THE 1980 CENSUS EXPERIMENTAL PROGRAM

Barbara A. Bailar, U.S. Bureau of the Census
Susan Miskura, U.S. Bureau of the Census

I. INTRODUCTION

In 1980, the Decennial Census will be taken by the mailout/mailback/followup procedure in over 90% of the country. This means that the census questionnaires will be mailed out by the Bureau, and the household respondents are asked to fill them in and mail them back. For those who do not return a questionnaire by mail, there will be a followup procedure. The expansion of the mail census from about 60% in 1970 was largely based on an experimental program known as the Mail Extension Test, conducted during the 1970 census.

Now there are new procedural questions which the Census Bureau will try to answer in the context of the Decennial Census. It is often impractical to try to address some of these questions in a single-site pretest. Prelist sites are generally atypical, in that they are selected to represent special problem areas; furthermore, it is often impossible to introduce satisfactory experimental designs in a single site, since procedural differences are difficult to control and inevitable human interactions contaminate the results. Of course, while experimenting during the census, the Bureau feels an obligation to maintain coverage and quality in the test sites equal to that in the remaining areas of the country. This is one reason that the number of experiments carried out during the census is necessarily limited, although ideas for new techniques are numerous.

The experimental programs in the 1980 census will provide for the examination of procedural alternatives to several standard operations, from mailing list compilation and improvement to training the temporary staff. Under regular census procedures, mailing lists are compiled by one of two methods. In heavily urbanized areas, the first step is to purchase an initial mailing list from a commercial vendor. This list is expanded by three Post Office updates, and a physical canvass of the area, called the precanvass. Each of these operations adds a unique set of addresses to the mailing list. In less urbanized areas, the mailing list is developed by a physical prelisting operation; the prelisted addresses undergo two postal updates before Census Day.

There are two basic types of mail census offices, referred to as centralized and decentralized. Centralized offices cover the most highly urbanized areas; in centralized offices, several operations, such as telephone followup of incomplete questionnaires, are done by a central office staff. Decentralized offices cover the remainder of the mail census area; in decentralized offices, telephone followup is done by individual enumerators.

Tuesday, April 1st is Census Day in 1980; mailout of questionnaires will take place on Friday, March 28. Approximately ten working days after April 1st, enumerators are sent into the field to followup on nonresponses to the mailing. Concurrently, mail returns are edited and, in centralized offices, questionnaires failing edit are followed up by telephone as much as possible. After nonresponse followup, the mail returns and enumerator-filled questionnaires are sorted and merged. A second followup including coverage improvement checks, some failed-edit cases, missing questionnaires, and so on, then takes place.

It is in the context of these procedures that the experimental program is being planned. The cost and effectiveness of alternatives to several of these steps will be tested.

II. THE UPDATE/LIST/LEAVE EXPERIMENTAL PROGRAM

A. Background and Purpose

The update/list/leave experimental program will test a variation of a "pure" or direct list/leave procedure. As the name implies, a "pure" list/leave procedure is one in which an enumerator, following a prescribed path of travel, lists all living quarters encountered, attempts personal contact with the occupants, and leaves a questionnaire to be filled out and mailed back. The Bureau of the Census has used list/leave methods in the past, most notably in the 1960 census; and the procedures used for the Canadian Census are a form of list/leave.

To offset the impersonalization of Post Office delivery of the census questionnaire, the "leave" aspect of the list/leave procedure is appealing. Personal contact with the enumerator may motivate the respondent to fill the questionnaire more completely both in terms of the household roster and individual data items; and encourage a higher rate of mail returns. In addition, the enumerator could explain the purposes of the census, determine if foreign language help is needed, and leave continuation questionnaires at large households. Finally, the enumerator could collect information, such as address corrections, household name and size, and telephone number, which would be useful if later followup efforts were needed.

In itself, however, the "list" aspect of a direct list/leave procedure has several disadvantages in terms of coverage, when compared to the extensive update and verification efforts in preparing address lists in mail census areas. Since the operation must be completed in a short time period before Census Day, it would be difficult to implement effective quality controls to insure high coverage levels from the procedure. The timing would also prohibit any more than two Post Office reviews. Furthermore, because the

enumerator is acutally conducting a short interview and leaving questionnaires, coverage might suffer because of the multiple emphases of the job. Because of these deficiencies associated with listing during a direct list/leave, it was decided to experiment with a version where the enumerator starts with an already-prepared list. The list is the commercial list, updated once by the Post Office, in urban areas; and the keyed list from the prelist operation in more rural areas. Instead of having to compile a list, therefore, the enumerator is responsible for updating those addresses already listed, and listing only new addresses. Hence, the procedure to be tested in the 1980 census is called the "Update/List/Leave" experiment.

The coverage improvement potential of a physical canvass has been demonstrated in the 1980 census pretesting program by the precanvass operation in urban areas; the update/list/leave program, which replaces the precanvass, will answer: 1) whether this same improvement can be realized when a precanvass-like operation is combined with drop-off of questionnaires, and: 2) the extent to which a precanvass would be successful in rural areas where a physical recheck is not otherwise performed. The coverage and quality benefits brought about by the personalization of the "leave" aspect will also be examined.

B. Design and Procedures

The update/list/leave experimental program will be carried out in five 1980 census mail offices. Two of the sites will be centralized, or highly urbanized areas; one will be very rural, and two will contain a mixture of urban and rural areas. Each experimental office is paired with a control office on the basis of characteristics expected to affect the usefulness of the update/list/leave procedure. Standard census procedures will be carried out in the control offices, but special records will be kept. This will allow analysis of the variables of interest both by nonparametric methods and by fitting data collected at the level of an enumerator's assignment to a linear model, accounting for the effects of the procedure, type of office, and specific office.

In the early part of the census period - immediately before and after Census Day - the procedures for the update/list/leave offices will differ greatly from the regular procedures. In the experimental offices, the enumerators will begin the update/list/leave three weeks before Census Day. They will canvass their assignments comparing what is on the ground to what is found in the address listing, and knocking on every door. They will be expected to contact a respondent at each address where someone is at home, leave a questionnaire of the appropriate form type, and determine if a Spanish language questionnaire, or other language help, is needed. A short interview to collect household name and size, telephone number, and address corrections will be conducted. During this interview, the enumerator will also verify the number of living quarters at the basic address, so that any missing units can be added. When personal contact cannot be made, a questionnaire packet containing explanatory material will be left. In addition, the enumerators will be responsible for adding any structure addresses missing from the listing, and leaving questionnaires at all added units. They will also make geographic corrections, and designate units no longer existing. This work will be quality-controlled by the supervisor, and any assignment which fails the check will be recanvassed.

Concurrent with this field operation, reminder cards addressed for each unit on the initial mailing list will be sent to the Post Office. Although reminder cards are not being used under standard census procedures (pretesting has indicated their use is not cost effective), they are considered appropriate under the update/list/leave for two reasons. First of all, since the questionnaires may be dropped off as much as three weeks before Census Day, but the respondents are asked not to mail them until April 1, a reminder card would jog the memory of those who might have forgotten. Secondly, sending the reminder cards would allow a parallel postal check which, under standard procedures, is done using the actual questionnaire. During the postal check, the Post Office will identify units to which mail may be delivered but for which there are no addressed reminder cards. Addresses for such missing units will be supplied to the local census office. When the enumerators complete their assignments and return the updated listing to the office, the addresses added during the update/list/leave will be matched to the misses identified by the Post Office. Any postal adds not already added by an enumerator will be put into the master listing and treated as nonresponse cases for later followup.

Under regular census procedures, a ten-working-day period elapses between April first and the beginning of nonresponse followup. During this time, mail returns are checked in and followup assignments are prepared. For the experimental program, this period will be extended because several operations other than questionnaire check-in must be accomplished. Besides the match of the postal adds to enumerator adds, conflicting geographical designations must be reconciled. However, beginning with the followup of nonresponse cases, the remaining procedures are basically the same for regular and experimental offices.

Shortly after the end of the census in the update/list/leave offices, a Post-Enumeration Survey (PES) will be conducted in each control and experimental office. The purpose of the survey will be to estimate both person and housing unit

undercoverage in each site, as input into the final analysis of the effectiveness of the update/list/leave procedure.

C. Measures of Effectiveness

As mentioned previously, the major variables of interest in evaluating the effectiveness of the update/list/leave program are the resultant undercoverage rates of housing units, and especially of persons. While the operational considerations - mail return rates, efficient followup procedures, etc. - are certainly important, we would be reluctant to use an update/list/leave procedure if it were successfully carried out but deficient in terms of coverage. Furthermore, since standard census procedures are, in general, quite adequate in terms of housing unit coverage, particular attention will be paid to measuring the potential of the update/list/leave procedure to improve within-household person coverage.

Both housing unit and person undercoverage rates will be measured through the previously-mentioned Post-Enumeration Survey. The PES sample will be designed so that differences in coverage rates between each pair of experimental offices and control offices can be detected. It is hypothesized that coverage rates for persons might be higher under the update/list/leave procedure than under standard procedures because of: 1) the personalization of the drop-off interview; and 2) the extra check allowed by comparing the number of persons on the questionnaire with the number reported during the drop-off. If, in fact, substantially more complete person coverage results from the update/list/leave method than regular methods, this would indicate a promising direction to go in attacking the severe problem of within-household undercoverage.

The PES, in which units in a sample of blocks are listed and rosters obtained within a sample of listed units, will also allow measurement of the accuracy of assigning geographical codes and the bias in designating the census sample. Overall mail return rates will be computed to determine if the personal contact did indeed serve as an incentive to respond. Incoming item nonresponse rates will be computed and compared. Miscellaneous measures of coverage quality, such as coverage edit failure rates and number of last-resort (minimum information) cases, will be tabulated.

Although many of the operational considerations of interest cannot be directly measured in the experimental program, simulations to set bounds on the efficiency which can be realized will be conducted. For instance, we can measure the number of times that a telephone number is available from the update/list/leave for households which do not mail back their questionnaire. In conjunction with the results of the experimental program using Telephone Followup for Nonresponse, this information will provide some idea about the extent to which telephone, rather than personal visit, of nonresponse cases may induce cost savings.

Finally, the relative costs associated with the update/list/leave method will be estimated. This comparison can be done by using the production records and simulation results to determine the factors increasing and decreasing costs compared to the regular census procedure. Of course, many of the procedures in the experiment on update/list/leave could be made more efficient if plans to conduct a census in this manner were made from the start, rather than trying to fit them into the regular procedures already developed. However, if the results indicate that the update/list/leave can significantly improve coverage, and that the whole package of necessary procedures are cost-effective, this experimental program could lead to major changes in census-taking in the future.

III. THE ALTERNATIVE QUESTIONNAIRE EXPERIMENTAL PROGRAM

A. Background and Purpose

High mail return rates and a high level of completeness of returned questionnaires are important objectives in the Decennial Census. Mail return rates directly affect the cost and time spent in personal visit followup of nonresponses. The completeness of the questionnaires returned by respondents also has cost implications in terms of editing, and telephone and personal visit followup to obtain missing data. Furthermore, if the level of completeness by the respondent is high, there is less opportunity for enumerators to have an effect on the tabulated data. For these reasons, much effort in planning for the 1980 census has been directed towards insuring acceptable rates of mail response and questionnaire completeness.

Classroom experiments carried out since the 1970 census provide some evidence that the layout of the census questionnaire may influence the degree to which it is completed. Certain basic designs may appear easier to fill, and are more completely filled, than more formidable appearing instruments with identical content. More speculative is any effect which questionnaire design may have on actual mailback rates; however, it might be reasonable to assume that a respondent is more likely to fill and mail back a form which looks easy to fill than one which looks difficult. Insofar as these effects may occur in filling out the Decennial Census questionnaire, a worthwhile goal is for the census questionnaire to be well designed, easily understood, and easily completed.

However, the layout of the census questionnaire is subject to several

constraints. The major constraint is related to the method used to process census data. Questionnaire responses and coded data, entered manually onto the schedule by filling small circles, are read by a scanning camera as input onto a computer file. The system (FOSDIC or Film Optical Sensing Device for Input to Computer) dictates that questionnaire folds and positioning marks for automatic feed into the scanner be properly placed, and that answer or code circles be dark enough to be read. In meeting these constraints, the layout of the 1980 census questionnaire - and in particular, the lengthy sample form - might appear to many as intimidating or difficult.

Besides the addition of color shading, there is one major difference in the layout of the 1980 questionnaire compared to the 1970 schedule. The pages on which one hundred percent data are entered for each household member are laid out vertically - so that the data for each person are filled in a column - as opposed to the 1970 horizontal design. This change has been made to accommodate additional data to be collected. However, classroom studies have indicated that the "across the page" design is somewhat better received than the columnar form. Therefore, it appeared desirable to test a version of the 1970 horizontal design against the 1980 vertical arrangement in the context of the census on a representative matched national probability sample. This test would allow comparison of the data quality resulting from the two camera-readable formats with identical content. Furthermore, it would allow measurement of the effect on mailback rates, which cannot be measured in classroom studies.

Hypothesized to have an even greater effect than alternative camera-readable formats is the constraint of automated readability. Without these constraints, there would be much more leeway in designing the questionnaire to be respondent-oriented rather than processing-oriented. The size and folding of the form could be flexible; the instructions for filling the form could appear next to each question rather than in a separate booklet; and the design could be made less forbidding in terms of initial impressions. Allowing the respondent to check answers rather than fill circles might make the form easier to complete, and perhaps this ease might prompt mail returns. To test this idea, it was decided to experiment with a second questionnaire alternative, unrestrained by having to be camera-readable in the FOSDIC system. Of course, it should be kept in mind that the entries on a non-FOSDIC form would have to be transcribed to a FOSDIC form or manually keyed onto computer-readable input. Any gains in the number or completeness of forms returned by mail would have to be balanced against the additional processing costs for a non-FOSDIC form.

In the Experimental Program on alternative questionnaires, then, two forms of different types, with content identical to the regular census form, will be mailed to national samples of households. Comparisons of mail return rates and the completeness of returned experimental questionnaires will be made with a national control sample of standard questionnaires to provide some measurement of the effects of the alternate designs.

B. Procedures

Four experimental census questionnaires - a long (sample) and short (100 percent) version of the two basic alternatives - have been developed. The horizontally or linearly laid out camera-readable form was designed at the Bureau of the census, and tested for processing acceptability. The non-camera-readable form was developed by a commercial contractor. To test these forms against the standard census form, a total sample of 18,000 cases will be selected in mail areas of the country at the same time as the regular census sample is designated. An equal number of cases will be allocated to each questionnaire version, form type, and type of district office as follows:

	Centralized Mail Offices	Decentralized Mail Offices	Total
Control Sample			
Long	1,500	1,500	3,000
Short	1,500	1,500	3,000
Linear FOSDIC			
Long	1,500	1,500	3,000
Short	1,500	1,500	3,000
Non-FOSDIC			
Long	1,500	1,500	3,000
Short	1,500	1,500	3,000
Total	9,000	9,000	18,000

The outgoing mailing pieces containing the control and experimental questionnaires will look exactly like the regular mailing pieces. Pre-mailout processing will be done in a manner entirely analogous to the processing for the regular mailout in terms of preparing packages, labelling, and distribution to the Post Office. Within the outgoing packages, the major differences will be the designated questionnaires and return envelopes different in size and shading from the regular return envelopes. These return envelopes will be addressed to the Census Bureau's Processing Center in Jeffersonville, Indiana, rather than to the local district office.

In Jeffersonville, daily mail receipts for all twelve subsamples will be tabulated. The control sample cases will be microfilmed and the original questionnaires returned to the appropriate district office. Alternative questionnaire cases will be transcribed to standard census forms, which will be microfilmed and returned to the district offices. The microfilmed questionnaires will all be uniformly edited

using standard clerical edit rules. The edit failure rates for questionnaires and for individual data items will then be compared.

C. Measures of Effectiveness

The differences in mailback rates among the three questionnaires will be analyzed separately for long and short forms. This analysis will address the major question of whether mail return rates in the census could have been affected by differences in questionnaire design.

Second, measures of questionnaire completeness will be obtained from the application of uniform edit rules to the information on the returned questionnaires. Each questionnaire will be classified by whether or not followup is necessary to obtain additional information. Each item on each questionnaire will be classified as acceptably answered or not. These analyses will allow comparison of questionnaire and item completeness from each type of form in the Alternative Questionnaire Experiment sample.

Insofar as possible, mailback rates and edit failure rates will be analyzed in terms of respondent characteristics. It would be of particular interest to know if certain demographic characteristics - race, urbanization level, education - might be correlated with the tendency to fill a particular questionnaire alternative more completely. However, because of the sample size and design, any detailed analysis in this area will be extremely limited. The experiment can be considered the most recent in a series of steps to answer these types of questions. Should overall respondent performance differ widely by form design in the experiment, it is likely that further research will be carried out to learn more about these effects in the future.

IV. TELEPHONE FOLLOW-UP OF NONRESPONDENTS

A. Purposes

After delivery of the census questionnaires by mail to all households on the census mailing list, household members are asked to complete the questionnaires and return them by mail to local census offices. If the questionnaire for a household on the mailing list has not been received in the office by a certain date, the address is scheduled for follow-up by personal visit of a census enumerator. If the enumerator finds the address, he or she attempts to complete the questionnaire by personal interview; if the address is for a vacant unit, the enumerator is to complete the questions for vacant units; if the address cannot be found, the enumerator is to delete it.

The expected mail return rates for occupied units in the census is expected to be about 80 percent; however, it will be much lower in the large central cities composing centralized mail areas. The cost of following up all the addresses of non-mail returns is very high, well over 100 million dollars. In addition, personal visit follow-up takes time and personnel to carry out. If the Bureau was able to contact a good portion of the non-mail-return cases by telephone, considerable savings in time, money, and personnel could be realized.

It should be noted that an attempt to use telephone followup for nonresponse in the 1970 census on an ad-hoc basis was abandoned. The present experiment has tried to address the problems which arose in the 1970 attempt, by structuring procedures and insuring the availability of appropriate telephone directories. Problems exist, however, due to the fact that the name of nonrespondents is not available in centralized offices. Thus, the purpose of this experiment is to test, in different kinds of areas, the feasibility of telephone follow-up of nonrespondents. The experiment is specifically designed to:

1. Assess the relative effectiveness of a telephone follow-up procedure in the census; and
2. Measure the extent to which there are biases relating to differences between respondents' reactions to telephone follow-up and personal visit follow-up.

B. Procedure

Because a current listing of telephone numbers for households is necessary for the success of this experiment, the Bureau has asked for the assistance of the telephone companies. Many of these companies are able to generate current telephone listings for small geographic areas. The American Telephone and Telegraph Company has provided us with a list of areas covered by the Bell System for which street address directories are regularly prepared and maintained. These directories will be made available to the Bureau for the areas needed. Of course, the directories will not contain unlisted numbers.

Since mail return rates vary by region of the country, we need to learn whether the telephone follow-up procedure will be successful or will present problems in a variety of settings. Will it be cost-effective where the percentage of unlisted numbers could be as high as 50 percent such as in Los Angeles? Will it be feasible in Manhattan where it is often difficult to followup in person? To answer these questions and others, the census district offices where street directories are available will be stratified by type of office and region of the country. Eight strata have been defined and one census office from each stratum will be selected. The selection criteria will include percentage of listed numbers and expected mail-return rate.

Within a selected district office, a sample of the non-mail return units will be selected for telephone follow-up conducted from the district office by a crew of telephone enumerators especially trained in the procedure. This centralized telephoning procedure will be used even in decentralized offices.

C. Measures of Effectiveness

There are several questions to be answered. The answers can be used as measures of effectiveness. These are as follows:

1. Are the data obtained by telephone comparable to the data obtained by personal visit? Extensive comparisons of distributions will be made for a large number of items including age, race, origin or descent, income, occupancy status, value and rent, number of rooms, and so forth.

   In addition, a formal reinterview and a relisting of the areas in which both personal visit and telephone follow-up cases are scheduled will be undertaken. This reinterview will provide a measure of respondent variability in the two procedures as well as an estimate of the number of missed units and perhaps missed persons.

2. What is the attrition rate of enumerators? If enumerators are more willing to stay on the job doing telephone follow-up than personal visit follow-up, considerable savings of time and money can be made.

3. What are the relative costs of the two procedures? The cost factor is an important one in deciding whether the procedure is feasible for nation-wide use.

4. How much time does it take to enumerate the population by each method? Though one expects the telephone procedure to take less time, in an area of many vacant units or multi-unit structures, it could require more time. First the telephoning would take place and then, because of no answers, personal visits would be made. Thus, the average amount of time required per completed questionnaire is an important variable.

5. How well do enumerators complete the questionnaires under the two procedures? The number of "last resort" enumerations, the number of missing entries on the questionnaires before and after Follow-up II, and the number of refusals are all measures of the quality of the completed questionnaires.

6. Does the telephone procedure lead to more missed units, and more double enumerations? The relisting should answer these questions.

7. Does the telephone procedure lead to more or less fabrication of persons? The reinterview should shed some light on this.

V. THE EXPERIMENTAL PROGRAM ON STUDENT INTERNS

A. Background and Purpose

Much of the expense of taking the Decennial Census arises from hiring, training, paying, and supervising the 250,000 temporary employees needed for the job. In pretests for the 1980 census, there have been severe problems in staff recruitment and turnover, particularly among the enumerators. It appears that the traditional components of the census workforce are available in much smaller degree, at least in large metropolitan centers, and that many persons now hired are not sufficiently motivated to complete the job or, to some extent, to do it well. Perhaps the job has become more difficult in some respects. In any case, the direct and indirect costs of recruiting and retraining replacement personnel is a cause for serious concern.

Another feature of recruiting which has made the process more complex is an increased emphasis on the need to hire indigenous enumerators, particularly in minority areas. Extensive attempts are made through publicity and community relations work to hire qualified minority workers. In the pretests, however, the success rate was not as high as hoped, and greater efforts will be made in the Decennial Census.

In light of these problems, it was suggested that college and university students, employed on conditions tied into their academic work, might provide a more stable and motivated workforce. If a program could be developed whereby the Census Bureau would provide curriculum support and practical work opportunities, in return for cooperation from various schools, the idea could be mutually beneficial.

Major questions need to be answered, of course, before arrangements for such a program could be made on a large scale. Some of the questions relate to administrative considerations by any schools to be involved. A critical issue is the extent of interest and commitment which colleges and universities would show. And, of course, the Bureau would need to know if, in fact, the hypothesized motivational factors would lead to reduced turnover and to better quality work.

To answer these concerns, an experimental program to test the feasibility of a student intern program will be carried out in the 1980 census. The purpose of the test is to see if an internship program can be developed which would assist in the recruitment of students as enumerators, particularly in minority areas. The participating schools, representing a number of geographic areas, would develop a plan of study which would include academic credit

for the work experience and provision of a block of time for student participation in the internship. At the completion of the experience, a thorough evaluation of its success could be made. It should be noted that the Experimental Student Intern Program is more a study of operational feasibility than a controlled experiment.

B. Procedures

A number of colleges and universities will be contacted to determine the interest of the school and faculty in participation in the student intern program. For the most part, the universities contacted will be those where: 1) the total minority enrollment is at least 1,000 students, 2) the school is located in or near large SMSA's, and there is a significant minority population in the area; and 3) the area where the student interns are expected to work is one in which recruiting or turnover problems are anticipated. Of the schools indicating a willingness to participate, perhaps as many as twenty will be selected for the experiment.

The Census Bureau staff will cooperate with each participating school to help set up the internship and related coursework. The only Bureau requirements are that the involved students meet the basic requirements for an enumerator's job, and that academic credit be awarded for the internship, either in and of itself or in conjunction with credit for a particular academic course. Therefore, the schools may exercise a fair degree of flexibility in combining the internship with any of a number of disciplines.

Although the use of census-related material will not be required on the academic side of the student intern program, the Bureau will make available a variety of published and specially-developed resources. One of these will be a textbook covering the history, purposes, procedures, and products of the 1980 Decennial Census operation, with some discussion of methodology and technical issues. The development of the text is being coordinated by the Data Users Services Division at the Bureau by employing experienced and well-known authors representing various fields to serve as editors and writers.

The Census Bureau district offices where the students will be employed will reserve a block of 40-50 positions during nonresponse follow-up enumeration. In order to receive a satisfactory rating and, therefore, academic credit, the students must satisfactorily complete their entire work assignment according to normal census job performance standards. The quality of each person's work will be evaluated and a summary will be sent to the school as a basis for justifying the academic credit. Students may be offered positions in later census operations, but this would not be part of the formal internship in the experiment, since the school year will have ended for many participating universities.

C. Measures of Effectiveness

The most important question to be answered by the Student Intern Experimental Program is if such an arrangement is feasible and beneficial to both the schools and the Census Bureau. The response of the schools and their evaluation of the usefulness of the program will be extremely important in the decision to pursue such arrangements further. The methods used to integrate the academic coursework with the job experience will also be examined.

Standard measures of enumerator performance will be used in evaluating the effectiveness of the students' work. The most important measure will be the rate at which students fail to complete their work assignments, despite the supposed motivation of completion as a prerequisite to academic credit. Two other measures of interest will be the rate of "curbstoning," or fabrication of interview results; and production, the number of interviews completed in a given period of time. Since these three measures - turnover rates, curbstoning rates, and production - will be collected for all enumerators in the census, their values for student interns can be compared with those for all or other groups of enumerators.

If, on the basis of the results of the experiment, the Student Intern Program is assessed to be viable and worthwhile, the Census Bureau will have identified an important new source of temporary employees. It will also have enhanced a data dissemination program by providing students with greater opportunity to learn about availability, accessibility, and use of the demographic and geographic products of the census. The result could be a program of mutual benefit and cooperation between our government agency and the nation's colleges and universities.

VI. ALTERNATE TRAINING METHODS

A. Purposes

Training temporary personnel to take a census is an enormous job. For the follow-up of nonresponse cases in the 1980 census, approximately 150,000 enumerators will be trained at a cost of over nine million dollars. Training serves as an enumerator's formal introduction to the census. An enumerator learns the history and purposes of the census, acceptable field procedures, interviewing skills, and administrative procedures through training. Moreover, since an enumerator's first direct contact with the census is usually through training, its effects on an enumerator's attitudes can be expected to be significant.

The training traditionally used by the Bureau is delivered in a pyramidical fashion; that is, each supervisor trains the people who will be working for him/her. All

training is scheduled at the same time throughout the country so that thousands of training sessions are conducted concurrently. This decentralized training approach is relatively inexpensive and can mobilize thousands of trained field workers in a matter of days. However, it demands a high degree of structure which is obtained by the use of verbatim training guides that require word-by-word delivery to a group of trainees.

As with any approach, however, there are disadvantages to verbatim training. First, the characteristics of census workers vary and the training author must structure and present learning activities for an unknown population. The task of presenting concepts and skills to a group of people is particularly difficult because there is no classroom feedback. In other words, the trainer cannot adapt material to the needs of a particular group. Enumerators in a poverty-stricken inner city receive exactly the same training as enumerators from an affluent suburb.

Second, the author of training materials relies on written English that approximates spoken discourse in a classroom. Unfortunately, this skill is an extremely difficult one to acquire. Accordingly, material that makes sense when used by an individual in writing sounds stilted and monotonous when read aloud to a class over a period of several hours.

A third problem, related to the preceding, is that lecturing is essentially a passive-receptive learning approach. An enumerator sits and listens and is told how to perform a job. Although this approach is widely used in high schools and colleges, it assumes a high level of interest and motivation on the part of the student. Educational research has demonstrated conclusively that maximum instructional periods using lecture should not extend past certain time limits at different grade levels. Generally a maximum of 50 minutes in high school and 80 minutes in graduate school are considered rough guidelines.

At the present time, the most widely accepted model of instructional development requires 1) a task analysis of a job which specifies training objectives to be covered in training, 2) the development of learning activities and selection of media to present the objectives, 3) the development of behaviorally-oriented procedures to assess the level of skill-acquisition for each of the training objectives, and 4) the use of evaluated feedback to both trainees and trainer so that progress can be assessed. The alternate training approaches to be tested in the 1980 census can be viewed as an integration of this training model and available technologies that allow the "pyramid" training approach to be maintained. The new approaches will be employed experimentally to determine if they lead to better training with improved enumerator data-collection skills, less enumerator attrition, improved enumerator attitudes, and possibly lower costs resulting from these improvements.

B. Procedures

Two experimental training approaches will be compared with the standard census training given to nonresponse follow-up enumerators. Six decentralized district offices (DO's) will be matched on variables such as population density, percentages of minority population, educational levels, and income levels, and then each will be randomly assigned to one of the three training approaches. Accordingly, each training approach will be used in two DO's for the purposes of this study.

Standard Training

The standard training in this study will use a verbatim training guide, audiovisuals (filmstrip-audio tape), and paired interviewing (with and without scripts). Small group exercises will be used to encourage active learning by the enumerators.

At the present time, different groups of people are responsible for writing the procedural manuals and the guides for training. This separation of function typically results in a training sequence which progresses as follows: A concept is introduced, the enumerator is referred to the appropriate section of the manual and procedural directions, and then an activity (question asked by trainer or workbook exercise) is used to provide practice or to test acquisition of the skill.

Although this sequence may appear acceptable on paper, it is complicated by several factors. First, since the procedural manual was not written as a training tool, a burden is placed on the enumerator to read to acquire information. Further, since the training author is attempting to develop job skills, it is often necessary for the enumerator to refer to more than one section of the manual for all the information necessary to perform a specific task. Finally field procedures, administrative procedures, and questionnaire-use procedures are all described using different manuals. Therefore, the enumerator must refer at times to an enumerator's manual, to an enumerator's Cost and Payroll Manual, and the Questionnaire Reference Book (QRB). These multiple sources unnecessarily complicate the enumerator's job because standard training is designed with the assumption that the manuals will be used extensively on the job.

Experimental Training Using Redesigned Manuals

The primary purpose of the first experimental training approach is to test a training development model which continues to use a verbatim training guide, but which integrates the roles of procedures manual writer and training guide writer. Using this approach, significant changes to the field procedures manual are required, since it is directly integrated into the training. This change impacts most directly on the accessibility of procedural information, the presentation format of procedural instructions, and other factors which affect readability. Specifically, when compared with standard reference manuals, the redesigned manual is designed to be a job performance aid. Its table of contents emphasizes tasks rather than general concepts. Moreover, the redesigned manual attempts to combine all critical job information into one source document thereby eliminating the need for other administrative and procedural manuals. Procedural information within the manual is presented in the same temporal sequence experienced by an enumerator on the job.

Other general characteristics of the redesigned manual include an emphasis on visual illustrations and standardized job aid formats (either checklists or flow charts.) To the maximum possible extent, cross-referencing to obtain procedural information for a job task is minimized.

Probably the most important feature of the redesigned manual, however, is that it is designed around training objectives. Accordingly, certain objectives covered by the training are not repeated in the manual. Specifically, census history, different types of census-taking procedures, and census definitions are included in the training but excluded from the manual.

It should be noted that there will be similarities between the standard training and training using the redesigned manual. Specifically, the same audiovisuals will be used, small-group interviewing will be used in both approaches, and some workbook exercises will be similar. However, the approaches will vary in length; training using the redesigned manual will be approximately 25 percent shorter. The important distinction between the two approaches is the use of the redesigned manual which allows a streamlining of the training which is designed to be more comprehensible to the trainee.

Abbreviated Experimental Training

An advantage, as well as a disadvantage, of the verbatim approach is that it requires the inflexible presentation of job knowledges and progression through a predetermined set of learning activities. Although this approach guarantees that material is covered, it also ignores the differences and needs of different groups of enumerators. Another problem with this approach is common to any lecture presentation; it is not easy to maintain trainee interest. Finally, an abbreviated but formal (or structured) training is desirable for training replacement enumerators. It is often impractical to train the new personnel hired in formal sessions due to high turnover rates. Therefore it is desirable to have a structured abbreviated training to be presented to small groups.

The purpose of the abbreviated experimental training approach is to use a small group approach to training as an alternative to the verbatim training guide. As opposed to the two days required for the standard verbatim approach, the abbreviated training will be at most one day.

Small groups possess many advantages not present in large groups. More direct contact between the trainer and trainee is ensured; it is not as possible for a trainee to be overlooked; the learning environment is less formal and therefore possibly less threatening; and feedback is improved because trainee problems with the material are more easily noticed.

Nonetheless, small groups still place significant demands on the trainer. The trainer must still communicate what is expected of the trainees, and learning activities covering critical job skills must still be presented. Instead of a verbatim training guide, the abbreviated training approach will use a checklist of training objectives and a workbook of learning activities and performance checks (quizzes and exercises) that will determine trainee acquisition of the objectives.

To the maximum extent possible, the approach will emphasize active learning using simulated job materials (address registers, questionnaires, and related forms.) All specified training objectives will be covered, but the trainer will have the flexibility (at times) of explaining things in his/her own words.

An important feature of the abbreviated training will be the use of the redesigned field procedural manual. Accordingly, the training will emphasize the inherent simplicity of the enumerator's job (e.g. identify

nonresponse households, locate households, interview and complete questionnaire, report progress.)

C. Measures of Effectiveness

Three general measures of effectiveness will be used to compare alternate approaches. First, standard job performance indices will be used, such as measures of attrition, questionnaire production rates, and questionnaire fail-edit rates. In addition the number of misclassified occupied units and number of last resort cases will be compared.

Second, extensive use of debriefing questionnaires will be made to obtain enumerator and crew leader feedback about training and field work.

Third, observers will be trained to provide direct feedback about the delivery of the three different training approaches and to observe enumerators during actual field work. These observers will actually sit and observe enumerator training sessions, solicit feedback from enumerators concerning the training, and comment on the apparent effectiveness of different training strategies (e.g., audiovisuals, classroom lecture, practice exercises, reading from manuals, and group interviewing.) Their primary function as field observers will be to identify performance problems that can be linked to inadequate training, and to determine how well field procedures are followed. Some direct quantitative measures to be collected will be frequency and type of manual use, and coverage and content errors.

VIII. JOB ENRICHMENT

A. Background and Purpose

As a small scale feasibility study in the overall experimental program, the Census Bureau will explore the benefits and problems associated with using nonresponse enumerators to publicize the census on a very localized level. The idea is to train enumerators not only on followup procedures, but to give them prior training to allow them to fulfill a simple and brief public relations role before they are trained to conduct interviews with households which did not mail back questionnaires. These enumerators could then volunteer for a one hour assignment which requires contact with local people to inform them about the census. The purposes of such a program are to provide a new approach to public education and, more importantly, to reinforce the individual enumerators' pledge of confidentiality and strengthen their identification with the Bureau.

B. Procedures

The job enrichment study will take place in one district office, paired with a district office to serve as a control area. For the experimental office, a supplementary one hour pre-training session will be given by the Bureau's Community Services Office, and the local Public Information Office representatives who have the function of working with community groups and local press to inform them about the census. The enumerators who take this training may then volunteer for assignments such as making a one or two minute standard announcement to a neighborhood gathering which may be attended by as few as 4 or 5 other people.

C. Measures of Effectiveness

One of the most important variables in this study will be the average attrition rate of enumerators who are given the hour course, whether or not they accept an assignment following it. Attrition will be measured by whether they complete training, accept and complete a field assignment, and are willing to accept a second assignment, if offered. Other important measures will be enumerator attitudes toward their job and specifically toward performing the public relations contacts. These variables will be measured for the experimental office and comparable measures will be obtained for the control office. Participant observers' reports will also be solicited.

Since this is a feasibility study, other questions are also of importance. For example, how difficult was it to generate contact lists by ED, and what percentage of the population could potentially be reached through this approach?