

### ***B.1. Universe and Sampling Procedures***

The SED is a census of all students receiving a research doctorate between July 1 and June 30 of the following year. Because it is a census, no sampling is involved. All institutions identified in IPEDS as granting doctoral degrees are asked to participate IF they confer “research doctorates” and if they are accredited by one of the regional accreditation organizations recognized by the Department of Education. If so, the schools are asked to distribute survey questionnaires, or cooperate in the electronic distribution the self-registration link, to their research doctoral recipients at the time of graduation. The SED maintains the universe of research doctorate-granting institutions each year by comparing the list of research granting institutions from IPEDS against the schools participating in the SED. If a new institution is found to be offering a research doctorate, they are contacted and added to the SED universe.

A high rate of response is essential for the SED to fulfill its role as a key part of the universe frame for longitudinal sample surveys, such as the Survey of Doctorate Recipients, and as the only reliable source of information on very small groups (racial/ethnic minorities, women, and persons with disabilities) in specialized fields of study at the Ph.D. level.

The feasibility of conducting the Survey of Earned Doctorates on a sample basis, and the utility of the resulting data, have been considered and found to be unacceptable. First, it is highly unlikely that the 530 graduate offices that distribute the SED questionnaire voluntarily could be expected to effectively carry out a sampling scheme such as handing out the questionnaire to every fifth doctoral candidate. In addition, one of the reasons many institutions participate in the survey is to receive complete information about all of their doctorate recipients and to be able to make comparisons with peer institutions.

A second sampling option – a mailing to doctorate recipients AFTER graduation – would likely result in a much lower response rate because of difficulties in obtaining accurate addresses of doctorate recipients, particularly the foreign citizens who represent an ever growing proportion of the doctorates recipient universe each year. Such a technique would impose on the universities the additional burden of providing current addresses of new graduates, a somewhat ineffective process because experience with mailing surveys to new doctorates shows many addresses are outdated almost immediately after graduation.

A third alternative, sending the questionnaire to doctorate recipients at a selected subset of institutions, would result in only a marginal decrease in respondent burden because the largest universities, all of which would need to be included in such a scheme, grant a disproportionate number of doctoral degrees. For example, the 50 largest institutions annually grant 51 percent of all doctoral degrees. Application of these sampling techniques would reduce both the utility of the data and the overall accuracy of the collected data. Matrix or item sampling – a widely used technique in achievement testing – would not be feasible because the characteristic information is needed for each doctorate recipient for use in selecting the sample for the follow-up SDR. It would reduce the utility of the information to request, for example, sex, or race, or field of

degree information for some doctorate recipients and not for others. These characteristics are not evenly distributed across the doctorate population, and the extensive uses made of the data base rely on the completeness and accuracy of the information on doctorate recipients.

Therefore, sampling doctorates would decrease the utility of the data while increasing burden on the Graduate Schools which administer the survey and decrease the incentives for the institution to participate.

## ***B.2. Survey Methodology***

Because there is no sampling involved in the SED, there has traditionally been no weighting necessary. Basic information about non-responding individuals is obtained, where possible, from public records at their graduating institutions, graduation lists, etc. Both unit and item nonresponse are handled by including categories of "unknown" for all variables in tabulated results. The statistical experts associated with this survey are Colm O'Muirheartaigh, Vice President of Statistics and Methodology at NORC (312-759-4017) and Rachel Harter, Senior Statistician on the project at NORC (312-759-4058). At NSF, Mark Fiegenger, Project Officer for this survey (703-292-4622) and Stephen Cohen, SRS Chief Statistician, (SRS) (703-292-7769), will provide statistical oversight.

## ***B.3. Methods to Maximize Response***

The SED has enjoyed a high response rate during its existence, with an average of 92% completions over the past 30 years. It owes this high rate, in part, to the use of the data by the Graduate Deans who go to extraordinary lengths to encourage participation on the part of their graduates. Each Graduate Dean receives a profile of their graduates, compared with other institutions in their Carnegie class, soon after the data are released each year. It is also due to extensive university outreach efforts on the part of the survey contractor, NORC, and National Science Foundation staff and to the importance the universities themselves place on the data.

Throughout the data collection period, schools are constantly monitored for completion rates. Data on doctorates awarded on each commencement date are compared to data from the previous round in order to flag fluctuations in expected returns. Schools with late returns or reduced completion rates are individually contacted. Site visits, primarily to institutions with low response rates, by NSF staff and survey contractor staff are also critical to maintaining a high response rate to this survey. NORC's electronic monitoring systems are particularly important to these efforts, as each institution's graduation dates or SED submission dates can vary from monthly to annual.

In addition to the broad efforts to maintain high completion rates, targeted efforts to prompt for missing surveys and critical items are also key. The survey contractor works with Institutional Contacts and also utilizes Web-based locating sites to contact students by mail and e-mail for missing surveys or items. A Missing Information Roster is sent to Institutional Contacts who can sometimes provide basic items, in addition to addresses. A series of letters is sent to any

graduate who did not complete the survey through their graduate school, requesting their participation and containing PIN/passwords for web access plus paper questionnaires are sent to non-responding students. Additionally, a Missing Information Letter (MIL) is sent to any respondent who did not provide one of the “critical items” on the survey. This letter asks for the missing item and provides both a return envelope and a special e-mail address where the response can be sent. Finally, any non-respondent who does not complete the SED through their graduate school and does not return a survey through the non-respondent mailing effort is given the opportunity to complete a slightly shortened version of the survey over the phone. Data received via the different modes are merged and checked to avoid duplicate requests going out to the various sources. The results of these varied efforts significantly increase the number of completions as well as reduce the number of missing critical items, thereby improving the quality of the SED data.

The response rates of institutions as well as the response rates to questionnaire items are evaluated annually. For example, the evaluation of the response rate for 2007 indicated that over half of the non-response was due to 21 institutions. Institutions with poor response rates were targeted for special letters or site visits by NSF or survey contractor staff and, to a large extent, these efforts have been successful in raising the response rates at institutions.

#### ***B.4. Testing of Procedures***

The SED has undergone extensive review and testing of the questionnaire and the methods employed in conducting the survey, and there has been extensive outreach about the uses of the data by the SED’s stakeholders. The changes made to the SED 2010 survey version are a result of many activities which have helped inform changes to instruments and procedures over time. The following major activities have been conducted since the previous OMB clearance submission (see Attachment 9.1 for a list of the methodological studies conducted over the past 15 years). The NSF project officer will be pleased to provide any of the documents referred to in this section or those referred to throughout the supporting statement.

#### ***Questionnaire Review and Research***

Cognitive interviews were conducted to explore the effects on respondents of item format changes from the 2007 and 2008 SED questionnaire instruments, and to gauge respondents’ understanding of the term “interdisciplinary”. Twenty respondents were brought in and asked to complete the 2009 version of the questionnaire, then probed for their reaction to specific questions. They were also asked to compare the 2009 version to a mock-up version of the possible 2010 questionnaire, and asked to rate their preference on any changes that were made. The recommendations based on the results of these cognitive interviews are incorporated within the SED 2010 questionnaire, and will expand the questionnaire from a 10-page to a 12-page survey. (See Attachment 9.3.)

#### ***Data Collection Related Tests***

The accuracy of the data from the Survey of Earned Doctorates has been one of its strongest assets. An ongoing evaluation of the accuracy of coding, editing, and data entry processes is conducted. It consistently indicates that the error rate is very low (less than one percent). During data collection, the frequency distribution of variables is monitored on a continuous basis, so that emerging problems, such as high item non-response rates, can be identified early in the data collection phase and appropriate corrective measures implemented, if necessary. Additional quality control checks on the merger of paper and electronic questionnaires as well as the merger of missing information into the master data base are also ongoing. The survey questionnaires are constantly compared with the universities' graduation lists and commencement programs to make sure that only those persons with earned research doctorates are included.

### ***Survey Methodology Tests and Research***

Several tasks were completed since the last OMB package, and include several that informed the recommendations for the next cycle. These tasks ranged from continuous assessments of everyday processes to overarching reviews of the institutions and degrees included in the survey to confirm the completeness and accuracy of the SED universe.

The following tasks are done regularly throughout each survey round:

- Review of systems, programming, and quality control data preparation processes with a goal of earlier release of the data;
- Merging data on a flow basis to identify and correct data inconsistencies and reduce the amount of time between the close of data collection and the release of the data.

These tasks are done annually, prior to the beginning of data collection or to the start of data preparation:

- Comparison of the IPEDS database of doctorate-granting institutions to the SED universe to identify institutions newly offering doctorate programs that are not currently in the SED;
- Review of the IPEDS database to determine if any institutions currently participating in the SED are offering eligible degrees that are not currently being included;
- Discussion of possible improvements in the coding and editing processes to ensure faster data entry resulting in more timely follow-up with non-respondents;
- Consultation with data processing managers on issues of paper and electronic data handling and mergers;
- In-depth analysis of confidentiality issues, particularly of data products that will be publicly available;
- Coordination of items common to the SDR and SESTAT instruments (see section A.4).

The following tasks are completed annually at the end of each data collection period. The results are compiled and reviewed before each new OMB clearance cycle to inform possible changes:

- Extensive reviews of unit and item-by-item frequencies ;
- Item analysis for floor and ceiling effects;
- Review of all respondent comments for concerns over confidentiality or item improvements;

- Detailed review of emerging and declining fields of study and alignment with the CIP (Classification of Instructional Programs);
- Review of “other, please specify” information in consideration of expanding or changing answer options;
- Coordination of items common to the SDR and SESTAT instruments (see section A.4).

Finally, the following tasks were conducted during the last OMB clearance cycle, and will be conducted periodically in the future:

- conduct of cognitive interviews, as noted above, with doctoral students from various disciplines;
- specific analysis of the items changed during the prior cycle (in the case of this package, changes made to the 2007 questionnaire) ;
- review of the non-PhD doctorate degrees included in the SED to confirm that they are research degrees and thus eligible for the survey;
- extensive literature reviews on targeted topics, such as disclosure avoidance and other confidentiality issues, as well as the history and contemporary purpose of the Doctorate of Education (Ed.D).

### ***Research of SED Data Needs and Uses***

SRS conducted a series of eight outreach meetings in fall of 2008 to learn about the specific data needs and uses of institutions, associations, and organizations that make extensive use of the SED’s race/ethnicity and gender data. The meetings provided important input to SRS’s efforts to redesign the statistical tables that report this information. SRS also conducted a web survey during this same period to gather similar information from the SED data user community.

### ***Proposed Tests and Research***

Over the course of the proposed OMB cycle (April 2009 – April 2012), the SED anticipates conducting several methodological tasks that would involve both SED respondents and the Institutional Contacts (ICs) at participating institutions. The burden hours for these tasks are included in Section A.12. Proposals for these additional tests are still under consideration. These will be submitted for OMB approval prior to implementation.

The SED anticipates conducting focus groups and/or cognitive interviews with potential or already existing SED respondents over the next 3 years. One set of interviews would involve the web survey. Dr. Don Dillman has begun an expert review of the SED web survey and provided some recommendations for changes to the design of individual questions. Some of these recommended changes have been incorporated in the 2010 SED questionnaire (see Attachment 1) and are included in the list of changes in Attachment 2. Dr. Dillman will continue his expert review and may have further question changes as well as recommendations about the web survey methodology and its administration as a whole. Interviews may be conducted with respondents to gauge their reaction to these changes, their reaction to the “Field of Study” lists on the paper survey versus the web survey, or other possible mode effects.

Additionally, another set of cognitive interviews may be conducted prior to the next OMB

submission (for the 2012-2013 survey rounds) to test any changes to the questionnaire that would be recommended in the next review. The recommended changes would be based on analysis of the data from previous rounds to identify problem questions or emerging trends not being captured by the current instrument.

Finally, the SED anticipates conducting a web survey of all the ICs from participating institutions. This short survey would collect information on the specific practices involving the conduct of the survey at the institutions in the effort to identify new technologies, practices, or trends that impact the SED. The goal of this survey would be to identify areas where the SED can better support the ICs and adjust practices to meet the changing needs of the graduate schools.

The draft SED questionnaire was reviewed by Federal sponsors in November of 2008, and the final questionnaire was reviewed and then approved by the sponsors in January of 2009. (See Attachment 5 for the list of persons who were consulted or who reviewed the questionnaire.) See Attachment 2 for a list detailing changes made to the SED 2010 questionnaire from the 2009 version and the rationales for those changes.

#### ***B.5. Individuals Consulted***

NORC at the University of Chicago is the organization contracted to collect and analyze the SED data for the 2010-2011 survey rounds. Staff from NORC who have consulted on the aspects of the design are listed in Attachment 5.

Additional individuals both inside and outside of NSF who have consulted on the statistical and methodological aspects of the design are also listed in Attachment 5.