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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.

The Variable Listing 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!