A SURVEY OF THE USERS OF A WORKING STATE MENTAL HEALTH INFORMATION SYSTEM: IMPLICATIONS FOR THE DEVELOPMENT OF IMPROVED SYSTEMS

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This paper reports the results of a formal interview survey of 160 users of the Michigan Department of Mental Health's computerized information system. This system is not a clinical information system; the system has automated a data base used primarily for management tasks such as program planning, management, and evaluation.

The survey's results lead to the identification and discussion of a number of barriers to the utilization of such computerized systems in a mental health setting. The findings have important implications for the design and use of these systems in mental health; therefore, design implications are presented.

Introduction

Automated mental health information systems are being installed in community mental health centers (CMHCs) as a new technology for improving clinical and organizational functioning through efficient information processing. Despite the large number of system installations, no system can claim unqualified success. Barriers to the efficient use of these systems by mental health professionals include not only inadequacies in the availability and usefulness of current hardware and software, but also certain human problems existing in mental health care delivery systems. The humans that work with information systems are often overlooked or seem like fallible obstacles to be overcome. Such an orientation has contributed to the general neglect of the objective study of human factors as a key to useful, accurate, and efficient management information systems.

This paper reports the results of a formal interview survey of 160 users of the Michigan Department of Mental Health's computerized information system. This system is not a clinical information system; the system has automated a data base used primarily for management tasks such as program planning, management, and evaluation.

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Subjects and Methods

Interview Questionnaire

During the spring of 1975, professional interviewers from The University of Michigan's Institute for Social Research interviewed 160 users of the Michigan Department of Mental Health's statewide computerized management information system. The respondents received a highly structured interview containing both open-ended and multiple choice questions. The survey instrument had been carefully designed, pretested, and revised.

A series of initial questions determined if the respondent's work role was either that of an administrator or a frontline worker. Subsequent questions examined the: (1) availability and usefulness of management information, (2) respondent's carefulness when completing the required data collection form imposed by the state system, (3) attitudes about the existing system and the use of management information for evaluating both the respondent and the respondent's CMHC, and (4) opinions about the respondent's professional attributes. Wherever possible, attitudes and opinions were measured using previously standardized procedures; these are well described by Gorodezky.

Sampling and Data Analysis

Respondents were from a stratified sample of 10 Michigan CMHCs. The sampling plan was designed to randomize both the selection of respondents and CMHCs within the following stratification scheme:

1. Two large CMHCs with 64 respondents (and with yearly budgets from $800,000 to $3,000,000 and with an in-house computer used to analyze management information).
2. Four large CMHCs with 64 respondents (and with yearly budgets from $800,000 to $3,000,000 but without an in-house computer).
3. Four small CMHCs with 32 respondents (and with yearly budgets under $800,000 and without an in-house computer).

The Michigan Interactive Data Analysis System (MIDAS) was employed to tabulate and analyze results. Using standard statistical procedures, the factors underlined in this and the previous section were described and analyzed for statistically significant findings.
Results

Nearly all of the respondents felt a computerized management information system was needed in a CMHC. However, a majority (66%) of the respondents spontaneously reported dissatisfaction with the realities of implementation and/or operation of the Michigan Department of Mental Health’s system. The detailed results below describe specific characteristics of the respondents and the system which help explain respondent dissatisfaction.

Categories of Information

Usefulness of information. Five categories of information thought to be useful for decision making in CMHCs and which could be derived from the information system were presented to all respondents. Respondents were asked how useful each information item would be for them in their work if the information were made easily available. Information either described the respondent's agency or another agency within the local community. The average and median response revealed all categories of information to be of either minimal or moderate usefulness. Administrators found each information item significantly more useful than did line workers (non-administrators). These results are summarized in Table 1.

Table 1

USEFULNESS OF INFORMATION: ADMINISTRATORS (A) AND LINeworkERS (L) COMPARED
N=159 (A=41, L=118)

<table>
<thead>
<tr>
<th>Agency</th>
<th>Categories of Information</th>
<th>Not Useful</th>
<th>Min</th>
<th>Mod</th>
<th>Extremely Useful</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Agency</td>
<td>Number of Active Cases</td>
<td>L</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Irrespective of Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of Active Cases</td>
<td>L</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>for a Specific Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of Face-to-Face</td>
<td>L</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contacts for a Specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Agency</td>
<td>Number of Active Cases</td>
<td>L</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Irrespective of Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of Active Cases</td>
<td>L</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>for a Specific Problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significance based on a comparison of the number of subjects in a particular row that either do or do not fall below the grand median (median test).

Availability of information. Admini strators were asked whether each information item in Table 1 was easily available, available, available with difficulty, or not available. The total number of active cases in the administrator's organization performance, there would be the strong possibility of an inaccurate evaluation.

Use of Information

Respondents were asked about the use of in-
formation derived from the state's data collection form. This was done with respect to: (1) use by the local CMHC and (2) use by the state mental health authority. Only about one out of every four respondents felt either organization used the information for decision making. Many respondents (29%) believed the state authority did not actually use the information. A majority of respondents didn't know how either organization used the data (Table 2). The respondent's work role or other factors did not significantly alter these findings.

A content analysis of the interview revealed that those respondents who regarded information as not very useful and/or little used tended to think information would be used against them or their valued objectives, and they believed information was primarily of use to those outside the organization who would use information to evaluate the individual or the organization critically.

In principle, the vast majority of all respondents (82%) approved of the use of management information systems in and management information for evaluating the performance of the respondent's CMHC. Similarly, respondents approved (66%) of using information systems in evaluating the respondent's professional performance.

Respondents who indicated one of the categories of information in Table 1 would be either moderately or extremely useful were then asked how they would use the information in their work. A standard content analysis procedure revealed that respondents used information for a very limited number of decision making steps. This suggests that CMHC professionals, both administrators and lineworkers, are satisfied with a structural analysis of their decision problems that is so incom-

er the factors of: (1) the respondent's work role (administrator or lineworker (factor A)), (2) the CMHC type (large or small; with or without an in-house computer (factor B)), or (3) the form type (organization's form or state's form (factor C)) affected completion care.

For the above problem a multifactor analysis of variance procedure was used in which the groups are of unequal size. Since the same people completed both forms, factor C was a repeated measure. This procedure permitted an evaluation of the effect of work role, CMHC type, and form type on the dependent variable—completion care. Winer's textbook describes this procedure. Table 3 summarizes the results of this procedure.

Respondents were significantly more careful when completing their organization's own form than they were when completing the state's form. The respondent's work role and organizational factors such as CMHC size (budget size) or the availability of an in-house computer do not affect this finding. Statistical interaction was found as noted in Table 3.

### Table 2

OPINIONS ABOUT THE USE OF DATA DERIVED FROM THE STATE'S DATA COLLECTION FORM

(Percent Distribution)

<table>
<thead>
<tr>
<th>User Organization</th>
<th>N</th>
<th>Used for Nothing</th>
<th>Used for Decision making</th>
<th>Don't Know</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local CMHC</td>
<td>159</td>
<td>2</td>
<td>21</td>
<td>77</td>
<td>100</td>
</tr>
<tr>
<td>State Authority</td>
<td>159</td>
<td>29</td>
<td>29</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

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Table 3

SUMMARY OF ANOVA DESCRIBING THE EFFECT OF THREE FACTORS ON DATA COLLECTION FORM COMPLETION CARE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A (work role)</td>
<td>1</td>
<td>.1253</td>
<td>.1253</td>
<td>.1880</td>
<td>NS</td>
</tr>
<tr>
<td>B (CMHC type)</td>
<td>2</td>
<td>.9470</td>
<td>.4735</td>
<td>.7102</td>
<td>NS</td>
</tr>
<tr>
<td>AB</td>
<td>2</td>
<td>2.2790</td>
<td>1.1395</td>
<td>1.7092</td>
<td>NS</td>
</tr>
<tr>
<td>Subj w. groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[error (between)]</td>
<td>34</td>
<td>22.6509</td>
<td>.6662</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C (form type)</td>
<td>1</td>
<td>3.0680</td>
<td>3.0680</td>
<td>9.4053</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>AC</td>
<td>1</td>
<td>1.8504</td>
<td>1.8504</td>
<td>5.6726</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>BC</td>
<td>2</td>
<td>.6592</td>
<td>.3296</td>
<td>1.0104</td>
<td>NS</td>
</tr>
<tr>
<td>ABC</td>
<td>2</td>
<td>2.4964</td>
<td>1.2482</td>
<td>3.8265</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>C x subj w. groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[error (within)]</td>
<td>34</td>
<td>11.0897</td>
<td>.3262</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attitudes and Opinions

A variety of statistical correlational procedures revealed a general absence of significant relationships. Self-report data about the respondent's carefulness when completing the state's form or about the respondent's perceptions about the usefulness of information potentially derived from this form was not correlated with several variables. These variables included: (1) the respondent's perceptions about the organization (hierarchy of authority, division of labor, and rules and regulations, for example, (2) the respondent's perceptions of his/her professional attributes (autonomy and self-regulation, for example, (3) the respondent's sociodemographic characteristics (age and educational level, for example), or (4) with the size of the CMHC or the presence of an in-house computer used to analyze management information.

The above findings suggest that the CMHC professionals surveyed were a homogeneous group. It seems likely that this interpretation can be generalized beyond the surveyed population. Further, the information system appears to be independent of both the professional and his/her organization.

Discussion

This section could be easily called "Barriers to the Utilization of Mental Health Information Systems." This is because the preceding findings lead to the identification of a number of barriers to the utilization of computerized systems in a mental health setting. These barriers are described below according to topic areas.

Suggestions for overcoming identified barriers are presented also.

Errors of Centralization and Decentralization

Our data revealed that the implementation of a large automated information system imposed upon distant CMHCs by a central mental health authority may be associated with the development of local semi-redundant automated and/or non-automated information systems. The CMHCs own system will receive more care and be more valued; this often leads to limited cooperation with the procedures and requirements of the central system. The limitations of local CMHC resources lead to a local system which is often dysfunctional. Thus, two systems are created neither of which work well.

The above phenomenon suggests an obvious conclusion. Management information systems should not be imposed on mental health organizations from above without extensive consultation with and planning done by those units. If different parts of the system have different information needs, this can be handled by developing separate codes for data for the separate purposes, embedding them in more inclusive coding systems, and allowing negotiation over categories that seem inappropriate to some organizations. We believe that modern techniques for developing coding systems are sophisticated enough to yield both useful standardized categories and some individualization of data for special local purposes. Further, the use of hierarchical computer networks would permit small local computer capacity integrated with and served by the state mental health authority's larger computer.
It may be that a large centralized computer is unnecessary for the above purpose if local units can supply desired information to the central authority. The central authority can maintain the quality of local systems by developing and implementing standardized procedures for auditing local information processing procedures.

Organizational Factors

Information about other agencies within the CMHC's local community was reported to be relatively unavailable. Unless a mental health management information system provides information about the utilization of services by clients in all the elements of a multi-management health delivery system, it is very difficult to plan services, avoid duplication of services, and prevent clients from falling between the cracks between organizations. Competitiveness, differences in philosophy, and an exaggerated narrowness of focus of interest on the clients of one's own agency all work against the development of shared information systems.

Steps need to be taken locally to strengthen regional planning. In some ways this is a sine qua non for effective regional information systems. Again, this is less likely to be facilitated by having it mandated from above than by having it encouraged by successful local demonstrations. We believe that a temporary overfunding of some regions to develop effective regional information systems is to be preferred over funding of all regions at levels that insure inadequate information and poor motivation.

Dysfunctional Patterns of Information Use

Information is used for decision making. Decision making can be regarded as a series of steps that begins with a vague recognition of the problem and proceeds to a tentative identification of the objectives of the organization that are likely to be influenced by the decision and a tentative identification of options among which a choice is to be made. Professionals in CMHCs are almost continuously engaged in decision making and in solving problems of the most complex sort. However, this investigation revealed that many CMHC professionals, both administrators and lineworkers, are relatively unsophisticated decision makers; this statement may be generalized to many other types of organizations.

On the whole, most decision makers concerned with setting objectives, allocating resources, and setting policies that regulate the flow of specific populations through their system, do not appear to have a clear grasp of the structure of the decisions they are making. This work and the related work of Quarton and his colleagues\(^\text{10}\) found that CMHC decision makers avoid critical decision making steps. This may be because many individuals in mental health systems (physicians, psychologists, and social workers) who have been well educated and who are highly motivated to help sick clients, are so oriented to solving the problems of individual clients that they ignore the analysis of problems concerning populations with shared needs. They often appear not to be aware that even to solve the problem of the individual client, it is necessary to use facilities and resources that will not be available unless prior planning, linking decisions on resource allocation and policy making, create and maintain these facilities and resources.

These generalizations have important implications for the design of and use of management information systems in mental health. In the first place, it does not seem likely that information systems will be built and maintained unless a large number of people in such systems believe they are useful and, in fact, use them efficiently, forcing the information system to become progressively more sophisticated. Further, a type of training or education acceptable to everyone, may be necessary in order to increase the efficiency of decision making. (Most respondents (81%) reported being self-taught about the use of the information system studied.)

Information systems (not necessarily systems designed for daily operations) need to be developed that will facilitate this education. The work done by Quarton\(^\text{10}\) offers one approach for learning how to use computerized information for mental health decision making. This approach uses computerized simulations of mental health decision making processes in combination with provocative structured learning workshops.

Quality and Availability of Information

Respondents found some categories of information to be of low quality irrespective of the information system. The respondents belief that standardized diagnostic category data and semi-standardized measures of severity are often inaccurate is supported by considerable evidence.\(^\text{11-14}\) This suggests that information systems should not routinely collect information widely believed to be inaccurate. The data suggest that successful information systems will concentrate on collecting as useful, accurate and complete information as possible on a limited number of factors, in preference to collecting a lot of information of a less refined nature on a large number of factors. Established epidemiological and survey research methods may be used periodically to collect information unavailable to routine data collection procedures.

The quality of information is probably related to its use and availability. Recall that easily available information was that most used by those surveyed. Thus, information systems must make information of demonstrated use easily and rapidly available to both administrators and lineworkers. When information services are bad, administrators and lineworkers in mental health agencies do not contribute high quality data, do not ask good questions of the data base, do not allocate resources for information, and do not contribute to the development of better information systems.

Psychological Factors

Some mental health personnel surveyed appeared to suffer from a mild type of suspiciousness about how information concerning clients and per-
sonnel activities would be used. Further, the survey's attitude and opinion findings suggested the information system to be independent of both the professional and his/her organization. Both suspiciousness of and separateness from information systems is probably greatly increased if, as was the case for those surveyed, individuals don't know how collected information is to be used. This situation may lead to some indifference toward the success of information collecting systems and some carelessness when coding information. These psychological factors require a successful information system to make explicit how information is to be used and to have a sustained and impressive record of demonstrated information processing, report generation and report interpretation competence.

The above is neither an exhaustive list of barriers to information system utilization nor an exhaustive list of methods to overcome the identified barriers. The above discussion was based only upon a survey of a small sample of users of an existing information system. A survey of this type is useful because objective data is collected about a system; findings can be compared to the claims made by the developers of such systems.

Unfortunately many of the above problems exist not only in our information systems but also in ourselves. Therefore, the task of developing management information systems in psychiatry and mental health is an unusually difficult one. The importance of the task cannot be overstated; the inability to successfully implement and utilize management information systems in mental health settings is one of several key reasons why these settings are experiencing serious difficulties in such areas as quality of care, service delivery, cost containment, needs assessment, and resource allocation. I refer you to the related papers presented in this Symposium by Gardner Quarton and Cecil Murray for information about the Washtenaw County Mental Health Information Laboratories' approaches to the task.

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References