SIR ON SSHENET: DEVELOPING A COMMON STUDENT INFORMATION DATABASE FOR 14 UNIVERSITIES AND SHARING IT UNDER CMS

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Abstract

State System of Higher Education universities provide student enrollment data to one host university. The data are transferred in common format from the 13 different computer systems to the host via 9-trk magnetic tape. CMS files of student data are created by reading the tapes with DITTO, an IBM® utility. These files are edit checked via programs invoked under Version 5 SAS/AF® software. Those passing edit checks are written to SAS® datasets. The SAS datasets are used to generate summary information which is reported to state and federal agencies. State System universities are also accessing this information under Release 4 eMS via dialup modems to the host computer. Each university user's PROFILE EXEC automatically establishes CMS links to the minidisks of SSHENET (repository userid) and invokes a system named SIR which operates under SAS/AF software. Individual university users establish write links to minidisks by selecting programs which run under SAS/AF and invoke SAS/FSP®. When the user exits a program, the link is dropped so even though that user is still running a SAS session and is linked to SSHENET's minidisks, the common write disk is now available for other users.

Historical Perspective

The 14 state owned universities in Pennsylvania are collectively joined as the State System of Higher Education (SSHE). Although the earliest founding date of a state owned university is 1837, Governor Thornburgh established SSHE by enacting Act 188 of 1982 with his signature on July 1, 1983.

A 20 member Board of Governors, appointed by the Governor of Pennsylvania and confirmed by the Senate, guide SSHE through their policies. The Board works to implement those policies through the Office of the Chancellor. Within this Office the Vice Chancellor for Academic Policy advises university officers in the execution of academic policy. To support the formation of these policies, the Director of System Research and Planning provides analysis of enrollment and other germane information. Thus the Board of Governors relies on accurate and readily available information to guide SSHE.

Institutional Researchers at each SSHE university oversee the submission of student enrollment and other information to the Office of the Chancellor. They respond on common formats, those of the U.S. Department of Education's Center for Education Statistics (CES) and Office for Civil Rights (OCR). From the CES, the Integrated Postsecondary Education Data System (IPEDS) forms are important. Collectively, these formats focus the data collection effort of the Institutional Researchers.

Problems

The Director of System Research and Planning could not effectively support the Chancellor with analysis of enrollment and other information. When the Board of Governors or the Pennsylvania Legislature asked the Chancellor questions about enrollments, he could not return an accurate answer quickly. Occasionally, a Board Member or reporter would ask two separate sources, one at the university and the other at the Chancellor's Office, the same question about an enrollment. When the answers were not identical, the Chancellor's credibility and advocacy for SSHE suffered.

The Director lacked a comprehensive student information database. The Institutional Researchers submitted the IPEDS and OCR reports on paper. Those reports contain large amounts of summarized information, but no raw data. Without comprehensive data, the Director could answer questions about student enrollments only within the constraints of the IPEDS and OCR student classifications. If the Governor's Office asked for information about a particular group of students, but departed from the IPEDS classification, the Chancellor could not answer. To support the Chancellor, the Director needed the database and an efficient, reliable system to access it.

From the university perspective, each had computerized student information databases, but to produce the IPEDS and OCR reports, each had to create, maintain, and run programs which distilled that comprehensive information into summary statistics. Then someone had to transfer the results to the paper IPEDS and OCR forms for submission to SSHE. In a sense SSHE paid computer center staffs at 14 universities not only to not report data, but to report summarized information ineffectively.
o Approach

The Director created and implemented a plan, with the Chancellor's approval, to develop a comprehensive student database. To follow the plan, the Director enlisted the aid of three groups from the universities: the Presidents, Institutional Researchers, and Computer Center Directors. The Presidents provided administrative support. The Researchers and Center Directors provided technical support. This plan also contained provisions for the establishment of certain incentives. The Director offered to generate the IPEDS and OCR reports for each university. He also offered to share the student database with each university. All groups cooperated and performed their advisory roles in accordance with the plan.

The technical support groups created a format for the SSHE student information record. They identified and defined core variables from which IPEDS and OCR reports could be generated. To make the database comprehensive, the Researchers added several variables of research interest. The finished format eliminated multiple reporting of the same student information.

For final implementation of the plan, the Director created, and the Board of Governors approved, a data collection policy to assure the submission of data by each university. The Director consulted the technical groups to establish how and when universities would submit this data. Their decision was each university would submit unlabeled, nine-track magnetic tapes, written in EBCDIC, three times during the academic year. To formally satisfy the Board of Governors' policy, a tape collection policy was established which required each university Presidents and Institutional Researchers access the host computer via dialup modems. Office of the Chancellor personnel have access via controller and leased line. Users call private numbers using terminal emulation packages. After the user logs on to the host system by providing userid and password, a REXX program automatically starts. This program establishes the user profile and presents the user with a menu of choices. All menus contain SIR as a selection.

When a user selects SIR, the REXX program performs several important functions before it invokes SIR. It displays a message on the terminal which indicates that SIR is initializing and another menu will be presented within 20 seconds. During this initialization phase, the program establishes read only links with SSHENET's AI minidisk. It also invokes SAS and establishes which SAS Library SAS will access during the session. The program assigns the filedef SASEXEC to a CMS file named OHMY SAS. This file issues Display Manager Commands and pulls the program statements in file OHMYB SAS into the Display Manager Program window, for subsequent automatic submission. Note also that the program disables the message facilities of VM/CMS. This step prevents SIR from losing users to a VM/CMS message screen which does not contain instructions on what to do next. But perhaps the overall significance of the REXX program is that the user does not have to do anything beyond pressing the ENTER key to access the menu system of SIR.
Portions of the REXX, OHMY SAS, and OHMYB SAS programs follow:

<<<<<<<<< REXX PROGRAM <<<<<<<<<<<

/* FRONT END FOR SSHE CMS USERS */
CLRSCRN
OK~O
OKA~1
DO UNTIL OK~1
   SAY "**********************************************************"
   SAY "FRONT END FOR SSHE CMS USERS"
   SAY "**********************************************************"
   SAY "OPERATING UNDER CMS"*
   SAY "PLEASE MAKE A SELECTION"*
   SAY "AS INSTRUCTED BELOW"*
   SAY "*
   SAY "*
   SAY "SIR : Press ENTER"
   SAY "QUIT : Press Q and ENTER"
   SAY "*
   SAY "*
   SAY "**********************************************************"
   SAY "OKA=0"

FULL FIRST
IF FIRST="Q" THEN DO
   OKA=0
   CLRSCRN
   SAY "**********************************************************"
   SAY "OKA=0"

CP SET DMSG OFF
CP SET SMSG OFF
CP SET EMSG OFF
LINKCMD= "LINK SSHENET 191 192 RR PWORD"
PUSH LINKCMD
EXECIO 0 CP
ACC 192 C
GLOBAL TXTLIB OFORMS
CP LINK SAS 191 450 RR
ACCESS 450 Z
FILEDEF SASEXEC DISK OHMY SAS Al
"EXEC SAS (SASLIB FORMS"
   END
   IF FIRST="Q" THEN DO
      OKA=1
   END
END

********---- Welcome to SIR --********
Instructions, etc ...

Category

& Enrollments and Alumni
& University Characteristics
& Financial Information
& Development - Fund Raising
& Academic Planning
& Change or Add Information
& HELP - Additional Description of Categories
& EXIT SIR

**********************************************************
#field1
>>>enroll.program
#field2
>>>univch.program

(Additional statements)

endsas;
#
proc display
c=sir.leader.leader.program;
run;

<<<<<< OHMYB SAS Al <<<<<<<<

PROC DISPLAY C=SIR.LEADER.LEADER.PROGRAM
RUN;

>>>>>> END OF OHMYB SAS Al >>>>>>>>

The Leader program operates as the master menu of the SIR system. The analyst created the master menu on a program rather than a menu screen for several reasons. SAS/JMP program screens provide greater flexibility in design than menu screens, as explained by Rinehart(1988). For example, with this program structure a user may EXIT from a SAS session quickly. To perform the same function, a menu would call a program that contained the ENDSAS command. Additionally, program screens can call other program screens faster than menus. From the user perspective, especially a microcomputer user, the time needed for a menu screen to call and finally display another screen is dreadfully long. By employing a method outlined by Harris(1988), the analyst noticeably reduced this call time. For illustration, parts of the LEADER program follow.

****************--- Welcome to SIR ---------
Instructions, etc ...

************ Category

& Enrollments and Alumni
& University Characteristics
& Financial Information
& Development - Fund Raising
& Academic Planning
& Change or Add Information
& HELP - Additional Description of Categories
& EXIT SIR

===================================
#field1
>>>enroll.program
#field2
>>>univch.program

(Additional statements)

endsas;
#
proc display
c=sir.leader.leader.program;
run;
Note the final Proc Display statement. If the user made an error during the selection phase, this statement causes a repeat display of the SIR Master menu.

All of the programs in SIR are of similar structure. If a user makes an incorrect or incomplete selection, the program executes but then displays its program screen again. The user may either read the instructions and try again, select help and try to determine what additional information is necessary, return to the master menu, or exit SIR. Most importantly, SIR does not lose the user.

Several SIR programs allow users to write information to a common use minidisk. A user accesses these programs by selecting the "Change or Add Information" category on the LEADER program screen. But granting write access to a common minidisk presented security and access problems. SIR contains official information, so the analyst could not allow write access to the Al minidisk. He could minimize risk by allowing users to write to a separate minidisk, the F disk. This solution provides only a safeguard against loss of official information, but not of university provided information.

The possibility of loss exists because under CMS, once write/read access has been granted to a minidisk, all files on that disk are erasable. As for access, a user can not establish write access to a minidisk if another has established a write or read link. So within any program that will read or write information on the F disk, link and access statements execute only at the time of submission. Just prior to completion, the program drops the link to the F disk. In this way users share but do not monopolize read and write access on the common use minidisk. An annotated program that accomplishes this task follows.

```plaintext
#field18
endsas;
#field17
>>>sir.leader.leader.program
##password
cms link sshenet 291 397 wr pword ;
cms acc 397 f ;
cms filedef wisha disk dummy dummy f1 ;
proc fsedit data=rr
    screen=sir.leader.fund.screen; run;
(Additional statements)
```

### Results

This year marks the first year in many when SSHE universities will receive more appropriations money than the "State Related" universities. This fact alone is the most telling of how successful the Chancellor was in his advocacy for SSHE before the Pennsylvania Legislature. He credited his Governmental Relations Office with much of the success. But he also acknowledged that Governmental Relations succeeded so well because they received accurate information quickly. Much of this information came from the comprehensive student database via SIR.

The Chancellor agreed with the Director of Systems Research and Planning that the student information database was quite valuable. So valuable that several million dollars of additional state appropriations are directly attributable to answering questions from it at the right time.

The Chancellor also reestablished his credibility, as now he could answer questions and not be contradicted. The Chancellor's Office and universities share the same information, so the same question receives the same answer, regardless of whom it is asked.

The Chancellor's credibility does evoke trust and sometimes financial reward. For example, the Chancellor's Office made contacts with the trustees of an estate located in Blair County. Previously all money from the trust had gone to Penn State University. However, the Chancellor's Office suggested to the trustees that they were overlooking a large contingent of Blair county residents who attended SSHE universities. When the trustees asked for quantitative proof, SAS code and the student information database provided the answer. Based upon this information, the trustees established an annual scholarship fund of $150,000 for Blair County residents who attend SSHE Universities.
REFERENCES


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