CHAPTER FOUR: REPORTING

The product of an evaluation is almost always a formal report. While the report frequently may be supplemented by other forms of oral communication—overheads, conference presentations, workshops—a formal written report is standard for NSF. Depending on exactly who the audience is, a specific report may vary in format, length, and level of technical discussion. For example, a report to a Board of Education will be far more concise, and less technical, than a report to a professional association or a funding agency.

In this chapter, we discuss the development of a formal report for an agency like the National Science Foundation. The specific type of report on which we focus is one that would be the product of an experimental or quasi-experimental design. For details on developing reports for other methodologies, specifically, case studies, see Yin, (1989).

What are the Components of a Formal Report?

Most reports include five major sections.   The major sections are:

- Background

- Evaluation Study Questions

- Sample, Data Collection, Instrumentation

- Findings

- Conclusions (and recommendations).

The Background Section

The background section includes and describes the following: (1) the problem or needs addressed; (2) the stakeholders and their information needs; (3) the participants; (4) the project's objectives; (5) the activities and components; (6) location and planned longevity of the project; (7) the resources used to implement the project; and (8) the project's expected measurable outcomes.

Notable constraints that existed in what the evaluation was able to do are also pointed out in this section.

For example, it may be important to point out that the conclusions are limited by the fact that no appropriate comparison group was available or that only the short term effects of program participation could be examined.

Evaluation Study Questions

The evaluation is based on the need for specific information; stakeholders such as Congress, NSF-funded program and project directors, and the participants, have distinct needs. There are many questions to be asked about a project. However, all of these questions cannot be answered at one time. This section of the report describes the questions that the study addressed. As relevant, it also points out some important questions that could not be addressed due to factors such as time, resources, or inadequacy of available data gathering techniques.

Evaluation Procedures

This section of the report describes the groups that participated in the evaluation study. For quantitative studies it describes who these groups were and how the particular sample of respondents included in the study was selected from the total population available, if sampling was used. Important points noted are how representative the sample was of the total population; whether the sample volunteered (self-selected) or was chosen using some sampling strategy by the evaluator; and whether or not any comparison or control groups were included.

This section also describes the types of data collected and the instruments used for the data collection activities. For example, they could be:

- Quantitative data for identified critical indicators, e.g., grades for specific subjects, Grade Point Averages (GPA's)

- Ratings obtained in questionnaires and interviews designed for project directors, students, faculty, and graduate students

- Descriptions of classroom activities from observations of key instructional components of the project

- Examinations of extant data records, e.g., letters, planning papers, and budgets.

It is helpful at the end of this section to include a "matrix" or table which summarizes the evaluation questions, the variables, the data-gathering approaches, the respondents, and the data collection schedule.

Data Analysis

This section describes the techniques used to analyze the data collected above. It describes the various stages of analysis that were implemented and the checks that were carried out to make sure that the data were free of as many confounding factors as possible. Frequently, this section contains a discussion of the techniques used to make sure that the sample of participants that actually participated in the study was, in fact, representative of the groups from which they came. (That is, there is sometimes an important distinction between the characteristics of the sample that was selected for participation in the evaluation study and the characteristics of those who actually participated—returned questionnaires, attended focus groups, etc.)

Again, a summary matrix is a very useful illustrative tool.

Findings

This section presents the results of the analyses described previously. The findings are usually organized in terms of the questions presented in the section on Evaluation Study Questions. Each question is addressed, regardless of whether or not a satisfactory answer is provided. It is just as important to point out where the data are inconclusive, as where the data provide a positive or negative answer to an evaluation question. Visuals such as tables and graphical displays are an appropriate complement to the narrative discussion.

While the discussion in the findings section usually focuses most heavily on quantitative information, qualitative information may also be included. In fact, including both can turn a rather "dry" discussion of results into a more meaningful communication of study findings. An easy way to do this is to include quotes from the project participants which help to illustrate the point being made.

At the end of the findings section, it is helpful to have a summary that presents the major conclusions. Here "major" is defined in terms of both the priority of the

question in the evaluation and the strength of the finding from the study. For example, in a Summative Evaluation, the summary of findings would always include a statement of what was learned with regard to outcomes, regardless of whether or not the data were conclusive.

Conclusions (and Recommendations)

The conclusions section reports the findings with more broad-based and summative statements. These statements must relate to the findings of the project's evaluation questions and to the goals of the overall program. Sometimes the conclusions section goes a step further and includes recommendations either for the Foundation or for others undertaking projects similar in goals, focus, and scope. Care must be taken to base any recommendations solely on robust findings and not on anecdotal evidence, no matter how persuasive.

Other Sections

In addition to these six major sections, formal reports also include one or more summary sections. These would be:

• An Abstract—a summary of the study and its findings presented in approximately one-half a page of text.

• An Executive Summary—a summary which may be as long as four pages that provides an overview of the evaluation, its findings, and implications. Sometimes the Executive Summary also serves an a non-technical digest of the evaluation report.

How Do You Develop an Evaluation Report?

Although we usually think about report writing as the last step in an evaluation study, a good deal of the work actually can and does take place before the project is completed. The "Background" section, for example, can be based largely on the original proposal. While there may be some events that cause minor differences between the study as planned and the study as implemented, the large majority of information such as research background, the problem addressed, the stakeholders and the project's goals, will remain essentially the same.

If you have developed a written evaluation design, the

material in this design can be used for the sections on "Evaluation Study Questions" and "Sample, Data Collection, Instrumentation." The "Data Analysis" section is frequently an updated version of what was initially proposed. However, as we noted in Chapter Two, data analysis can take on a life of its own, as new ideas emerge when data are explored; the final data analysis may be far different than what was initially envisioned.

The "Findings" and "Conclusions" sections are the major new sections to be written at the end of an evaluation study. These may present somewhat of a challenge because of the need to balance comprehensiveness with clarity, and rigorous, deductive thinking with intuitive leaps.

One of the errors frequently made in developing a "Findings" section is what we might call the attitude of "I analyzed it, so I am going to report it." That is, evaluators may feel compelled to report on analyses that appeared fruitful, but ultimately resulted in little information of interest. In most cases, it is sufficient to note these analyses were conducted and that the results were inconclusive. Presentation of tables showing that no differences occurred or no patterns emerged, is probably not a good idea unless there is a strong conceptual or political reason for doing so. Even in the latter case, it is prudent to note the lack of findings in the text and to provide the back-up evidence in appendices or some technical supplement.

One tip to follow when writing these last sections is to ask colleagues to review what you have written and provide feedback before the report reaches its final form. Your colleagues can assist in assessing the clarity and completeness of what you have written, as well as provide another set of eyes to examine your arguments and, possibly, challenge your interpretations. It is sometimes very hard to get enough distance from your own analyses after you have been immersed in them. Ask a colleague for help and return that favor in the future.

What Might a Sample Report Look Like?

In the pages that follow, we present sample sections from an evaluation report. The sections have been created to illustrate further the kinds of information included in each section. This report is a progress report developed after the first year of funding of a project that will ultimately continue for a total of 5 years.

Report of the Higher Education University Alliances for Minority Participation (AMP) Project

Background

Overview of the AMP Program

The Alliances for Minority Participation (AMP) Program is funded by the National Science Foundation's Human Resource Development division, part of the minority student development initiative. The program was developed in response to concerns raised by the low number of underrepresented minority students who successfully completed science and engineering baccalaureate degree programs. A major goal of the AMP Program is to increase substantially the pool of interested and academically qualified underrepresented minority students who go on for graduate study in these fields. Students eligible to participate in this program are United States citizens or legal residents in undergraduate colleges and universities who are African American, American Indian/Alaskan Native, or Hispanic.

AMP Program objectives are listed below:

- Establish partnerships among community colleges, colleges and universities, school systems, Federal/state/local agencies, major national Science, Engineering and Mathematics (SEM) laboratories and centers, industry, private foundations, and SEM professional organizations.

- Provide activities that facilitate the transition and advancement of minority students through one or more critical decision points during SEM education—high school to college, 2-year to 4-year college, undergraduate to graduate school, or college to the workplace.

- Achieve a demonstrated increase in the number of underrepresented minority students receiving undergraduate SEM degrees.

- Demonstrate the involvement and commitment of SEM departments and faculty in the design and implementation of improvements of SEM undergraduate education.

- Demonstrate the existence of an infrastructure and management plan for ensuring long-term continuance of AMP or similar activities among the participating organizations and institutions.

- Identify for evaluative purposes the critical data elements associated with demonstrating the increases of undergraduate and graduate students in SEM programs.

Project Description

The "Higher Education University" AMP project was funded initially for 5 years, renewable each year. The project operated during 1991-92 from September to June and during the 1992 summer session from July to August. According to the project plan, some students participated during both periods, while others participated in either the

academic year or the summer session. The "Higher Education University" AMP project included a coalition of colleges, universities, K-12 schools and nonprofit organizations.

Students were involved in the following core activities:

- Summer research using the skills of science, engineering, and/or mathematics

- Travel to attend professional meetings for scientists, engineers, and mathematicians

- Attendance at programs to hear presentations by special speakers on subjects related to science, engineering or mathematics

- Enrollment in the Summer Bridge Program to improve and enrich SEM skills

- Participation in peer study groups to improve skills in science and/or mathematics.

- A Black History program that was added to enhance African American students' self-esteem.

The project was fully funded for $1 million per year. This funding provided for project managers, faculty/teachers, graduate students, support personnel, development of a project database, student financial support, and the implementation of the previously described activities.

The Purpose of the Project and Its Evaluation

The goal of the project was to provide appropriate activities and support to students involved in the AMP project to improve and enrich their science, engineering and mathematics skills so that their interest and retention in the SEM pipeline continues through undergraduate to graduate school, and eventually to the Ph.D. The initial evaluation of the project focused on identifying those activities that successfully met the AMP objectives and on reporting student outcomes related to the success of the activities. On an annual basis, the evaluation will identify which of the project activities need to be modified or deleted prior to the project's Summative Evaluation.

"Higher Education University" AMP Project objectives are listed below:

- Establish and maintain a partnership among community colleges, colleges and universities, school systems, and industry

- Provide activities that facilitate the transition and advancement of minority students through two critical decision points during SEM education— 2-year to 4-year college and undergraduate to graduate school

- Retain 95 percent of the AMP students in SEM courses

- Increase the number of underrepresented minority students in SEM courses each year by 10 percent

- Increase by 25 percent each year the number of minority students receiving undergraduate SEM degrees

- Demonstrate the involvement and commitment of SEM departments and faculty in the design and implementation of improvements of SEM undergraduate education

- Demonstrate the existence of an infrastructure and management plan for ensuring long-term continuance of AMP or similar activities among the participating organizations and institutions

- Identify which components and activities helped recruit, retain and increase the number undergraduate and graduate students in SEM programs.

Evaluation Questions

The evaluation looked at a broad range of questions related to both the project's implementation and its success. Specifically, the evaluation addresses the following questions:

- Did the AMP project result in the establishment of adequate partnerships?

- What was the impact of the partnerships on promoting the AMP project's objectives?

- What activities were most successful in recruiting, retaining and increasing underrepresented minorities in science, engineering, and mathematics?

- What evidence is there that the project may successfully reach its long-term outcomes (e.g., SEM baccalaureate degree, acceptance into graduate school seeking a SEM degree)?

- How could the project be improved and/or changed to better serve the needs of underrepresented minority students who are enrolled in science, engineering, and mathematics courses?

Sample, Data Collection, Instrumentation

The primary sources for information about the AMP project came from the Annual Reports, the database of Minimum Obligatory Set (MOS) elements, project-focused questionnaires and interviews, and observations of the instructional components. The principal group for study was all AMP students in the project. Aggregates of grades by race, gender and class status, pass and fail records, GPAs and retention rates were the basis for analyzing the impact of the "Higher Education University" AMP project sites and components. These same data were used for tracking the longitudinal progress of the AMP project for SEM underrepresented minority students—that is, the students' movement towards SEM baccalaureate and graduate degrees. For comparative purposes, selected scholastic information for all SEM students by race, gender and class status were collected. Table 1 summarizes the evaluation design. Variables, measures, and samples (participants) are presented for each evaluation question.

Table 1: Summary of the Evaluation Design

Question 1: Did the AMP project result in the establishment of adequate partnerships?			
Subquestion	**Data Collection Approach**	**Respondents**	**Schedule**
1a. What partnerships were established?	Review of records Interviews	NA Principal Investigator	End of year End of year
1b. Were the partnerships established in a timely fashion?	Review of records Interviews	NA Principal Investigator	End of year
1c. Were the goals for the number and mix of partners achieved?	Comparison of proposal and data from 1a	NA	End of year
Question 2: What impact did the partnerships have?			
Subquestion	**Data Collection Approach**	**Respondents**	**Schedule**
2a. How effective were the partnerships?	Questionnaires	All staff, Selected students	End of year
2b. What were the most effective activities provided by them?	Questionnaires Observation	All staff NA	End of year Ongoing

Data Analysis

Descriptive statistics (frequencies, percentages, means, medians, standard deviations, etc.) were used to report the results of the evaluation. Also, these statistics were used to make comparisons among the ratings and statements from the various respondents. Tests of significance were computed to determine if there were real differences among certain quantitative data, that is, the grade point averages and grades for AMP students and all SEM students.

Table 2 summarizes the data analysis design. The measures, variables, and analyses are presented for each evaluation question.

Table 2: Summary of the Data Analysis Plan

Question 1: Did the AMP project result in the establishment of adequate partnerships?		
Subquestion	**Data Collection Approach**	**Analysis Plan**
1a. What partnerships were established?	Review of records Interviews	Descriptions Simple numerical tallies
1b. Were the partnerships established in a timely fashion?	Review of records Interviews	Frequency distribution of time of partnership establishment
1c. Were the goals for the number and mix of partners achieved?	Comparison of proposal and data from 1a	Matching of goals with achievements

Question 2: What impact did the partnerships have?		
Subquestion	**Data Collection Approach**	**Analysis Plan**
2a. How effective were the partnerships?	Questionnaires	Percentages selecting various ratings
2b. What were the most effective activities provided by them?	Questionnaires Observation	Percentages selecting various ratings Summaries of running records

Findings

Did the AMP project result in the establishment of adequate partnerships?

The total number of institutions and groups that formed coalitions with the AMP project was 25. The types of groups that formed the coalitions were: 2 colleges, 5 universities, 4 junior colleges, 3 school districts, and 11 businesses and community groups. The only group that was below the target was school districts in the area. The target was to have 6 school districts involved.

The activities of these coalitions were judged to be very helpful to the project. Over 80 percent of the staff responded "helpful" or "very helpful" (the highest ratings) to the following activities:

• Mentoring

• Extended on-site experiences

• Special training opportunities

   etc.

Which components of the AMP project were the most successful in supporting and retaining AMP students?

The Summer Bridge Program was a very successful part of this project. This conclusion is based on ratings from the AMP students and the grades that they subsequently received in pre-calculus and calculus. (See Tables 3 and 4.)

The data are impressive. Over 50% of the Summer Bridge students received an "A" or a "B" in these classes. Equally important, the failure rate was low. Only 10% of the students failed pre-calculus and 15% failed calculus. These compare quite favorably with failure rates in the past which ranged from an average of 20% in pre-calculus to 35% in calculus.

A number of the comments about the Summer Bridge Program recognized the positive effects of the support systems which were provided.

A 16-year old female remarked:

> **"The Bridge Program gave me just that extra little boost**
> **that I needed to do well in my classes.**
> **I knew the basic material. I knew I knew the**
> **basic material. I was ready!"**

This program was not without criticism, however. Several students pointed out that the schedule of classes, occurring as they did at mid-summer, prevented them from taking jobs that they needed. They recommended that the program be offered right after the end of the regular school year or right before the beginning of the next school year, so that a block of time would be available for employment.

Another component that received high ratings was the Peer Study Group with its opportunities for collaborative learning. (See Table 3.)

    etc.

For a moderate number of students (35%), scholarship assistance was critical for them to remain in school.

    etc.

Summary of Findings

1. There was a large number of coalitions formed between from the business and community groups. School districts met only half of the participation target.

2. The Summer Bridge Program, Peer Study Group, and scholarship assistance were AMP components, which were rated highly for supporting students to remain in the SEM pipeline.

    etc.

Conclusions

For 1991-92, the "Higher Education University" AMP project met its objectives. The project established partnerships among community colleges, universities, school systems, business, and community groups. However, partnership with the school system fell short of their participation target by 50 percent.

The Summer Bridge Program, Peer Study Groups, and scholarship assistance were rated by the AMP students, faculty, and AMP staff as critical to retaining and increasing undergraduate and graduate students in SEM programs. However, in the Summer Bridge Program, there were some negative remarks about the scheduling of activities and recommendations were made for...

The Black History course received high ratings from the African American AMP students. Many of these students said that they were encouraged to succeed as SEM students after learning about successful role models in science and mathematics.