop participants will participate in another workshop in the following year is 6.1%, and then decreases by 20% per year.								

Exhibit B-3 shows demographic characteristics of 1991-1997 UFE participants as reported by PIs to NSF, and the percentages attending workshops in various disciplines.

<b>Exhibit B-3. Characteristics of UFE 1991-1997 Participants</b>	
	<b>Percent of 1991-1997 Participants</b>
<b>Gender</b>	
Male	70
Female	30
<b>Race/ethnicity</b>	
Nonminority	84
Minority	16
<b>Type of institution</b>	
2-year	23
Baccalaureate	28
Comprehensive or Doctoral	33
(of the above categories, Historically Black)	5
Other (nonuniversity)	15
<b>Discipline of workshop</b>	
Astronomy	1
Chemistry	10
Computer Science	7
Engineering	13
Geosciences	3
Interdisciplinary	14
Life Sciences	8
Mathematics	28
Physics	10
Social Sciences	5

## The Sample

As reported in Chapter I, we included only individuals who had attended UFE workshops during 1996 or 1997. NSF awards supported 124 and 125 workshops in 1996 and 1997, respectively, and we estimate that a total of 5,887 faculty<sup>1</sup> attended them. NSF supplied us with hard-copy lists of participant names for 76 workshops from 1996 and for 72 workshops from 1997. These lists contained 1,429 and 1,501 names, respectively, for a total of 2,930 names.

From these lists, we randomly selected 1,786 names and began telephone interviews in the spring of 1999. At the close of the academic year, we had completed interviews with 602 participants. Four hundred seventy-three sample members were deemed unreachable (because their numbers had been disconnected, their current whereabouts were unknown, etc.), and another 183 respondents were deemed ineligible (because they were not, or were no longer, undergraduate faculty or indicated that they had not attended the seminar).

This left 498 sample members to attempt to reach in the fall. After lack of success in reaching many of them, this part of the sample was deemed unreachable. To obtain an adequate number of respondents for our analyses, we then replenished the sample with another 1,174 names, again randomly selected from the participant lists.

Although we are not able to characterize the total sample of 2,930 participants in terms of their demographic characteristics or type of institution because the hard-copy lists did not contain such information, we can describe them in terms of their disciplines. Exhibit B-4 shows these disciplines.

<b>Discipline</b>	<b>Percent of Sample</b>
Astronomy	0
Chemistry	12
Computer Science	9
Engineering	13
Geosciences	2
Interdisciplinary	20
Life Sciences	8
Mathematics	28
Physics	6
Social Sciences	1

Of the telephone interviews attempted, a total of 1,118 interviews were completed, that is, 38% of our overall sample, and 19% of the total participants in 1996 and 1997 workshops. The most frequent reasons for noncompletion of interviews were: (1) we were unable to reach the sample member after multiple attempts (44%), and (2) the

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<sup>1</sup> This number is calculated from the total number of nonduplicated faculty who attended workshops in 1996 (2,842) plus the nonduplicated number of faculty who attended workshops in 1997 minus faculty who were duplicates from 1997 (3,218-173=3,045).

sample member was ineligible (i.e., faculty who teach undergraduates- 14%). Only 4% of the sample members refused to complete the interview. Thus, 48% of sampled eligible faculty were unreachable or refused. Because of cost and technical considerations, we did not perform a separate study to analyze the reasons why they did not respond.

Characteristics of the 1,118 participants who were interviewed are shown in the second column of Exhibit B-5. The third column shows the characteristics of the universe of 1991-1997 participants, which are similar in most respects to the population of interviewed participants.

<b>Exhibit B-5. Characteristics of Telephone Survey Respondents and 1991-1997 UFE Participants</b>		
	<b>Percent of Telephone Survey Respondents</b>	<b>Percent of 1991-1997 Participants*</b>
<b>Gender</b>		
Male	67	70
Female	33	30
<b>Race/Ethnicity</b>		
Minority, including Asian Americans and Asians	15	16
(Underrepresented minority)	6	8**
<b>Type of institution</b>		
2-year	23	27***
4-year	43	33***
Comprehensive	22	24***
Doctoral	12	16***
<b>Discipline of workshop</b>		
Astronomy	0	1
Chemistry	13	10
Computer Science	9	7
Engineering	11	13
Geosciences	2	3
Interdisciplinary	18	14
Life Sciences	12	8
Mathematics	27	28
Physics	6	10
Social Sciences	2	5
*Source: DUE Database unless otherwise noted.		
**Source: Estimated from hard-copy survey responses of 1996 and 1997 workshop PIs.		
***Percentage of undergraduate faculty participants only. Percentages for comprehensive and doctoral institutions were estimated from 1996 and 1997 DUE data (before those years, DUE's survey did not break down "Universities" into these two types of institutions).		

Other characteristics of the respondents for which there are no comparison data available from the DUE PI surveys are presented in Chapter I.

## Sample Weighting for Analyses

We compared results on various outcomes (e.g., whether respondents developed or revised a course after the workshop) by using data that were weighted for gender, minority status, type of institution, and discipline of workshop and found no significant differences in the results. Exhibit B-6 shows how small the differences in outcomes were when using weighted and unweighted data. Because results did not differ significantly, results presented in this report use unweighted data.

<b>Participants' Postworkshop Changes to Courses</b>	<b>Using Unweighted Data</b>	<b>Using Data Weighted for Type of Institution</b>	<b>Using Data Weighted for Discipline of Workshop</b>
Little or no revisions	18.4	18.2	18.2
Moderate revision to $\geq 1$ course	26.9	26.7	27.4
Major revision to $\geq 1$ course	30.0	30.2	31.1
Developed $\geq 1$ course	5.4	5.4	5.1
Developed and revised $\geq 1$ course	19.7	19.6	18.2