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Abstract

This paper discusses the application of computer technology to clinical social work. It is based on a three-year research and demonstration project on microcomputer applications to clinical social work. The paper reviews the use of computers in social work, contrasting the developments in this field with those that have occurred in psychiatry and clinical psychology. It then describes the two major components of the integrated software package for supporting clinical social work that has been developed and is currently being tested. The paper concludes with a discussion of the misconceptions and realities of introducing computer technology to a clinical social work agency.

Applying Computers to Clinical Social Work

This paper describes the development of an integrated software package designed to provide microcomputer support to clinical social work practice. This software is the principal product of the Digital Social Worker, a three-year research and demonstration project being conducted in the Family Therapy Program, Alberta Children's Hospital, Calgary, Canada. The goal of the project is to demonstrate the contribution that microcomputers can make to clinical social work practice, especially in relation to semi-structured decisions regarding eligibility, referral, treatment planning, intervention, and evaluation.

The Project Rationale

The project has a tripartite rationale. The first part relates to the history of computer applications to social work and social welfare. Until the mid-seventies, applications were almost exclusively mainframe-based data processing operations designed to serve administrative and management functions rather than clinicians' needs. Data of interest to clinicians were either not stored or, if included in the

system data base, were likely to be of poor quality or not accessible to clinicians (Dery, 1981). The negligible benefits to clinicians from such applications did not offset the significant costs of data entry and the threat of closer surveillance and deprofessionalization of practice (Gripton, 1981).

The second part of the rationale relates to the contrast that existed in 1981, when the project was being planned, between the limited application of computers to clinical social work and the numerous applications to the related disciplines of psychiatry and clinical psychology (Schwartz, 1984). Gripton (1983) has attributed this difference to four conditions that facilitated applications to psychiatry and clinical psychology:

> 1) the low cost, flexibility, and appropriate capacity of microcomputers that make use feasible for the private practitioner; 2) the control exercised by the private practitioner over the application of the computer to his or her practice; 3) the high proportion of psychologists and psychiatrists engaged in private practice; and 4) the commitment of psychiatry and psychology to science and the traditional use of psychometrics and other quantitative measurements [by these occupations]. (p. 17)

There is evidence that these differences in computer utilization are diminishing (Schoech, 1983).

The third argument for the project was that certain developments in social work itself seemed likely to override social workers' misgivings about computers. Demands for accountability and integration of services have stimulated the installation of computerized service information systems, even in small agencies. Methods for clinician self-evaluation of practice have been developed that involve the use of standardized psychosocial measures and other procedures that generate quantitative clinical data (Bloom & Fischer, 1982). Clinical interventions that require more systematic and efficient clinical records, such as behavior modification (Fischer & Gochros, 1975) and task-centered casework (Reid & Epstein, 1977), have become more practiced.

Main Parameters of the Project

In light of the history of computer applications to social work and the recent trends described above, the Digital Social Worker project was

based on four parameters. First, microcomputers were used because they are better suited than the mainframe computer to the development of a flexible, "user friendly" system, than one that was autonomous of the host organization's computer system.

Second, the applications developed were to be exclusively oriented to the needs of clinical practitioners. Clinicians were to participate in all decisions relating to the development and installation of the system.

Third, clinicians were to be fully supported in the development and use of the system. State-of-the-art hardware and software were to be made available. The project programmer/analyst was hired as much on the basis of her ability to work with clinicians as on her technical qualifications. A data entry clerk was hired to assist clinicians with this task.

Fourth, software development was to be oriented primarily to support clinical decision-making. A major activity of the start-up phase of the project was an analysis of the information requirements of family therapists. What clinical data did they collect? How did they store, organize, manipulate, retrieve and dispose of this knowledge? It was concluded from this analysis that the system should be designed primarily as a decision support system (DSS). Its principal function would be to support important semi-structured clinical decisions related to eligibility, referral, assessment, treatment planning, intervention, and evaluation of practice. Some characteristics of semi-structured decisions are: they are made at irregular intervals and unpredictable times; the decision process is heuristic rather than prescribed; and the data items selected to inform such decisions, the way in which these items are combined, and the decision alternatives vary from decision to decision.

A secondary emphasis was on the development of interactive programs to administer standardized psychosocial measurements and carry out other procedures for collecting clinical data and monitoring, measuring and evaluating practice. The project has de-emphasized but not excluded data-processing and management information system (MIS) applications for better caseload management and the production of structured reports.

Analyzing how family therapists make clinical decisions

A critical phase of DSS development is the analysis of how users make

the decisions the system is intended to support. Two approaches have been used in this project. One, the ROMC framework, was developed for designing DSS's for relatively unspecified and unstructured decision environments, such as family therapy practice (Sprague & Carlson, 1982, pp. 95-107). ROMC is an acronym for "representations," "operations," "memory aids, " and "control mechanisms." Sprague and Carlson (1982) state that:

> The capabilities of DSS from the user's point of view derive from its ability to provide representations to help conceptualize and communicate the problem or decision situation, operations to analyze and manipulate those representations, memory aids to assist the user in linking representations and operations, and control mechanisms to handle and use the entire system. (p. 96)

The conceptualizations used by family therapists include theories of the family and of family therapy, diagnostic classifications, criteria for classifying family systems and relationship patterns, and categories of intervention. Examples of computerized representations are family maps, a graphic profile of a family or its members plotted against a normative profile, and a table of indices of the relative effectiveness of different interventions with a particular family problem.

Family therapist decision-making also involves operations for gathering, selecting, organizing and retrieving data and information. This includes such activities as collecting and weighting client data, developing a treatment plan for a family, and assessing the merits of alternative interventions. A DSS would support these operations in an integrated fashion, and also permit user enquiries and updating of the data base.

Decision-makers use memory aids. Examples of aids used by family therapists are a card file of basic information on client families, an appointment calendar, and a list of work to be done. These aids can be readily computerized.

Clinicians employ a variety of styles and strategies in their decision-making that combine personal modes with organizational conventions of interpersonal communication, information handling and decision rules. The project DSS has been designed with a view to providing family therapists with a similar degree of choice over its operations. To this end most of the project programs are menu driven and permit the user to override "default options."

The ROMC analysis was conducted by interviewing family therapists about how they make clinical decisions, and the results were used in developing the project DSS software. Besides indentifying the supports that therapists could use in making clinical decisions, the ROMC analysis also confirmed that there was sufficient uniformity among therapists in the way that they practiced to justify the development of a system that could be expected to serve all of them. Individual therapists were not as idiosyncratic as it first appeared.

Group supervisions as a decision-making mechanism

The second analysis of family therapists' decision-making was based upon audiotape and videotape recordings of their group supervision sessions. The therapists meet weekly for group supervision, when cases are presented for group discussion and evaluation. The families presented are ones with which the presenting therapist is having difficulty. It may be that treatment is not having the expected result; or that new information has thrown the assessment into question; or that a change in the family's situation indicates that some renegotiation of the treatment contract is in order. These meetings revealed that the structure and process of group supervision is analogous to the structure and process of decision support systems.

In group supervision, the data base for decision making consists of the data on the family under discussion collected by the presenting therapist and selectively presented to the group, plus data on similar cases that the therapist has treated in the past. Added to this are data on similar families treated currently or in the past by the other participating therapists. A third data set is comprised of relevant research findings and expert opinions and prescriptions from the family therapy literature that is known to the therapists.

These data and the ways that they can be retrieved and manipulated in the course of group supervision comprise the data base management software for group supervision.

How these data are selected, combined, compared and otherwise analyzed is determined by the therapists' model base, the theories of the family and family therapy and the taxonomies, definitions and criteria that the therapists use to organize, sift and weight data during the course

of group supervision discussions.

Two kind of queries of the data base predominate in group supervision. The first asks what characteristics of the case under discussion are similar to or different from other cases with which it is being compared. This implies that a similarity function must be performed by the project DSS software. The other type of query is the "what if" question. "What if this happened in the family?" "What if that intervention were tried?" These queries represent the interfacing of the group supervision data base and model base to estimate outcomes of alternative decisions.

The part of the group supervision sessions that corresponds to the dialogue generation and management system of computerized DSS is the protocols that govern group discussion. In lieu of a computer, the family therapist who is using group supervision as a DSS dialogues with the system by providing an exposition of a family, then posing questions and asking for advice from other members of the group. The protocols, together with ground rules and group norms, govern the user-system interaction and are the means by which the presenting therapist exercises control over the operations of the group supervision system.

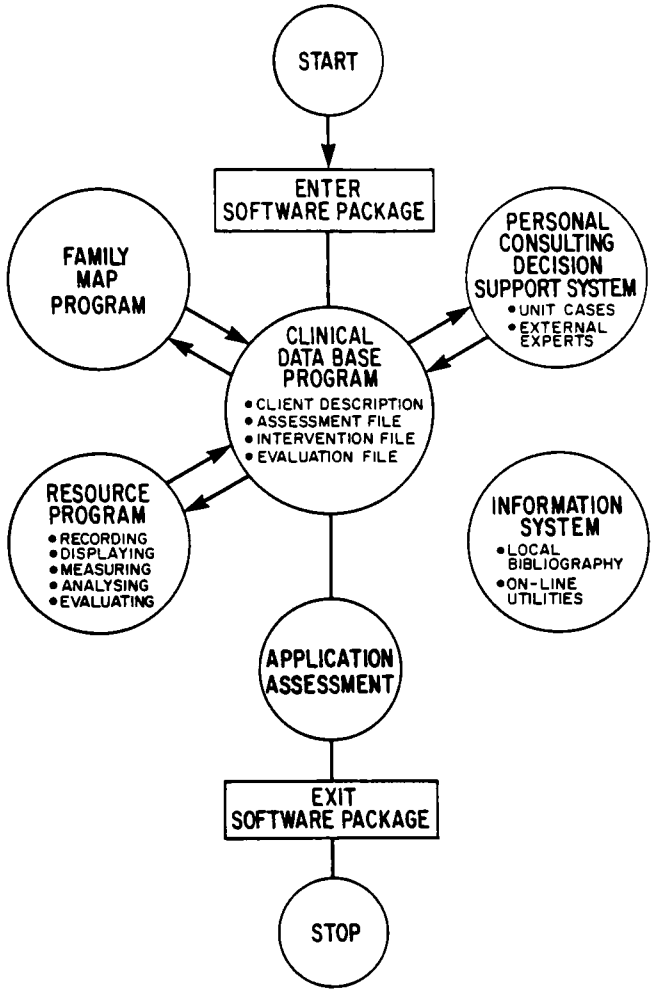
The Integrated Software Package

The structure and operation of the integrated software package are depicted in Figure 1.

Insert Figure 1 about here

At the center of the system is the Clinical Data Base Program. This is implemented under dBASE III, a commercial off-the-shelf relational data base management program. The principal content is the set of files that contain the records of families served by the program. The family therapists developed a case record of more than 300 items organized in sections on family description, assessment, intervention and evaluation. This formidable task involved reaching agreement on definitions of terms and taxonomy classes. Data can be entered directly by the therapist in response to query prompts that require only a "Yes/No," "Present/Absent," or scale value response. Therapists have found this recording procedure to be considerably more efficient than dictation or written data entry, and are confident that the quality of data has been enhanced through computerization. No concern has been expressed about

Figure 1. An integrated software package for clinical social work.



the opportunities for idiosyncratic record keeping that were sacrificed to produce a standard format record that permits cross-case comparisons and computations.

A second component of the package is a Family Map Program. This program constructs a family map from descriptive data on the family and the family therapist's ratings of the relationships and interactional patterns between family members on several dimensions. These ratings are depicted by lines of varying width joining the relevant family members. The family maps can be printed as well as displayed, and can be stored in the family record.

A third component is the Resource Program. This program is a computerized version of the procedures, forms, measurements, statistical operations, guidelines and decision trees presented in Evaluating Practice: Guidelines for the Accountable Professional (Bloom & Fischer, 1982). The substantial contribution of this book is that it provides clinicians with feasible means for making practice accountable, especially through the application of single-system experiments for self-evaluation of practice effectiveness.

The information generated by the Resource Program includes checklists, behavior records, self-anchored and rating scales, client logs, post interview session reports, line charts, bar charts, and computer administration and scoring of standardized psychosocial measurements. The program also enables the clinician to choose the best standardized measure, single-system design, or data analysis procedure to use in a given situation. The Resource Program resides in Lotus 1-2-3, an off-the-shelf program that combines data base management, spread sheet and graphics capabilites.

The Information Package consists of: A family therapy annotated bibliography that is being compiled by the family therapists and stored as a dBASE III file; and on-line utilites that access other bibliographic data bases. Continuing research is being done to determine which on-line utilites and data bases will provide the most cost-effective resource.

The component of the software package with the greatest potential is the consultation program that provides advice to the family therapists. It is described in the following section.

When an application of the package is completed, an application assessment is automatically administered to the user. This program asks the therapist to rate the help provided by the application on several key dimensions. These ratings are stored and used to evaluate the software package and to give direction to the programmer/analyst in improving it.

Development and Architecture of PCDSS

PCDSS (Personal Consultant Decision Support System) is constructed in terms of a theory of consulting, i.e., it has been designed to simulate the way consultants give advice. There are four components of this model (see Figure 2).

Insert Figure 2 here

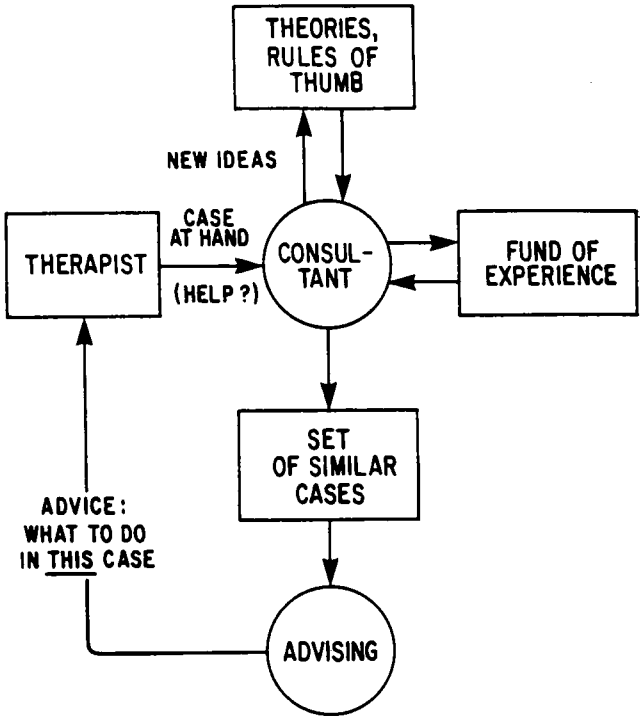
First, consultants typically quiz therapists about background information on the case at hand. For family therapy applications, this means describing in some detail the family about whom advice will be offered and what has happened in therapy to date. Second, consultants analyze or categorize the case at hand in reference to their fund of experience of cases that they have handled, read about or can theorize about. Explicit theory may play a role here; just as likely, a consultant may advise cases without the benefit of explicit theory or in the face of conflicting theories.

Third, consultants make comparisons between the case at hand and cases in their fund of experience, deriving a set of similar cases to think about. Finally, this set is analyzed for patterns in strategies attempted and success attained. Consultants offer advice in terms of these patterns and the likelihood that certain strategies will succeed for the case at hand.

These four components (the case at hand, a fund of experience, a set of similar cases, and derived patterns of actions) are at the heart of consultation.

There are four broad approaches to implementing computer-assisted consultation, each with a unique stress on one or more of these components. The data base (DB) approach (Codd, 1970) merely provides query facility into the fund of experience to answer simple questions, such as "What families have I seen that are single-parent, having a child acting out in school and a history of intergenerational sexual abuse?" The consulting system relies heavily upon the user's ability to draw

Figure 2. A model of consulting.



inferences from the organized presentation of sets of data in a variety of formats. Figure 3 illustrates this approach. We rejected the database approach as merely automating history recall without introducing any real "intelligence" to the consulting situation.

Insert Figure 3 here

The Decision-Support System (DSS) approach (Sprague and Carlson, 1982; Keen and Scott Morton, 1978) taps the recall and organization capabilities of the database approach, but adds the power of explicit mathematical and statistical models to the area in which the therapist works. To use the DSS approach in family therapy would require developing at least one model of the interaction of "causes" and "effects" (i.e., interventions and outcomes) on a statistical basis. Developing such models requires far more information about family therapy theory than now exists. The DSS approach was therefore not pursued. Figure 4 illuminates the activities of the DSS approach, which serves essentially to answer questions such as "What would happen if we try paradoxical intervention with a family like the one described in the previous paragraph?"

Insert Figure 4 here

The most ambitious consulting system approach is the expert system/artificial intelligence (ES/AI) alternative. This is actually a spectrum of approaches, each based on the idea that a "logical model" of family therapy intervention can be developed (Schoech, et al., 1985). Using the model, questions such as "Can paradoxical intervention be used with a family of this type in this situation?" may be answered. This approach is derived from early work in LISP on theorem-proving. While artificial intelligence has indeed blossomed in recent years, techniques for creating logical models are still difficult to use and successes in complex arenas such as family therapy have not been reported with the frequency of others like medical diagnosis. The expert system approach substitutes a "front-end" conversational program to tease out these models from "experts," thereby simplifying model-building. Nonetheless, the obvious lack of widely-shared theory in family therapy makes such models difficult to elicit. Shown in figure 5, the ES/AI approach has also been rejected by our team.

Insert Figure 5 here

Figure 3. The database approach.

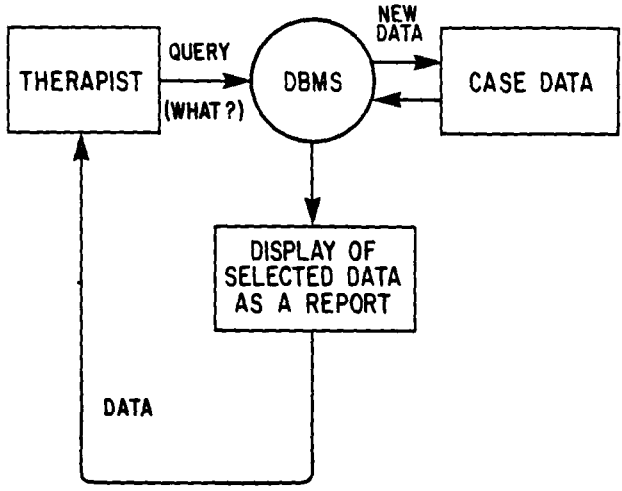


Figure 4. The DSS approach.

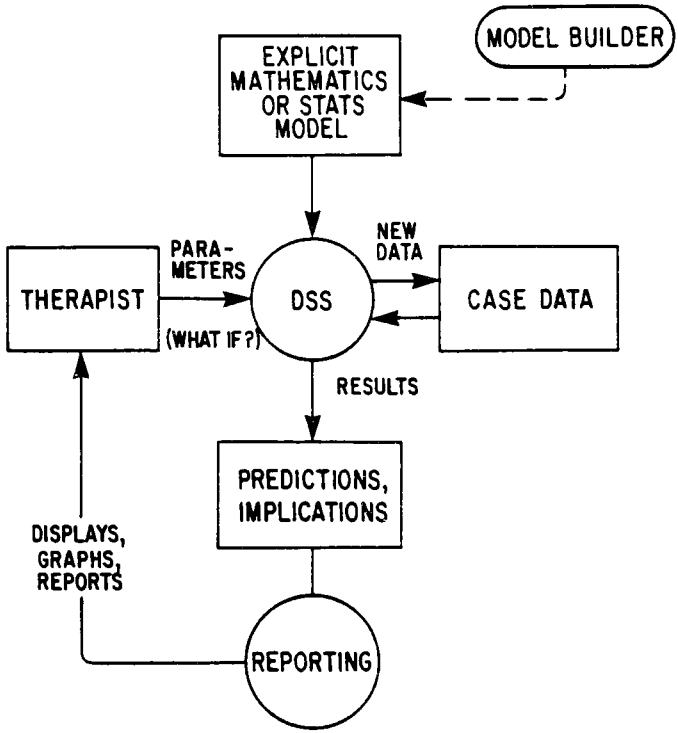
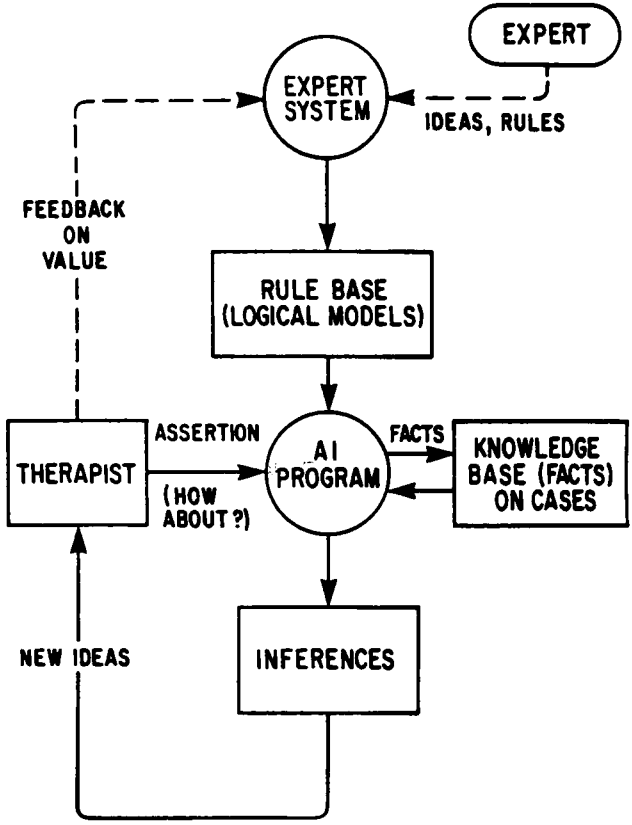


Figure 5. The ES/AI approach.



Instead, we have chosen a fourth plan (Licker & Thompson, 1985; Gripton, 1984), one combining aspects of each of the three approaches. First, PCDSS is built around, and thereby depends upon, a commercial database management package for microcomputers called dBASE III. This brings the query facilities of the database approach to consulting with the obvious benefit of easy data entry and reporting.

Second, PCDSS provides consultation from a variety of idiosyncratic consultants, each of whom is "teased" in some way to elicit a model. But the models are not logical models of family therapy intervention. Rather they are models of a consultant's way of judging cases as similar. Since no two consultants would judge each pair of cases as alike or dissimilar, our models, or "similarity functions" as we call them, characterize each consultant's way of consulting. In this way, PCDSS employs "experts" without the necessity of constructing complex, slow, costly and difficult-to-debug logical models.

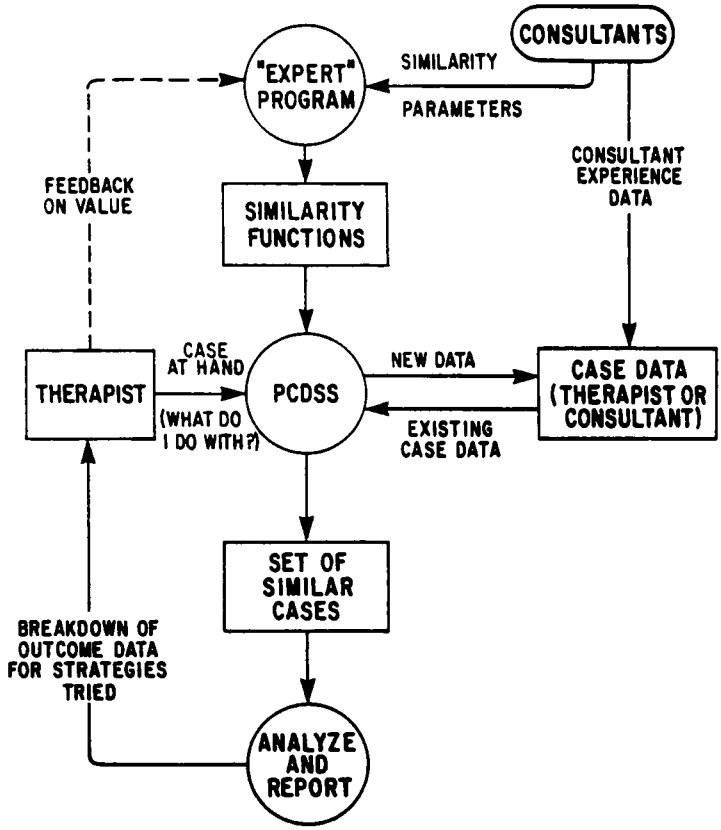
Third, like the DSS approach, PCDSS allows users to employ "What-if" strategies, by asking the consultants "What if the case at hand is like this:...?... or this...?" In other words, users, who are themselves therapists, may be non-specific in certain ways and uncover a range of advice. This allows them to select advice based upon their judgement of the likelihood that the case at hand is really as each description indicates.

The interplay of these approaches in PCDSS (an approach we call CS for "consulting systems") is illustrated in figure 6. Here we see the working of the database manager to retrieve cases, based on similarity functions which are elicited from consultants. These similar cases are then analyzed for patterns of strategies and effectiveness, while the specifications for the case at hand are refined in order to obtain additional advice.

Insert Figure 6 here

Consider the request used as an example so far: "What should I do with the Jones family, headed by a single mother who was abused as a child and whose daughter is acting out in school?" The therapist can request advice from a number of consultants, yet suppose she seeks advice from O. Racle. A file of therapeutic events contains information on what therapeutic interventions were tried with which families and what the

Figure 6. The CS approach.



judgment of "success" was on a variety of dimensions.

In a previous session, O. Racle has informed PCDSS that similarity judgments are made on the basis of family size (+/- 2 members), having similar presenting problems (in eight classes), age of head of household (+/- 6 years), and a number of other traits. Let us ignore these others for the moment. The therapist enters information describing the family, its problem, and a host of other factors. O. Racle then proceeds, under control of PCDSS (and therefore under control of dBASE III) to examine all therapeutic events on file, seeking those which fall into a certain range of family size (the size of the Jones family +/- 2), having problems O. Racle judges as similar to "acting out," and having the same age of head of household as the Jones family (+/-6).

The capabilities of the database manager are such that this search is easy and rapid.

Since the therapeutic events file links families, intervention tactics, therapeutic assessments, and outcomes, the results of this search provide a list of cases in which the families are similar to the Joneses and problems are similar to "acting out" (see Figure 7).

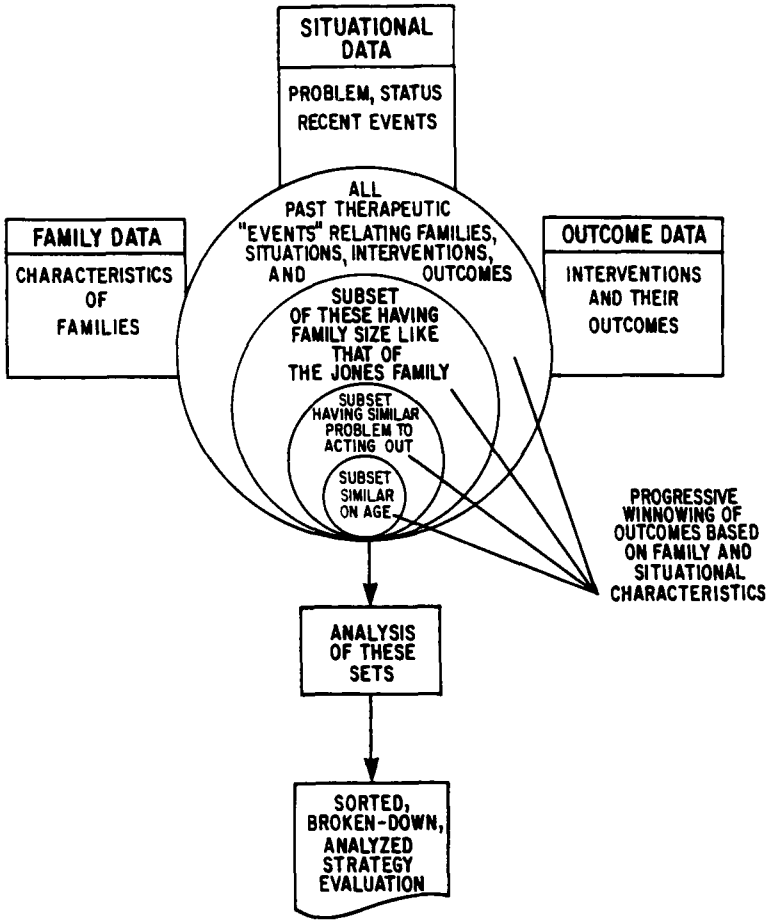
Insert Figure 7 here

Given this set, PCDSS proceeds to break it down by intervention tactics and provides an average outcome rating for each such tactic. Advice then consists of this analyzed list, which may be interpreted as providing probabilities that certain interventions will be effective for treating families like the Jones family now. That is precisely the form of the answer to the question posed: "What do I do with the Jones family, whose daughter is acting out in school?"

The advantage of this approach is that there is no need to construct explicit theories, either probabilistic or logical in nature, relating interventions and outcomes. We work from "raw" data of actual experiences of a consultant. This contrasts strongly with the DSS and ES/AI approaches which begin with theory and then apply it to specific circumstances. Instead, the CS approach utilizes implicit, but effective theory-in-action.

The danger, of course, is that if the "consultant" is a peer and the data

Figure 7. How PCDSS creates advice.



base is all experience (as it is in the Family Therapy Program at Alberta Children's Hosptial), the "conservative bias" of PCDSS to advise to behave in the future as in the past may create a system which does not learn. Also, there is the problem that what is effective for one consultant may not be effective for that consultant's advisee. A technique may work for a consultant and fail for a less-skilled therapist.

These criticisms are valid only if we presume that (1) advice is followed mechanically and (2) ineffectiveness in applying advice is biased in certain ways, i.e., non-random across intervention tactics. Neither assumption makes sense in the context of peer groups of professionals. Therapists have several sources of support other than PCDSS, such as peer and individual supervision, professional literature, and in-service training. Far from following advice mechanically, therapists in the Family Therapy Program at Alberta Children's Hospital utilize PCDSS as one source among others.

The other assumption is just as shaky. Therapists are highly-trained. Obtaining advice from other highly-trained colleagues who share a similar orientation should randomize ineffectiveness in application, although it will not eliminate bias among those who simply will not or cannot utilize a technique for personal, political, or practical reasons.

PCDSS may be enriched through the addition of textbook cases which are derived from coherent, accepted theories or from handbook cases which are taken from practical sources. Certified content experts may also be consulted and their experience coded into the database.

We view PCDSS as a good simulation of consultation, but it may also be used in a number of other ways. Because it captures therapeutic events, it may be used to learn about dependencies in order to construct explicit theories. In another mode, PCDSS can be used to teach novice therapists by posing -- and advising upon -- typical or syndromic cases. Finally, PCDSS can be restricted to work in a "self-advising" mode, allowing a therapist to become his or her own consultant.

We have plans to expand PCDSS in a variety of ways. First, similarity functions cannot currently be "debugged" actively by those whose knowledge is tapped to build them. We plan to construct an "advice analyzer" to provide feedback to "experts" on the value of their similarity

functions. Second, although a number of experts may be electronically "approached for consultation," PCDSS does not support inter-consultant comparisons and the merging of advice. Group decision-making is the natural extension of the individual mode we have implemented.

Third, although a limited "What if the case is really like this?" facility is provided, we have no way of saving and comparing these scenarios and their outcomes. Providing this information would assist therapists in understanding their cases better, if only to see if it really matters whether or not the head of a household is aged. As an extension of this, we plan to build a facility to relax constraints on similarity at the request of the user.

PCDSS is a complex software system aimed at simplifying the process of describing families and obtaining advice from consultants in a fairly straightforward mode. PCDSS contains a sophisticated data capture and report facility to simplify paperwork and a set of aids for assessment.

In conclusion, PCDSS provides a straightforward consulting facility for family therapists, built around a simple model of consulting while providing powerful data capture, reporting and advising functions.

Introducing Computers to Clinical Practice

The rationale for computerization

Practitioners or administrators who ask "Why computerize?" should consider the following conclusions derived from our project experience and consultations with others involved in developing computer applications to clinical practice:

1) Performance - Computers can store voluminous data in very little space, sort and retrieve it with great speed, and present it in varying formats to suit the needs of the user. They can easily answer "what if" queries, by recalculating conclusions based on alternative conditions suggested by the user. Furthermore, they can almost instantaneously share such information with the world at large through the use of electronic communication systems, thus broadening the user's knowledge beyond the immediate work environment.

2) Accuracy and Reliability - A properly functioning computer is unerringly consistent in its digestion and reproduction of data. As a result, such a device can obviate many of the errors in the recording,

storage and retrieval of information to which human processors are prone. Attaining such error-free functioning cannot generally be attained without a significant investment in developmental programming.

3) Productivity - There is no doubt that knowledgeable users of computer systems can accomplish considerably greater amounts of information processing than would be possible without this technology. Again, however, this benefit is not obtained without costs in terms of the learning required to harness this computational power.

4) Revelation - Since they extend human information processing capacity, computers permit the exploration of relationships among disparate items of information that would not be feasible with the "naked brain" alone. Hence, they can assist in revealing heretofore undiscovered relationships between data items.

Before these benefits of computerization can be realized, prospective users must first wrestle with the issue of purpose. Clinical service agencies perform many functions in their daily operation that are amenable to computer support. The question of purpose must be addressed in relation to the users of the system, as well as at the level of the individual task that is to be automated. A broad distinction can be made between management staff, who generally use computers to automate administrative tasks, and line employees, who may wish to utilize such machines to assist them as practicing clinicians. Each occupational group will be less inclined to utilize a computer system developed primarily to meet the needs of others. Although systems can be developed that meet the requirements of each group in equal measure, this can be achieved only with a corresponding increase in development and maintenance costs. Consequently, agencies with limited resources may in the short term be faced with robbing Peter to computerize Paul. Evidence suggests that computerized systems must be tailored carefully to the user's requirements if they are to be well utilized.

At the level of individual tasks, further issues of purpose revolve around the decision as to whether the computer system should directly automate presently performed functions, or innovate in the performance of tasks that were heretofore too time-consuming or computation-intensive for human computational capacity. For example, the introduction of word processing is a use of computer power that does not introduce any new functions but serves to enhance efficiency. On the other hand, the introduction of a clinical decision support system may reshape practice in truly novel ways.

Table 1 presents possible uses of computers in clinical agencies, based on the above considerations. Particular uses of computer systems are classified according to their interest to management or line staff. The uses are listed in descending order according to whether they primarily enhance the efficiency of task performance, or whether they lead to a modification of the task's performance. This list by no means exhausts the possible uses of computers in clinical agencies.

Insert Table 1 about here

A further primary consideration in planning for the computerization of a clinical service agency is the resources available to the agency to realize any such plan. Computerization entails the visible costs of hardware and software. Additional expenses are usually incurred for consultants to advise on which items of hardware and software to acquire. Once these items are on site the task begins of developing viable applications that serve the needs of the agency. This can vary in complexity from the simple use of off-the-shelf software for word-processing to the construction of an elaborate, tailor-made data base management system. Complex applications involve extended time frames and substantial investments of money and expertise. Computer experts are required to construct, test, and help implement the system. The costs associated with such an installation can be expected to exceed greatly the combined costs of the basic software onto which the specific application is built and the computers themselves.

It is only after the system is in place and functioning that the costs that are least visible at the outset are incurred. These include expenditures for staff training, maintaining and developing the software system. Computer programs often appear to be thoroughly error-proofed upon first implementation, but may contain subtle "bugs" that only appear after a protracted period of actual use. Furthermore, whatever the positive attributes of computer systems, they are inflexible to a high degree. As a result, individually tailored software systems typically incur ongoing maintenance costs involving the reprogramming of newly surfaced errors, in addition to redesigning of the system in whole or in part in order to make it better meet the evolving needs of the agency.

The process of decision-making related to the acquisition of a computer system is represented in figure 8.

Table 1

Applications of computers in social work practice.

Use	Management staff	Line staff	All staff
Word processing - correspondence	X		X
- agency	X		X
- client records			X
Caseload management		X	X
Caseload reporting		X	X
Financial tracking/projections (spreadsheets)	X		X
Scheduling - workloads		X	X
- room/equipment bookings			X
Administration/interpretation of scales of psychological/social functioning		X	X
Treatment outcome monitoring and documentation	X	X	X
Client and service descriptions to aid in planning resource development (e.g. problem typologies, service parameters, referral routes all through database management)	X		X
Clinical Decision Support Systems guiding treatment		X	X

Insert Figure 8 here

The first consideration is whether there is sufficient interest in computerization on the part of either management or clinical staff. If at least one of these groups is interested, then the next issue is availability of resources. If there are both sufficient interest among clinical staff and the resources available to computerize, the next consideration is the degree of standardization of practice among prospective clinician users. If standardization is low and unlikely to be developed, then computer application will be limited to "static" data use systems that passively store data on client and service parameters. Such applications are likely to be of greater value to managers than clinicians. Agency-wide clinical applications demand some consistency in how practice is conducted, described and defined across practitioners. Such standardization permits the development of "dynamic" systems that can render judgments as to how service is best provided. Dynamic systems are capable of reshaping the information that they store. Such is the case of the Personal Consultant Decision Support System described above. The chart also depicts the sub-process whereby the design of a dynamic data base system develops through cycles of refinement, while never reaching a final form. This type of applications development, involving continuous close collaboration between computer personnel and clinician users, is called "prototyping" (Sprague & Carlson, 1982). The maintenance of this cyclical process is dependent upon dependable operation of the computer system, the level of support provided to facilitate clinician utilization, the availability of resources to maintain the refinement process, and the level of enhancement to practice that its use provides to clinicians. Failure to meet these conditions will result in abandonment of the system (Hedlund, Vieweg & Cho, 1985), or downscaling to a static system.

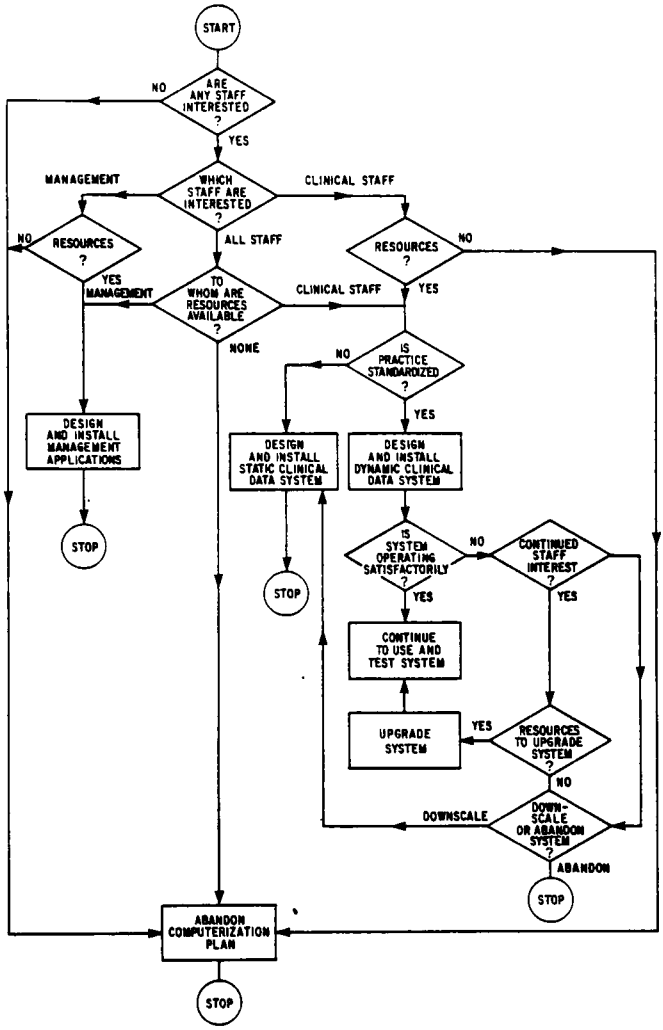
In summary, the process of computerization of a clinical service agency will proceed most productively if the following factors obtain:

1. The agency's administration supports the value of computerization;

2. In the case of clinical applications, the line staff is also supportive and open to technological innovation;

3. The necessary budgetary resources are available to finance hardware, software, and technical expertise;

Figure 8. Steps in planning a computerized information system.



4. There are adequate consulting, technical support, and training personnel;

5. Adequate investment is made in staff training;

6. Staff-users receive ongoing support from data entry personnel, and prompt trouble-shooting is available.

7. Use of the system is perceived by the users as significantly enhancing their practice;

8. In the case of clinical applications, the staff jointly adhere to a common theoretical perspective on clinical practice and largely use the same repertoire of therapeutic methodologies.

Some Impacts of Computerization - Good, Bad, and Indifferent

There are some further impacts on clinical service agencies that attend computerization. Some are readily apparent, others potentially surprising; some are clearly desirable, others potentially noxious. The first four apply to computer applications in general. The others refer more specifically to the kind of clinical decision support software which we have been developing.

1. Time will not be saved by computerization and the amount of data stored will be increased. Initially, time will be lost until the system is properly operational and staff have accomodated themselves to its functioning.

2. Lightning-fast storage of information can also meanlightning-fast eradication. Hence, proper procedures for reproducing "backup" copies of data banks become crucial. Fortunately, this task is easily and reliably performed by modern computer systems.

3. The secure protection of confidential data becomes a paramount concern as theft of this information also can occur at lightning-fast speed.

4. Overdependence on computerized data processing can lead to operational crippling when software or hardware malfunctions. The impact of this can be minimized through building competent technical

support networks. Similarly, the selective reproduction on paper of digitally stored information allows the agency to continue to function at some measure of effectiveness should such a malfunction occur.

5. Obsolescence in hardware and software will be totally unavoidable and mercilessly swift. It will be measured in months rather than years. The resulting depreciation of the original financial investments should be expected at the outset of the computerization process. The only absolute defense against this reality is to perpetually postpone computerization until the next, more powerful computer is introduced.

6. Deification of the computing machine can lead to dangerous over-reliance on its calculations. One of the oldest and truest adages about computers is "Garbage in- garbage out." It succinctly captures the fact that computers are nothing more than incredibly fast and reliable morons. The machine cannot convert items of data into meaningful information in the sense in which Bateson defines this term as "a difference that makes a difference." The transformation of fact to import must still be performed by the user of the system.

7. Users of software systems designed to improve clinical practice will be obliged to engage in conceptual clarification of the nature of their practice. Computer representations of the therapy process do not yet capture its subtleties and complexities. Nor can they resolve ambiguities, or correct faulty logic.

8. Clinical practice will come to be viewed more in digital/scientific terms than in analogic/ artistic terms. Practice will be analyzed more atomically according to its subcomponents, rather than holistically according to its overarching design. This development results from the fact that dissection is more amenable to computer-assisted processing than is the expression of global patterns. It is a direct concomitant of the triumph of digital (which represent percepts as sequences of bits of data) over analogic computers (which represent percepts as data wholes.)

9. Practice will tend to become more standardized within any given agency. Because any computer representation of clinical practice will enforce a parsimony of ideas about practice in order to enhance

computational manageability, all participating staff members will tend to underuse some of their earlier conceptualizations about practice in accommodating to the new computer system. This will be a consequence of the system requiring certain data of the user which previously may not have been valued highly, and ignoring other data which the user may consider highly important. Hence, the agency as a whole may experience a "regression toward the mean," a clustering of ideas and practice about the new definition of reality imposed by the computer system. Since individual clinical service agencies can easily share their data through the use of telecommunications, the effect of such networking may be to extend standardization beyond the boundaries of any particular agency to the larger system of psychosocial services.

10. Computerized agencies may more strongly resist change. Computer systems tend to develop considerable inertia because of the major investment in creating them. Redesign entails reprogramming costs, retraining, and further error-proofing. For a clinical service agency the initial investment in computerization is likely to consume the allotted resources, and the agency may be unwilling to reallocate further resources to such a revision. Hence, we anticipate that new developments in the practice professions will be expected to fit existing clinical computer systems, rather than the reverse. An installed system may thereby retard the agency in incorporating recent therapeutic innovations.

REFERENCES

Bloom, M., & Fischer, J. Evaluating Practice: Guidelines for the Accountable Professional. Englewood Cliffs, NJ: Prentice Hall, 1982.

Codd, E.F. "A Relational Model of Data for Large Shared Data Banks. Communication of the ACM, 13 (6) (1970), 377-387.

Dery, D. Computers in Welfare: The MIS-match. Beverly Hills, CA: Sage, 1981.

Fischer, J., & Gochros, H.L. Planned Behavior Change: Behavior Modification in Social Work. New York: Free Press, 1975.

Gripton, J. "Microcomputers and Wordprocessors: Their Contribution to Clinical Social Work Practice." In G. E. Lasker, (Ed.), Applied Systems and Cybernetics Vol. 3 Human Systems,Sociocybernetics, Management and Organizations. New York: Pergamon, 1981.

Gripton, J. "How to Computerize your Practice." Practice Digest. 6 (3,) (1983) 16-20.

Gripton, J. The digital social worker: Microcomputer applications to clinical practice. Presented at Council of Social Work Education Annual Conference, Detroit, 1984.

Hedlund, J. L. Vieweg, B. W., & Cho, D. W. "Mental Health Computing in the 1980s: General Information Systems and Clinical Documentation." Computers in Human Services.1 (1), (1985), 3-34.

Keen, P. G. W. & Scott-Morton, M. S. Decision Support Systems: An Organizaitonal Perspective. Reading, MA: Addison-Wesley, 1978.

Licker, P. & Thompson, R. Consulting systems: Group decision support by one person. Presented at 18th Annual Hawaii International Conference on Systems Sciences, Honolulu, 1985.

Reid, W., & Epstein, L. (Eds.) Task-centered Practice. New York: Columbia, 1977.

Schoech, D. Computer Use in Human Services: A Guide to Information Management. New York: Human Sciences, 1982.

Schoech, D., Jennings, M., Schkade, L. & Kooper-Russell, C. "Expert Systems: Artificial Intelligence for Professional Decisions." Computers in Human Services.1 (1), (1982), 81-115.

Schwartz, M. D. Using Computers in Clinical Practice. New York: Haworth, 1984.

Sprague, R. H., & Carlson, E. D. Building Effective Decison Support Systems. Englewood Cliffs, NJ: Prentice-Hall, 1982.