

## CHAPTER SIX: FINDINGS AND RECOMMENDATIONS

This chapter presents four recommendations to the federal statistical agencies on ways in which the training environment for survey and statistical training offered to "statisticians" might be improved at these agencies. The recommendations are:

1. Elevate priority for training at federal statistical agencies.
2. Assess training needs and opportunity within federal statistical agencies.
3. Create a formal approach to employee career development.
4. Enhance statistical literacy outreach to agency clientele.

Additionally, the subcommittee sought the insights of senior agency executives at the largest of these agencies regarding their future statistical training needs. Their insights conclude the chapter. Each recommendation is discussed in relation to findings that support the recommendation and implementation suggestions that arose from the subcommittee analysis. Each implementation suggestion was categorized as an activity that could best be undertaken by an *individual agency*, by *collaboration* between agencies, or by *standardization* among agencies.

### **Recommendation 1. Elevate Priority for Training at the Federal Statistical Agencies**

*Finding.* There is variation among agencies in amount of resources and priorities assigned to training. However, all agencies have the need for a workforce trained in statistical and survey methodology. Academic programs do not adequately prepare the workforce to conduct the functions required to produce official statistics.

*Action 1. Top Management Emphasis on Training (Individual Agency Action).* Training must take a high priority in the strategic plans of agencies. It must be made more visible. Top management must emphasize the importance of training to the agency and ensure that consistent and adequate resources are devoted to training. Training should be seen as a part of everyday work, not just a luxury or something to be done when the employee has extra time.

### **Recommendation 2. Assess Training Needs and Opportunity within Agencies.**

*Findings.* The statistical agencies exhibit great variation in the size and format of their training programs; the numbers, series, and grades of their statisticians; and the skill levels of current employees and new hires.

The majority of the statistical agency workforce consists of computer specialists (32%), survey statisticians (26%), and economists (22%). The proportion of computer specialists varied from one percent at NCES to 85 percent at the Smithsonian. There was similar variation for survey statisticians and economists. The proportion of survey statisticians varied from 2 percent at BEA to 77 percent at NCES and the proportions for economists varied from one-half of one percent at BoC to 80 percent at ERS. Mathematical statisticians, the initial focus of the study, compose only 8.6 percent of the

workforce, varying from less than one percent at the Smithsonian to 16.9 percent at EIA. But the large variation in numbers of employees at the several agencies affects the size and scope of training and development needs in these organizations.

The amount of money spent on statistical training does not appear to be a good overall measure of the adequacy of an agency training program. There is a large amount of variability in the assessment of cost of individual training courses. Not all the costs are captured as part of the accounting for agency training. The subcommittee hypothesis that average per-employee cost of training would provide a measure of training performance was not valid.

The Federal Statistical Agency training databases were not standard across agencies. The information in the existing databases was incomplete, had varied formats, and often lacked desired information.

*Action 1. Focus Groups (Individual Agency).* Agencies should consider conducting focus groups with different subpopulations of employees in order to explore employee awareness of training (where and how they get their information), what kinds of training they want more or less of, and why they may fail to take advantage of the opportunities available. This technique will expose weaknesses in the communication chain between those who plan and provide for training and those for whom it is intended. This technique was recently employed at the Census Bureau to provide employee and supervisor feedback on career development opportunities for mathematical statisticians. The feedback will be instrumental in establishing new directions for career development for this group of employees.

*Action 2. Performance Measures and Databases (Individual Agency, Collaboration, Standardization).* Training needs at each agency should be assessed on a routine basis; performance measures should be established to ensure that agencies are meeting training goals.

N Training databases can be very effective in facilitating evaluation of training needs. Two agencies, NASS and NCHS, have a complete and accurate training database. Elements of the NASS database are provided in Section 3 of Chapter One. These agencies could be encouraged to share information on the format and development of their databases. This could be in the form of a written article or a workshop presentation. The audience may well be broader than the federal statistical agencies.

N EIA has developed performance measures for its processes and resources. Those specific to training could be shared with other agencies.

*Action 3. Training Hours per Employee as Training Measure (Individual Agency, Collaboration).* Hours of survey and statistical training per "statistical" agency employee may be a more reliable comparative measure of availability of this type of training to this group of agency employees. After the agency data had been collected, a search of private sector training information uncovered a measure used in the Human Resource Development literature. *Training Magazine* reports that in 1996 the total dollars budgeted for formal training by U.S. organizations was \$59.8 billion. The total number of individuals who received formal training was 58.6 million, with professionals receiving

the greatest amount (37 hours per individual) and administrative employees the least (21 hours per individual). Data on hours of training is available on most agency training forms and agency databases. Analysis of this information would permit comparisons, among federal statistical agencies, of the quantity of training taken, but no measure of its comparative quality or effectiveness.

*Action 4. Information on Recently Hired Employees (Individual Agency).* The survey did not request "number of junior employees" and their participation in training. This information would be useful in assessing the training needs of entry level staff in comparison with those of employees who have a longer tenure with the organization.

### **Recommendation 3. Create a Formal Approach to Employee Career Development.**

*Findings.* Many survey and statistical courses are common between the federal statistical agencies who are, in many cases, using the same providers. Many federal statistical agencies support academic training for their employees in statistics, survey methodology, and computer science. Three agencies (NASS, BoC, CDC) have some formal career development programs for statisticians. Other agencies leave career development up to individual employee initiative, providing opportunities to take both in-house and external (academic or professionally sponsored) courses.

*Action 1. Training for Broad Professional Workforce (Individual Agency).* Statistical and survey training should meet the needs of this broad professional workforce which includes mathematical statisticians, survey statisticians, statistical assistants, operations researchers, computer specialists, economists, sociologists, psychologists, and anthropologists. These training needs cover a broad scope and should not be limited to the needs of the mathematical statisticians (the original focus for this study). Each agency confronts some specific requirements — caused by agency specialization — that all need to be addressed.

*Action 2. Interaction with Educational Institutions (Individual Agency and Collaboration).* More interaction with educational institutions should be encouraged to provide input on specialized courses needed by federal statisticians. The roles served by the Washington Statistical Society of the ASA and of ASA itself could be expanded. Specialized training for statisticians in areas other than statistics (such as technical writing and technical presentations) should also be addressed *by educational institutions.*

*Action 3. Sharing of Training Information (Collaboration).* Because of the variation in the nature of work done at each of the agencies and the variation in the types, grades, and skill levels of statisticians, the subcommittee does not recommend a "one size fits all" training program. It is recommended, rather, that federal statistical agencies increasingly share training resources and information. Courses offered at one agency could accept attenders from other federal statistical agencies. JPSM is presently facilitating cooperation in this area. There exists an opportunity for still more collaboration through JPSM. Examples of collaborative opportunities include:

- N Coordination of in-house courses common to several agencies may enhance agency training opportunities. For example, NASS offers a Basic Survey course that should be of interest to survey statisticians in any agency. They also developed, on videotape, a nonsampling error measurement course for agricultural statisticians. Statisticians at other agencies could benefit from this course.
- N An annual workshop for agencies to exchange information on survey and statistical training may facilitate collaboration. This might be an activity that FCSM would want to sponsor.

*Action 4. Training Collaboration Group (Collaboration).* If the agencies desire to pursue additional collaboration opportunities, a group with this focus should be established. A program of on-going measurement of training may be useful.

- N An interagency Federal Statistical Training Group could be organized to facilitate the interagency sharing of information and resources. This group could be an interest group reporting to the Federal Committee on Statistical Methodology, such as the Interagency Committee on Data Access and Confidentiality. Representatives from academic institutions (including JPSM) and a liaison with the Washington Statistical Society could participate in the group.
- N A web site would facilitate sharing of information on training opportunities and new programs and enable cross agency participation in those programs.

*Action 5. Agency Orientation Program (Collaboration).* Although agency orientation was not the focus of the study, this is another related area for potential collaboration. Agency orientation might well include an introduction to the federal statistical agency programs. This might be developed in conjunction with JPSM and their already existing seminar on the Federal Statistical System.

*Action 6. Career Development Showcase Session (Collaboration).* Because only three agencies (NASS, BoC, CDC) have designed formal career development for statisticians (or mathematical statisticians), finding out more about their plans should be of interest to all the other statistical agencies. Perhaps the three agencies could co-host a half-day showcase session for representatives from the other agencies.

*Action 7. Mentoring (Individual Agency, Collaboration).* Another approach to career development is to support professional employee mentoring programs. The only formal mentoring directed specifically toward mathematical statisticians was part of the Census Bureau Intern Program. CDC has a mentoring program, but it is not particularly focused on professional occupations. The Census Bureau is piloting a mentoring program for all professional series. Collaboration in the development of such programs has the potential to benefit all of the agencies.

**Recommendation 4. Enhance Statistical Literacy Outreach to Agency Clientele.**

*Findings.* Several agencies conduct statistical training for data users, customers, or other non-employees. Some federal statistical agencies provide statistical and survey methodology training to international audiences, yet make these courses generally available to agency employees. BoC, NASS, and BLS conduct extensive interviewer training programs that are very different in approach, but all have common components that would benefit from broader sharing of approaches.

*Action 1. Interviewer Training (Collaboration).* BoC, NASS, and BLS conduct interviewer training and evaluate interviewer performance. Possible collaboration might result in the development of a competency model of interviewer skills, knowledge, and abilities. Collaboration might also produce an evaluation model to measure interviewer performance.

**N** Noting interviewer competencies that are common to both agencies, generic training modules could be designed to meet the needs of both. In order to meet the shared challenge of simultaneously training a large number of interviewers in a cost-effective manner, perhaps Census Bureau and NASS could offer joint interviewer training, thus benefiting from economies of scale.

*Action 2. Non-Employee and Customer Training (Collaboration).* There also seems to be opportunity for sharing in the areas of non-employee and customer courses. Six agencies — BoC, BLS, ERS, NASS, NCES, and NCHS — provide statistical training to non-employees, including customers. Although course content might be too agency specific, the overall methodology, design, course objectives, and delivery strategies would be of value in meeting the goals of educating and informing stakeholders, the general public, and interested international parties about statistics. The administrative processes of communicating these unique courses to specialized audiences and encouraging them to participate might be of interest, as would the process of establishing cost and payment options.

## R R R R R The Future R R R R R

The information that the subcommittee gleaned from senior agency executives identified several new quantitative areas of application in federal statistical agencies. These are newly emerging fields. Rich Allen (NASS) mentioned the need for "statistical" employees to gain skills in accessing and using data from multiple sources — surveys, censuses, and administrative records. This includes computer data warehousing knowledge, record linkage, messy data analysis, and operation or household profiling. Jay Hakes (EIA) articulated a need for statisticians to lead their agencies in the development of performance measures respecting attainment of strategic goals.

Another area of increasing need is that of providing quantitative information to a broader audience (Jay Hakes; Cathryn Diplo, BLS; Pascal Forgione, NCES). This need has been greatly accelerated through the Internet and its capabilities for near-instantaneous dissemination of graphical and other information. Making data more readily available will increase the need for skills in disclosure avoidance procedures. That is, one must develop products that provide statistical data without releasing individual identities. Statisticians will need to assist in developing the quantitative literacy skills of the public. Both statisticians and the public must deal with data, metadata, and graphics. Agencies must assist in training "statisticians"

to communicate these statistical concepts. Additionally, "statisticians" will need to enhance their basic competencies in other disciplines (e.g. social sciences, computer science, business, health) as they bear on survey design and operations (Paula Schneider, BoC; Edward Sondek, NCHS).

The future shape of federal career development programs might emulate that of today's private sector, in which organizations support all employees ". . .to continually add to their skills, abilities, and knowledge." (*Robbins, p. 285*) In this model, employees take personal responsibility for their individual futures with support from their agencies (in contrast to relying on the agency to take responsibility for managing the careers of statistical employees). The federal statistical agencies are moving from a prescriptive model (wherein all participate in the same activity) to a more open descriptive model (wherein individual employees understand both the organization's goals and their own expectations). It becomes their own responsibility to develop an open descriptive plan for their training. By way of illustration, the Census Bureau has recently instituted an electronic system by which employees can view their own training history, access curriculum information and a schedule of in-house courses, then apply to participate in both in-house and academic courses.

Progressive employers facilitate and support employee development initiative by: (1) clearly communicating the organization's goals and future strategies; (2) creating growth opportunities; (3) offering financial assistance; and (4) providing the time for employees to learn." (*Robbins, p. 285*) Appropriate survey and statistical training supporting the missions of individual agencies should be made available to the agency workforce along with the opportunity to participate in the training and apply it to real work situations.

Enhancing collaboration in training across the federal statistical agencies will enhance the skills of the employees of the system. This will facilitate better mechanisms for training staff and increasing the skill level of the agencies. If this is done effectively, employee skills will be enhanced across the system. Thus, the future federal career planning process will be one in which the individual employees keep their skills, abilities, and knowledge current in order to prepare for tomorrow's new tasks with the support of their federal employer.

## **References**

Robbins, S. P. (1997).  
*Managing Today!* Prentice-Hall, Inc. Upper Saddle River, N.J.