USE OF SAS IN THE DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM IN A SOCIAL SERVICE AGENCY

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ABSTRACT

A growing demand by the general public for accountability in social programs is resulting in the rapid development of management information systems in social service settings. However, a lack of understanding on the part of social agency staff regarding the capabilities of automated information systems, as well as a relative lack of understanding by data processing personnel of the particular needs and constraints operating in social service settings, has resulted in a low level of satisfaction and only minimal utilization of many of the data systems that have been developed.

SAS has allowed a unique approach to the development of a management information system in a community mental health setting. SAS's flexibility provided an opportunity for agency staff to sample a wide range of information displays and test their utility over a two year period before making any costly software investments. The result has been the evolution of an output package which promises to have maximum utility for the agency.

INTRODUCTION

The utilization of computer technology in the field of community mental health is a relatively recent development. Two factors have played a major role in encouraging administrators in the field to begin exploring the advantages of automated data processing. First, a growing pressure on social service agencies to become accountable to the public has required the agencies to begin developing information systems for purposes of evaluating and reporting. Secondly, the availability of federal money through the Community Mental Health Center's Act has resulted in rapid growth in the size of the service agencies and a concomitant need for more sophisticated data processing and management than existing manual systems allowed.

Several characteristics of social service settings, however, have made the introduction of computer technology into the field difficult and often unsuccessful.

A. Most staff in social service settings are trained in the social sciences and many have little or no understanding of computer technology. This may give rise to unrealistic expectations, and poor communication with computer science personnel.

B. Social service staff are often unable to articulate their information needs since their experience with data base management is often minimal. They also have little understanding of the capabilities of computer technology. Computer science personnel, on the other hand, are not generally familiar with the special needs and limitations operating in social service settings. This has too often resulted in the hasty introduction into social service agencies of software packages similar to those developed for use in the private business sector. The results have, more often than not, been disappointing failures. In a recent survey conducted by the National Council of Community Mental Health Centers in 1977, only 24% of the respondents reported very good or excellent levels of satisfaction with their current systems and 80% were anticipating making changes in their systems.

C. The existing literature on Mental Health Information Systems strongly suggests that the viability of information systems in social service settings is dependent upon their ability to provide relevant output to the data generators (usually front-line staff). Morgan and Crawford (1974), for example, have reviewed some of the issues involved in computer applications to mental health delivery systems and concluded: "No computer system is as useless as those individuals responsible for collecting and inputting data see the utility of their efforts in terms of patient care. Useful and meaningful feedback to the caregiver is necessary." (p. 345) Hornstra and Tritt (1969) similarly saw the provision of useful data to clinical staff as "...the single most important requirement for building a successful computer system in a psychiatric facility ....." (p. 7) Unfortunately, though, the provision of prompt feedback following the implementation of a system requires a decision about output needs and the development of software before agency staff have had an opportunity to gain adequate experience. Consequently, such packages are often later found to be inappropriate to the needs of the agency. However, if significant cost were associated with the software development, the agency may be unable or unwilling to modify the programs.

D. Resources available for research and evaluation in general, and data processing in particular, are almost always scarce in
social service agencies. Administrators who have had little or no direct experience with computer technology are, not surprisingly, reluctant to make a significant initial investment, even if the funds are available. The attitude often expressed is "first show me".

The special characteristics of social service settings described above converge to create a difficult challenge for the system designer. The present paper reports how SAS was used as a development tool for addressing these problems in a Community Mental Health Center.

BACKGROUND

Valley Comprehensive Community Mental Health Center serves a four-county catchment area in rural West Virginia. Approximately four years ago a decision was made by the Center's executive director to take steps toward the development of an information system for eventual use in planning, management, and external reporting. It had become clear that the Center's existing data collection and processing capability was fast becoming inadequate for the reporting requirements that were being mandated by funding sources. Equally evident was the fact that rapid expansion in staffing and service program development was forthcoming and would require a more elaborate information system to meet management and planning needs.

The primary responsibility for designing an automated information system was assumed by a graduate student in placement at the Center and a 30 hours per month computer programmer/consultant.

SYSTEM REQUIREMENTS

The following considerations had to be taken into account in selecting the software to create and implement Valley's Management Information System.

1) No data base management package existed on the computer system that Valley would be using. Therefore, something was needed which could approximate the abilities of such a package.

2) Since there was little money available to hire a computer programmer, a language or package was needed which could satisfy the reporting requirements with a minimum of professional programming effort. Also due to limited resources, a language or package which could be learned quickly and easily by agency staff so that they could aid the programmer with program modification was essential if the feedback initially provided turned out to be inadequate. This meant that a best-guess had to be made regarding what would be generated for feedback to staff, and the programming cost would have to be small enough to allow successive modifications if required.

4) A language or package was needed which was capable of fulfilling the following:

A. File Structuring. The data consisted of three different types: records of initial contact (or admission) which contained demographic information about the client, the staff member to whom the client was assigned, the client's previous mental health history, and the reason for admission. There were also termination records which contained information about the treatment the client had received, the reason for termination, and the diagnosis at termination. The third data type was the staff daily activity logs. Each daily function performed by the staff created a record which contained an identification number (either an individual client or a group recipient code), and a description of the kind of service which had been performed. Staff were provided with pre-coded classifications which allowed them to document who was seen, where, for how long, by whom, when, and the specific service provided. Since each file contained very different information, they would need to be combined for some reports, but could be accessed separately for others.

B. Client Monitoring. In order to satisfy federal accountability demands, it was necessary to be able to document a client's treatment program and then to aggregate treatment over clients to determine total hours of service provided by each program available. Internally, center administrators wanted to begin systematic monitoring of service utilization and resource allocation.

C. Statistical Analysis. The Center needed the capability to perform statistical analyses on the data in order to meet evaluation requirements.

SAS APPLICATIONS

The software selected to address the above requirements was SAS. It did so in the following manner:

1) SAS has been able to function for Valley as a data base management system. In addition to the reports which are generated monthly or quarterly, the number of novel requests for information from the system has skyrocketed as staff have become more familiar with the system and its capabilities. Since Valley operates to a great extent on external funds, grant proposals are continually being written. Many of these funding agencies will request information which is needed immediately. For example, a legislator may request information on services provided to a specific target population with only a few days lead time for information retrieval. Other requests, while not requiring such rapid response, still need data in information. Last year the system was able to respond to 83 such requests. Using SAS in this way, the flexi-
bility of a data base management system was approximated.

2) SAS had the capability to produce output with very little programming effort. With relatively little assistance from a professional programmer, a Valley staff member was able to learn the basic SAS functions quickly and could assume responsibility for making minor modifications to programs. For example, the programmer could make use of subsetting IF statements to create a data set, MERGE it with the intake file to capture demographic data, and then use PROC's PRINT or FREQ with BY variables to generate a report for each staff member. A Valley staff member who had been taught SAS could change the subsetting IF statements, add or delete tables from the frequency procedure, or add or delete variables from the print procedure, and thus be able to generate reports similar in nature but quite different in content.

3) It was possible for SAS generated reports to be provided to every clinical staff member in the Center within three months of the onset of data collection. As expected, this relatively quick provision of feedback from the system was found to play a significant role in insuring the survival of the system during its early phase of development. This was true despite the fact that the feedback provided was rated by staff as having little usefulness in its initial form (Choban, 1977). SAS's flexibility, however, allowed the initial programs to be modified or completely replaced when necessary without large programming demands.

4) SAS was able to effectively meet the data processing requirements of the Center in the following manner:

A. File Structuring. For reports which required the three data sets to be merged, SAS's MERGE function was utilized. In 1975, the existence of multiple observations of the BY variable produced some problems which were essentially eliminated with the addition of the IN parameter, the FIRST., LAST., and RETAIN features added in 1976. SAS's powerful ability to create data sets, subset, merge and update them allowed much flexibility in output design. For example, some reports required an "unduplicated" client population. In this case client records were selected which contained only the most recent admission date and subsequent treatment (a client could be admitted, treated, and terminated and then be readmitted in a short time period; for example, alcohol and drug clients). Other reports required a "duplicated" population which meant all contacts with clients over some time period were selected regardless of the number of admissions and terminations. By being able to MERGE and select according to different criteria, SAS solved the problem of data set creation with a minimum of programming effort.

B. Client Monitoring. SAS provided, again with minimum programming effort, the ability to provide each staff member with a client tracking report. Due to the Center's rapid growth, caseloads per staff were increasing almost beyond manageability. Therefore, it was necessary to provide the staff with an account of each client's visits over some time period. This report included the date last seen, or some indication that the client had not been seen for 60 days and therefore required attention. Another feature SAS provided in this area was report formatting. PROC's PRINT, MEANS, and FREQ could supply the information, but did not format this information sufficiently. By using SAS's report writing capability, sums, partial sums, and frequencies could be generated and then output in an appropriate fashion. Table I provides an example of such a program.

C. Statistical Analysis. Although the first two years of system operation required little use of SAS's statistical analysis procedures, the more recent development of the Center's research and evaluation unit is resulting in an increase in the demand for such analyses. Experience to date suggests that SAS's statistical analysis procedures are more than adequate to meet the Center's data analysis needs.

CONCLUSIONS

Not only did SAS meet the initial system requirements imposed by the special characteristics of a social service setting, but it has also left the Center much better prepared to deal with the task of purchasing a hardware and software system internal to the Center. Staff understanding of computer technology has been greatly increased, suspicion and unrealistic expectations have been largely eliminated, and the staff's ability to communicate their needs have been enhanced. As a result of extensive experience with a wide range of SAS generated output, Center administrators are now more cognizant of the potential of automated data processing and more willing to commit resources to further system development.

REFERENCES


Table 1. An Example of a Monthly Report.

DATA ALX;
INFILE VALLEY;
INPUT . . . ;
TYPE_ACT = 'BAD CODE';
IF ACT = 01 THEN TYPE_ACT = 'EMERGENCY CARE';
TITLE . . . ;
PROC SORT; BY COUNTY ACT;
PROC MEANS NOPRINT; VAR HOURS; BY COUNTY ACT TYPE_ACT;
OUTPUT OUT=ALX SUM=HOURS;
DATA P1; SET ALX; BY COUNTY;
IF HOURS = . THEN HOURS = 0;
IF FIRST.COUNTY THEN TOTAL = 0;
TOTAL + HOURS;
IF LAST.COUNTY THEN GO TO DO;
RETURN;
DO: ACT = 100; HOURS = TOTAL;
   DROP TOTAL; OUTPUT;
DATA P2; SET P1 ALX; BY COUNTY;
DATA P3; SET P2; BY COUNTY;
IF FIRST.COUNTY THEN X = HOURS;
PERCENT = HOURS / X * 100.0;
RETAIN X;
PROC SORT; BY COUNTY ACT;
DATA P4; SET P3;
IF ACT = 100 THEN TYPE_ACT = TOTAL HOURS;
IF ACT = 100 THEN ACT = .;
CTY_NAME = ' ';
IF COUNTY = 0 THEN CTY_NAME = 'MONONGALIA';
   
DATA _NULL_; SET; BY COUNTY;
FILE PRINT HEADER=NWPG;
IF NOT FIRST.COUNTY THEN GO TO NEXT;
PUT _PAGE_.
GO TO NEXT;
NWPG: PUT 025 'COUNTRY' +1 CTY_NAME $10. ;
   PUT /// 013 'TYPE ACTIVITY' 030 'ACTIVITY CODE' 045 'HOURS SPENT'
   058 'PERCENT OF TOTAL HOURS';
NEXT: PUT /// 03 TYPE_ACT $23. 040 ACT 3. 050 HOURS 6.2 074 PERCENT 6.2 ;
NEXT1: ;