COMPUTERS IN MENTAL HEALTH: WHERE ARE WE NOW?

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Previous research and development trends in the application of computers to mental health care are briefly reviewed. The problem of clinician acceptance is noted. Predictions about future developments are stated. Present development is discussed in light of these predictions.

Three separate trends have been identified that describe the history of the application of computer technology to mental health care delivery needs. In the first of these, research was undertaken to develop automated patient data systems. The second trend relates to the development of automated clinical techniques. The third, and most recent, trend involves the development of interventionally relevant systems.

Research on automated patient data systems began as a collaborative effort among mental health administrators, clinicians, and computer vendors. The primary goal of this research was the development of readable charts and the collection of standardized patient data to be used for administrative information. Examples of such systems include the Multistate Information System (MSIS) at the Rockland State Hospital in New York, the Missouri Standard System of Psychiatry (SSOP) at the Missouri Institute of Psychiatry, and the Computer Support in Military Psychology System (COMPSY) at the Walter Reed Hospital in Washington, D.C. These systems provide objective reporting of traditional clinical functions, patient statistics, and other record keeping for approximately 1,000 psychiatric facilities across the country. Research and development on these systems continues at an impressive rate, and great progress has been made since their inception in the early 1960's.

Research on the automation of clinical techniques began in the middle 1960's shortly after the initiation of work on automated patient data systems. Examples of such work include the automated Minnesota Multiphasic Personality Inventory (MMPI) interpretive system developed by Pearson, Swenson, Rome, Mataya, and Brannick at the Mayo Clinic, Plotrowski's automated Rorschach interpretive system, Elwood & Griffin's automated Wechsler Adult Intelligence Scale administration system, Spitzer and Endicott's development of the DIAGNO programs for determining DSM-II diagnosis from structured interview protocols, Rosenberg & Glueck's automated nursing notes, and Colby's attempts to develop an automated psychiatric interview program. With the exception of Colby's efforts to use the computer as a therapist, much of this research has now found its way into mental health care delivery settings throughout the country. The widespread use of the Roche automated MMPI interpretation program is the best known example of this. However, progress in using automated clinical techniques has lagged somewhat behind the usage of automated management information systems.

The development of interventionally relevant automation techniques began in the early 1970's. At that time many clinicians were skeptical about the value of automated management information systems and clinical techniques. Their negative reactions led to efforts to design "need based" or "interventionally relevant" applications for computers in mental health settings. Interventionally relevant systems were developed specifically to provide the clinician with data that could be of assistance in their patient care decision-making. Examples of this work include efforts by Altman, Evenson, Sletten & Cho to predict the assignment of psychotropic medications, by Linkenheimer and McCarron to automatically produce recommendations for individual-
The total research and development effort on the use of computers in mental health care covers a span of nearly two decades. This is not much time to bring about significant breakthroughs. Still, it is enough to clarify some of the possible problems related to future applications of computer technology in the mental health care area and to suggest future directions for research and progress.

The Problem of Clinician Acceptance

Previous research studies attest to the fact that automated systems in mental health care delivery settings are cost beneficial and are liked by patients. Despite these positive evaluation studies and the strong rational arguments that can be made for the use of computers in mental care delivery settings, computers are still not popular with clinicians. Many clinicians believe mental health care is a humanistic endeavor that will suffer from the introduction of technology. While we presently have the available tools and technology necessary to bring about major improvements in the delivery of mental health services, these improvements will be slow in coming until clinician acceptance is improved.

Some prognosticators believe that this hurdle will be overcome relatively soon. An analysis of both long and short-term trends makes evident the simple truth that the labor force in general and the mental health professions in particular are being required to improve productivity ratios to meet the ever changing economic circumstances. In mental health care this is reflected by the recent emphasis on outpatient rather than inpatient treatment programs, and by the movement from long-term analytic based therapies to short-term crisis intervention based approaches. Mental health professionals are going to be expected to be even more productive in the future. Patient loads and turnover will have to be increased. These public mandated increases in clinician work loads will result in at least one important change. They will force acceptance of computers as labor saving devices. And once computers are accepted for labor saving purposes, they will also begin to be accepted for other areas of clinical care. I believe that this transition will have been nearly completed by the end of the next decade.

If one makes these assumptions, it is appropriate to ask, "How will computers be used as labor saving devices?" and "What clinical applications are apt to be widely automated?" My answers to these questions have been broadly outlined in several recent publications. For the remainder of this paper I will try and specify some of these projections in detail.

Future Applications

Before long almost all psychological tests will be administered, scored, and interpreted using on-line computer technology. Presently, computerized test interpretation is reasonably accurate and well accepted. Since Meehl's monograph in 1954, the evidence has been overwhelming; actuarial prediction is at least as good as clinical prediction. And, importantly, actuarial prediction is more easily done by computer. There are other issues that also argue for greater acceptance of automated test administration and interpretation systems. Published clinical research relevant to test interpretation is abundant and growing every year. It is impossible for clinicians to keep track of all this literature and to make use of it for each individual test interpretation. As one example, there are more than 500 special scales that have been developed for specific interpretive problems on the MMPI. No individual clinician can be expected to know the validity of these scales, and it would be nearly impossible for him/her to score and interpret all of the possible relevant scales for each patient. As a further example with the MMPI, there are now special adolescent and ethnic norms in addition to the traditional adult norms. It is difficult for the clinician to manually apply each of these norms appropriately. However, this type of problem is handled easily by the computer. What I am suggesting is quite simple. The level of psychometric sophistication is now so high and is growing so rapidly that it will be impossible for future clinicians to ethically and adequately interpret many tests in a cost efficient manner without the aid of computers. Thus, psychological testing is bound to be an early area where the computer will be widely accepted as a labor saving instrument.

A related need for computerized resources involves the completion of psychological evaluations based on comprehensive test batteries. Psychologists are growing more and more reluctant to complete psychological evaluations because the work is tedious, time consuming, and pays relatively less than psychotherapy. On the other hand, there is a growing need for accurate psychological evaluations as our treatment programs become more and more specific (e.g., special drug therapies and package psychotherapies).
Approaches will have to be developed to make psychological evaluation and reporting procedures easier. One obvious solution involves the combination of an on-line psychological assessment system with the abilities of a word processing computer. With this equipment the patient completes the test on a computer, the computer scores and interprets the results, the clinician reviews initial results, and the clinician and the word processor would work together in developing a finished psychological report. All of this will be accomplished on a computer system without the aid of the secretary. Clinician time will be saved because the computer can string together the words and phrases from the automated interpretation system along with the patient's demographic information to provide the bulk of the report material. The clinician need only be responsible for free form observational entries to the report.

There are other areas where the word processing capabilities of the computer system can be used to save clinician time. At intake, and after entry of diagnostic information into the automated system, the computer can be used to produce treatment plans and goals required by insurance carriers and peer review groups. At present most clinicians write out plans and goals "uniquely" for each patient. This is not only time consuming, but also unnecessary. In most cases, a clinician uses only a very limited number of treatment approaches and outcome goals. These can be objectively specified in advance, and stored in computer dictionaries to be printed out according to diagnosis. Because "paperwork" tasks of this sort are not rewarding to most clinicians, it can be expected that they will soon accept the labor saving capabilities of the computer in this area.

The word processing capabilities of the computer can also be used to save time in other repetitive chart writing applications. Regular progress notes can be structured and semi-automated. These can be used along with other material input by the clinician to reduce time spent preparing discharge summaries. Just as attorneys have learned to use word processing systems to save time in the preparation of standard legal documents, it can be expected that mental health professionals will make use of the computer's word processing capabilities to save time in the completion of routine and repetitive chart work.

As patients become familiar with computer interaction through psychological testing, and clinicians become familiar with computer interaction as a result of labor saving chart work approaches, a wide range of new interventionally relevant computer applications will be developed to improve mental health care delivery. These new approaches are apt to take advantage of the unique attributes of the computer media rather than just mimicking clinician behaviors. It is within the framework of these specifically tailored, computer-derived applications that we are likely to see the most important advances resulting from automation technology.

Up until now, computer applications in mental health have often been limited to mimicking clinicians and administrators. These rather crude approaches have often failed because they didn't significantly improve patient care. However, in the future the specific powers of the computer will also be used to develop new types of treatments and in improved patient care. In the future computers will not be used solely to mimic clinicians behavior; they will also be used to provide therapeutic experiences and clinician information that are impossible to provide with any other medium. Simulation, game theory, and computer systems will be used to provide therapeutic experiences to the patient while in treatment. Computer programs will be constructed to simulate experiences previously possible only outside the treatment setting. In the beginning these programs will consist of relatively simple role playing scenes where the computer presents the situation, the patient responds, and the computer provides constructive feedback. More advanced programs will follow that will supply long-term life feedback to the patient depending on his responses to stimulus scenarios presented by the computer. For example, a patient with low frustration tolerance and impulsive behaviors might be shown that abruptly terminating employment because of a disagreement with the boss leads to family fights, reduced money available for pleasurable activities, and the unpleasant reality of having to look for other employment.

In this type of application the computer will be used to provide a new type of treatment experience; to simulate the consequences of a patient's strategies in everyday life situations. I believe we can look forward to a series of such programs or "games" to be available for problem areas related to family relationships, vocational relationships, and job seeking. It is apparent that this type of computer application is more than a data processor or clinician mimic; it is an approach that expands the clinician's treatment armamentarium and improves the patient's outcome.

Other new computer applications in mental health care will follow from the current research in the area of interventionally relevant techniques. Here the computer will be used to provide predictive information aimed at improving clinician decision-making. Because such applications will be aimed at augmenting the clinician's decision-making processes, rather than attempting to replace or monitor them, clinician acceptance should follow.

As an example of an interventionally rele-
vant application of computer technology, consider the initial decision that is made by a mental health treatment facility whenever a new applicant applies for care. "Should that applicant be admitted for care?" Information required for this decision includes: eligibility for treatment, environmental support systems, and the nature of the symptomatology. Basic criteria for the decision to admit for care might include: eligibility and some probability of improvement is one of the available programs. Outcomes associated with the decision to admit include: improvement measured at discharge and possible disabling effects related to psychiatric hospitalization. Outcomes associated with the decision to deny admission include: possible suicide, acting-out, and dependence upon other social agencies.

Computations can be performed to provide information about the severity of symptoms and the likelihood of improvement, as well as the probabilities of occurrence of each identified outcome related to each decision choice. Once this information is available to the clinician, it is likely that his/her decision-making ability will improve. Furthermore, data gathered from all previous patients can automatically be used to update probability computations, thus leading to additional improvements because of the "learning capabilities" of the system.

Other clinical decision-making situations in which interventionally relevant approaches would be helpful include: determination of the type of overall treatment plan for a given patient, the type of specific treatments (e.g., medications, talk therapies, behavior modification, etc.), adjustments to the overall treatment plan, the time and type of discharge, and the kind of posthospitalization treatment. In each case, specification of decision processes dictates information needs that can be provided through applications of computer technology and that cannot be provided by current clinical methodologies.

Of course, there will also be some additional computer applications that will not be radically innovative. These will come into use because of the specific powers of the computer that allow it to do a better job than the human being in certain circumstances. This kind of application is most apt to be found in the areas of the behaviorally based psychotherapies. For example, computers are potentially able to administer techniques such as desensitization and bio-feedback with more care and precision than the clinician.

Conclusion

Historically, computers have been used to bring order where there is chaos and to reduce costs. It is exactly in these areas that I expect computers to have the greatest impact on the delivery of mental health treatment services. Computers will first be used to save money and, only afterwards, to put organization and logic into patient care.

In this paper I have summarized the developmental trends related to the use of computer technology in mental health care delivery settings, specified the problem of clinician acceptance as a major deterrent to future advances in this area, and predicted that computers will begin to be used widely in mental health settings for purposes of labor saving, but then will be used in other interventionally relevant areas as well.

At this point it is appropriate to ask the question, "Where are we now?" Unfortunately, the answer is, "Not very far." Most of our previous research has focused on automating either administrative or clinical techniques, only recently has work begun on interventionally relevant systems. Very little work has been reported on problems related to the poor clinician acceptance of computerized systems, and very little has been done to develop the potential of the computer as a labor saving device for the clinician. Finally, I am not aware of any ongoing research that is aimed at the development of new types of therapeutic interventions based solely on the unique capabilities and attributes of computers.

References