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ABSTRACT

The emergence of microcomputer-based management information system (MIS) software for child development programs offers new opportunities for action research, process evaluation, and outcome assessment. Factors such as program effectiveness, quality of service, management efficiency, community networking, and demographics can be investigated while services to individuals are recorded and tracked. The article first offers examples of some agencies using their MIS data base to answer research questions. Secondly, it describes conceptual considerations relevant to the use of computerized information for research. These considerations concern: (1) the nature of the information base; (2) implications of different forms of data elements for retrieval; (3) ad hoc queries of information in a relational data base; and (4) specialized data retrieval through variable listing. Finally, special characteristics of single agency studies and multi-agency research originating from a management data base are highlighted. It is concluded that the implications of MIS-based research for decision-making and policy formation are unlimited. (RH)

Research Applications of a Computerized Child Development Management Information Data Base

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ABSTRACT

The emergence of microcomputer-based management information system (MIS) software for child development programs offers new opportunities for action research, process evaluation and outcome assessment. Factors such as program effectiveness, quality of service, management efficiency, community networking and demographics can be measured and evaluated using the information base created while recording and tracking services to individual children. Research data can be derived from ongoing management information, an exciting option for studying qualitative and quantitative aspects of effective child development programming.

This article offers, first, examples of some agencies using their MIS data base to answer research questions. Secondly, we describe some conceptual considerations relevant to using computerized information for research and, finally, we suggest some special characteristics of research that originates from a management data base.

to whom the referral was made, the nature of the problem and the appropriateness of referrals to each community agency. With over six hundred families served by this agency, this study will give a significant overview of the basic community services offered and the staff's skill in using those services. Strategies for advocacy and for staff training will result from these analyses.

Before looking at specific research considerations, it is important to review some concepts regarding a computerized data base that bear on the ability to extract data for analysis.

DATA BASE CONCEPTS

The Information Base The concepts presented here are based on work with a management information system for comprehensive child development programs such as Project Head Start or Title XX. This system includes specific child data and family information in four modules: Administration, Education, Health/Handicap and Social Services/Family Involvement. Specific files contain detailed information such as immunization and health screening data, developmental assessment results, general eligibility and enrollment information and more. In addition to the basic information, there are also tracking procedures which report attendance and USDA data, home visits, family problems and referrals, health and handicapped treatment schedules and a master administrative task assignment calendar. Essentially, the information normally maintained on paper for each child is now maintained in the computer data base.

Relational Data Base and Ad Hoc Query For easiest research application, the management information system should be in the form of a "relational data base." A relational data base is one which allows information to be retrieved in an ad hoc fashion after the information is stored, independent of the purpose for which the data was originally acquired. For example, a relational data base would allow an ad hoc query to report the number of three-year-old children whose immunizations are not complete and current, although the original form and intent of the information as stored in the system was to create an immunization schedule for each center. Because of the ad hoc query feature, a relational data base allows research questions to be formulated and relevant data compiled, even if the research is designed after the fact.

Data Elements Each piece of information stored in the computer is called a data element. A data element might be the fine motor score on a developmental assessment instrument, the date of an educational home visit or a description of a family social service problem. For a relational data base, each data element is stored in a precise form and location in the data file. In order to access information, it is necessary to know the location and form of the data.

The form in which data are stored has particular implications which impact how the information can be retrieved. The same information could be stored in different ways -- as written text, a coded abbreviation, a numeric value or a date. For example, a health file might indicate whether a child has had measles by using straight text ("MEASLES"), an alpha code ("M" or "Y/N"), or a numeric code ("1" of "0"), or a date ("09/16/87") indicating when the child had measles. How data are stored is determined by the software programs, but to retrieve data for research purposes, it is only necessary to know where and in what form the data are stored.

It is typically a simple procedure to transform data from one form to another. For research, most data will need to be converted to numeric format for arithmetic manipulation. A transformation procedure could convert the information in the above measles "date field" example to a numeric ["0" if the field is empty (no date), "1" if the field is not empty]. For many purposes, you could merely request a count of children whose measles date field is blank. This would tell you how many children had not had measles without your having to do a data transformation. The point is this, the form of the data probably will not create too great a problem for analysis, but it is necessary to know how and where the data elements are stored.

<u>The Variable Listing</u> It is helpful for each data element to be recorded in a data dictionary. For example, one child development MIS calls its data dictionary the "Variable List" which presents the following information necessary to retrieve data from the system:

+ The module and screen on which the variable appears (e.g. Health File, Screen 5 - Immunizations)

+ The data file which contains the information (e.g. CB301.DBF)

+ The technical name and location of the data (e.g. IMMSTAT, 32,1)

+ Valid codes used for that item (e.g. "A" - immunizations complete, no supplements, "B" - immunizations and supplements complete, "C" - immunizations not complete).

It is necessary to have this basic technical information in order to access the management information system for specialized data retrieval. The software vendor or a contract programmer should provide such a data listing.

RESEARCH AND THE MANAGEMENT INFORMATION SYSTEM

The research potential from a management information data base is incredibly broad. Specific research questions can be formulated and addressed based on the interests or concerns of the research. In general, there are three levels of analysis available when designing research from a management information data base: analysis of subgroups of children or families within a program, studies of features of the programs as a whole, and analysis of data across many programs. This section highlights special characteristics of research from a management data base.

Single Agency Studies

Using an agency's management information system for research takes advantage of data that are collected routinely in day to day program operations. Data integrity is improved because missing or inaccurate information is noticed and corrected as the program staff works with the information daily. The researcher will have a data base which has been checked and validated against paper records from which the data originated.

Moreover, using a management information system, the research sample can be defined and selected from the overall data base. For example, one analysis might compare the current immunization level of four-year-olds using samples of medicaid eligible versus non-medicaid eligible children. Another analysis might compare pre- and post-developmental assessment results of a sample of children using a new curriculum to a sample using the old curriculum. The specific samples to be studied can be readily extracted from the existing management data base.

District, State and Regional Multi-agency Research

Exciting research opportunities evolve when a group of centers or agencies use a common management information system. Similar to research with a single agency, data from multiple programs can be compiled into a common data base to allow consolidated analysis. The management information system forces consistency in how data are recorded and stored. All agencies using the system will have consistent, comparable data on their respective children. The implications of this are clear to any researcher who has tried to make comparisons of samples based on information for children participating in different programs.

In some of our initial multi-agency research using a data base, we compiled "Master File" information from numerous participating agencies. The "Master File" contains basic demographic data on each child such as age, race, sex, national origin, medicaid eligibility and number of years in the program. It also identifies the classroom, center, and county where the child is located. As these data are compiled from multiple agencies, we are able to generate district, state and regional

service profiles. As data collection continues, we will be able to evaluate specific aspects of service delivery and implement electronic reporting and monitoring for corporate offices or governmental funding agencies. Along with this reporting capability is the ability to research broad-based questions from the consolidated data base.

When information from more than one agency's data base is to be compiled for management or research purposes, there is a physical problem of getting the data into the same computer. Two options are readily available for physically compiling a multi-agency data base. At the most direct level, each agency can simply copy data files onto floppy diskettes to be mailed to the central computer. This approach is recommended if the consolidation is not done frequently since it is the easiest procedure to implement. Data from the various agencies' diskettes will then be appended into a central data file (along with agency identifying codes) in the master data base.

A second, more sophisticated method of consolidating the data, is transmission over the telephone line using a modem. In this procedure, each center will have a modem with communications software and will simply dial the number for the central data base modem. Once connection is established, files are downloaded and then consolidated as described above. The disadvantages of this procedure, other than the costs of modems and training people to use the system, are that long-distance phone charges may apply and there is sometimes data distortion on the phone lines. Neither of these problems are prohibitive, but for only occasional use, the same result can be achieved by simply mailing diskettes.

When doing a single or multi-agency study, the existence of a standard management information data base affords extensive, systematic data about what happens to children. We can more readily study the effects of our various program options and how much time, money and effort go into providing the services we offer. The child development researcher will need to take advantage of this new opportunity to address both administrative and developmental questions based on the definitive data taken directly from the program's own operational records.

SUMMARY

The use of a computerized management information system at a child development center creates vast potential for research. Questions can be formulated, even after the data are collected, and information can be selectively retrieved and analyzed. Analysis of data from single centers or programs will address specific questions, but the compilation of information from several centers makes possible multi-agency analyses and district, state and regional profiles of service delivery. The implications for decision-making and policy-setting are unlimited!