Software to monitor CD-ROM usage

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Cambridge Scientific Abstracts' Aquatic Sciences and Fisheries Abstracts (ASFA) compact disk database provide worldwide information on freshwater and marine environments on two disks spanning 1982 to present (with semiannual updates). At the University of California San Diego's Scripps Institution of Oceanography (SIO) Library, ASFA disks have been available for enduser searching since December 1986 and are used by a diverse population. SIO itself is the primary clientele with about 190 graduate students, 270 academics, and supporting staff. Many SIO personnel are not served by ASFA's information due to their technical, research, or educational orientations; therefore the total user base at SIO may be estimated at 300-350. Outside SIO, the users for ASFA disks are many and diverse. ASFA disk searchers come from SIO's mother university (UC San Diego) as well as from other universities and colleges in San Diego. Two of these local universities offer undergraduate and masters degrees in marine science. A local university's law school has a strong law of the sea interest. ASFA searchers may also be high school students, visiting scholars, or marine consultants. A significant number of users also come from nearby Mexican institutions with research and educational programs in marine science.

DOS PRESENTS AN OPPORTUNITY

Starting from day one, a batch file on the CDROM microcomputer facilitated loading of the CDROM search software and also recorded the date and time of entry and exit for each disk access. At the beginning of 1988, searcher status began to be recorded by batch files. Opportunity for capturing this usage data with batch files is presented by the ASFA CDROM search software's inability to search more than one disk at a time. Though the ASFA database comes on two compact disks, the ASFA CDROM search software does not allow changing of a disk in the compact disk player while the software is loaded. If disk switching is attempted while the software is loaded, a non-recoverable error results; the microcomputer has to be rebooted and the software reloaded. In order to begin a search on a second compact disk, the searcher has to exit the ASFA CDROM search software, switch disks, and then reload the software (Cambridge advises that a future software release may change this). The appearance of the DOS environment (noted by the appearance of the DOS prompt) between each exit and entry of the

CDROM search software allowed the installation of an AUTOMENU-based menu system on the CDROM microcomputer's hard disk. The menu system incorporates embedded batch files that guide the searcher back into the CDROM search software and also unobtrusively gathers data on CDROM usage. An AUTOMENU menu queries user status; then batch files embedded within AUTOMENU create a log file notation of the user's status and the date and time of CDROM search software entry. AUTOMENU's batch file then loads the CDROM search software. When the CDROM software is exited (in order to switch or remove a disk), AUTOMENU's batch file then resumes control and logs the date and time of CDROM search software exit. A search of both two compact disks encompasses two entries and two exits and is logged as two distinct sessions. The success of this logging system depends on searchers exiting the CDROM search software. Almost all users do so when finished searching; this closes the search session in the log file and leaves the menu system ready for the next user.

CREATING A LOG FILE

Usage data is captured with three tools: DOS' "echo" command, DOS command redirection with the "greater than" symbol (>), and Norton Utilities' TIMEMARK timestamping utility. Norton Utilities (NU) is a useful collection of utility software one of which, TIMEMARK, is both a timestamp and a stopwatch. TIMEMARK can both note the current date and time and calculate the elapsed time since it was last run. The actual TIMEMARK software is entitled TM.EXE and is copied into the CDROM search software directory (or another directory listed in a "PATH" statement in the microcomputer's AUTOEXEC.BAT file). AUTOMENU's batch files run TIMEMARK before loading the ASFA CDROM search software and after the searcher exits it. A sample batch file illustrating appropriate commands follows; it may have to be modified depending on the directory structure of the CDROM microcomputer's hard disk. A different version of this batch file is created for each user status offered as a menu option in an AUTOMENU menu.

```
ECHO OFF
ECHO ********************** >> C:\LOG
ECHO SIO ACADEMIC >> C:\LOG
TM START /L >> C:\LOG
CDROM.EXE
TM STOP /L >> C:\LOG
ECHO ! >> C:\LOG
ECHO ********************** >> C:\LOG
```

This batch file will create a LOG file. LOG contains the written record of CDROM usage; however LOG will only be recording whenever someone enters and exits the CDROM search software. If the CDROM searcher does not exit from the CDROM search software when finished

searching (eg WilsonDisc), then the endpoint will not be captured and the length of search session will be unknown. In this example, the LOG file resides in the root directory of the hard disk drive; however LOG can be stored in any directory by indicating the appropriate path.

The first ECHO command avoids an unnecessary screen display of the execution of the DOS commands following. The second ECHO command puts a line of asterisks into a file named LOG. The asterisks differentiate one CDROM session from another. If the LOG file does not already exist, it will be created by the second ECHO command. If LOG does exist, the two "greater than" symbols (>>) ensure that ECHO appends information to the end of the LOG file rather than overwrite the LOG file. The first TM command starts TIMEMARK's timer and writes the current date/time into the LOG file. The next line, CDROM.EXE, loads up the CDROM search software; this line will be different for each CDROM search software. When the CDROM search software is exited, the second TM command stops TIMEMARK's timer and writes the exit date/time and the elapsed time into the LOG file. The next ECHO command writes an exclamation point into the LOG file; it appears after the elapsed time in the LOG file. The exclamation point is necessary so that the next line of asterisks ECHOed into the LOG file is written on a new line. The second line of asterisks ECHOed into the LOG file signify that a CDROM search session ended.

Running similar batch files from AUTOMENU for each user status will create a log file that looks like the following:

```
************************
SIO ACADEMIC
11:22 am, Tuesday, January 10, 1989 11:44 am, Tuesday, January 10, 1989
22 minutes, 40 seconds !
************************
************************
SIO GRADUATE STUDENT
11:45 am, Tuesday, January 10, 1989 11:54 am, Tuesday, January 10, 1989
8 minutes, 34 seconds !
************************
************************
MEXICAN UNIVERSITY
12:01 pm, Tuesday, January 10, 1989 1:07 pm, Tuesday, January 10, 1989
1 hour, 5 minutes, 32 seconds !
************************
************************
SIO STAFF
3:04 pm, Tuesday, January 10, 1989 3:25 pm, Tuesday, January 10, 1989
21 minutes, 13 seconds !
************************
```

A TIP FOR CAPTURING USER STATUS

Information on user status should be gathered in such a way to ensure that an active selection of status is made by the user. Since most menus (including AUTOMENU's) will display menu selections with the first choice being the default, it is imperative to make the first choice a "null" choice. Since unobservant or lazy users will passively select the default menu choice by simply pressing the "enter" key, this default should not be a user status. If the default menu selection is a status, then the data gathered for that first status will be too high. The batch file running from the default menu choice should cause the user status menu to redisplay so that users are forced to make an active selection of their status.

SALVAGING INCOMPLETE DATA

Search sessions occasionally appear in the LOG file without a logoff date/time (and thus without an elapsed time). These incomplete sessions occur whenever the microcomputer is rebooted during a search session. Since some of the data is incomplete, actual CDROM usage will be greater than the logged usage depending on the frequency with which users reboot the microcomputer while searching. Some of this incomplete data can be salvaged if desired. In the LOG file, incomplete search sessions only indicate the searcher status and the logon time; the logoff time eluded listing due to rebooting. If the next session following the incomplete session has the same searcher status and its logon time is close to the incomplete session's logon time, then it is relatively safe to assume that it is the same person searching after a reboot. The second session's logon time could then be used as the incomplete session's logoff time thus salvaging some data.

ANALYZING CDROM USAGE

The simplicity of this usage logging scheme is its merit. Programming skills are not required; the logging system and its analysis can be managed without requiring outside assistance. This simple LOG file of status, logon and logoff dates and times, and elapsed time provides several possibilities for analyzing CDROM usage. Management needs should drive the data analysis rather than letting the availability of data drive the analysis. The usage data gathered will support a wide variety of analyses and, since reports are not generated ex machina by a programmed system, data analysis will consume some time.

Total usage of ASFA CDROM was 582 hours in 1988 and 617 hours in 1987. Thus usage decreased while the ASFA CDROM database increased steadily in size. Diminished novelty in CDROM searching plus increased experience with searching ASFA CDROM could explain decreased usage for

the second year. The SIO Library is tracking ASFA CDROM usage beyond these two years in order to gain better understanding of usage. The total number of 1988 ASFA CDROM search sessions (number of times that one disk was accessed) was 1824. 1987 data (1458 disk accesses) is not comparable because ASFA CDROM was a one-disk database for the first 7 1/2 months of 1987. From the 1988 data, proportionate usage by user status can be analyzed (figures 1 & 2). SIO (the primary clientele) represented 50.2% of the users searching the disks (figure 1). However SIO searched for only 43.2% of the total time (figure 2). Thus, secondary clientele (non-SIO) searched longer than primary clientele (SIO). SIO users tend to be more experienced at CDROM searching than non-SIO users; SIO users are frequently repeat users whereas non-SIO users may be searching ASFA CDROM one time only. SIO users tend to have better defined information needs which may contribute to brevity in searching. SIO users may more directly approach the relevant information due to their familiarity with the scientific vocabulary and literature.

Time-related analyses of usage data can be completed. Monthly usage by SIO and non-SIO searchers (figures 3 & 4) was analyzed in order to gain a better understanding of when peak periods of usage are and particularly when secondary clientele usage is heavy. As expected, monthly usage correlates with the academic year. Peak usage by non-SIO searches occurs at expected times when papers are typically assigned during the academic quarters and semesters in San Diego universities, colleges, and high schools. SIO monthly usage is more regular during the academic year perhaps reflecting the graduate education and research orientation of SIO. The logged usage data would also support analyses by searcher status for specific weeks, days, and the time of day. High-use and low-use weeks, days, and time of day could be identified. Users could be directed to identified low-use days and times. At the SIO Library, the usage data regularly reveals long blocks of time without activity and also reveals days when the ASFA disks were not used even though the Library was open.

Since one ASFA disk covers items indexed from 1982 through 1986 and the other disk covers items indexed from 1987 to present (with semiannual updates), search sessions would tend to be disproportionate depending on the disk being searched. Since the LOG file (as constructed above) is incapable of distinguishing which disk is being used, calculations regarding median or average search sessions are suspect since the data relates to two disks of unequal size. The SIO Library declined to ask searchers which ASFA disk they were about to search since only gross usage data was needed for management purposes. Introducing another menu to gather this data was judged to be overly intrusive compared to the minimal benefit received.

Many factors can conceivably influence CDROM usage so the data

presented will not easily lend itself to cross-library comparisons. Libraries with CDROMs vary in their hours of access to the CDROM, their instructional efforts, the size of the CDROM's audience, and the research and/or instructional environment in which the library is situated. For the SIO Library, this CDROM usage data satisfied the Library's concern for its expenditure on ASFA CDROM. When considering purchase of ASFA CDROM in Summer 1986, the intended audience was SIO's graduate students. Usage analysis shows substantial usage by this group. Interestingly, mediated online database searches continue without decrease for SIO clientele. Availability of ASFA CDROM did not affect the activity of the existing online search service. This lack of impact was not unexpected since ASFA does not offer in-depth information for many fields in marine science. This lack of impact may also be attributed to the Library's continual effort to place ASFA CDROM in context with other information resources. CDROM usage data will certainly fulfill several management needs but it should be considered judiciously when justifying CDROM expenditure. Usage data does not record the value of the CDROM's information to the users' needs; this should be a primary consideration in evaluating CDROM expenditure.

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