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ABSTRACT

A survey of 3,581 rehabilitation facilities was conducted to determine their extent of computer use. Completed surveys were returned by 1,586 (44 percent) of the facilities, of which 864 (54 percent of the respondents) are using computers. The users indicated that computers are most frequently used for administrative purposes, whereas production and rehabilitation services uses are much less frequent. A number of statistical analyses were significant. It was found that the facilities that are currently using computers are much larger in terms of the number of clients they serve, the number of employees, and the size of their annual budgets. The users also provide a wider variety of rehabilitation services than the nonusers. Almost one-half of the current computer users own a microcomputer, one-quarter own a minicomputer, and only a few own a mainframe computer. There were sizeable differences in the costs of purchasing and operating these three classes of computers. However, there was no difference in terms of user satisfaction between the three classes of computer users. The results indicated that there is a substantial need for both customized software and for short-term training on how to use computers effectively in facilities. It was also found that the use and ownership of computers by facilities is likely to rise dramatically in the near future. Most of the facilities that will be acquiring a new computer system will be purchasing a microcomputer. (Author/KC)

Research Report

Research and Training Center

A NATIONAL SURVEY OF COMPUTER USE IN REHABILITATION FACILITIES

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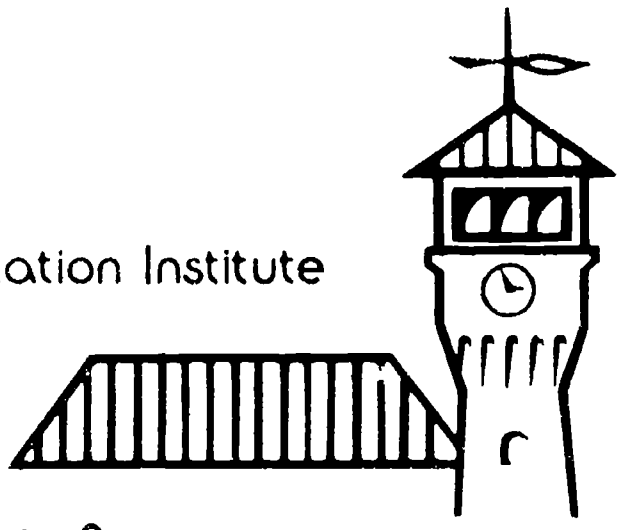

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The results indicated that there is a substantial need for both customized software and for short-term training on how to effectively utilize computers in facilities. It was also found that the use and ownership of computers by facilities is likely to rise dramatically in the near future. Most of the facilities which will be acquiring a new computer system will be purchasing a microcomputer.

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PREFACE

The Research and Training Center at the University of Wisconsin - Stout is one of several national centers funded by the National Institute of Handicapped Research to conduct research and training related to improving the lives and well being of handicapped people. Each of the centers has a unique focus. The Center at U.W. - Stout is the only one which addresses issues directly related to the role and function of vocational rehabilitation facilities. One of the primary areas of the Center is to conduct research and training designed to improve the rehabilitation services provided by rehabilitation facilities (e.g., vocational evaluation, work adjustment training, and placement). A second area is to conduct activities which will lead to the improvement of the economic viability of those facilities. The third area of research examines alternate models to the current vocational rehabilitation facility model.

This paper will present the findings from a recent research project which investigated a number of aspects of computer use. The project consisted of a two-phase survey of a substantial number of rehabilitation facilities in this country, however, the paper deals primarily with the results of the first phase of the study. Much of the information gathered in the second phase is contained in the National Directory of Rehabilitation Facilitities Using Computers (McCray & Blakemore, 1985). This project impacts equally on all of our research areas. It has implications for improving the economic viability of facilities since computers are potentially powerful tools for increasing productivity. The project also relates to the improvement of rehabilitation services provided by facilities in that computers could be used to increase both the efficiency and variety of services provided to handicapped people. Finally, it may suggest alternate models based on extensive use of computers.

INTRODUCTION

Since they first became commercially available some three decades ago, there has been a virtual explosion in the use of computers to enhance business and industrial operations. Today, computers are used in a wide variety of administrative applications including such things as accounting, budgeting, billing, payroll, and handling mailing lists. Computers are also used in a large number of industrial applications, such as, monitoring production lines, controlling machinery, and tracking inventory levels. It appears that computers can now be used to assist in virtually every area of business operations.

In the early stages of their development, computers were used almost exclusively by large businesses, universities, or government agencies. The great expense and difficulty in operating those machines prevented their use by smaller businesses such as rehabilitation facilities. Advances in technology in recent years have resulted in dramatic decreases in the cost of computers and increases in their use. Now, computer systems capable of handling the needs of small businesses are available at prices such businesses can afford.

There is a fairly sizeable and rapidly growing literature on the use of computers with the handicapped, but there has been relatively little written about the use of computers in rehabilitation facilities, per se. For example, Nave, Browning, and Carter (1983) published an annotated bibliography on the use of computers in rehabilitation and special education but only two articles of the 191 they reviewed dealt specifically with the use of computers in rehabilitation facilities. The West Virginia Research and Training Center

(Eighth Institute on Rehabilitation Issues, 1981) published a document about the use of computers in rehabilitation but that manuscript focused primarily on the use of computers by state vocational rehabilitation agencies. Growick (1983) also reviewed the uses of computers in rehabilitation but, again, the majority of the articles he examined were most relevant for state vocational rehabilitation agencies.

One of the few articles written specifically for facilities was a monograph by Cimler and Henderson (1979) which discussed a variety of potential uses of microcomputers in rehabilitation facilities including such areas as administration, personnel, rehabilitation services, and production. Pogorelc (1982) also discussed potential uses of computers in rehabilitation facilities and presented an outline of the steps to follow when purchasing a computer system. In addition, three other articles have discussed existing and potential uses of computers in the provision of rehabilitation services to the people being served within facilities. In the first of these, Cole (1983) described three programs he has developed for use with an inexpensive microcomputer to assist him in such activities as calculating client payroll and in monitoring staff and client activity. Crimando and Sawyer (1983) discussed a number of potential uses of computers in the provision of work adjustment services. These included computer assisted instruction, skill training, service planning, and client progress tracking. Finally, Spence, Woods, and Young (1984) described a computer package which they developed for use in Individualized Program Planning.

Two previous surveys of computer use in rehabilitation facilities have been conducted. Miller (1981) sent a brief questionaire to approximately 2400 facilities throughout the country. His instrument asked facility personnel if they used computers, and, if so, whether they owned or leased the

machine or used a service bureau (a company with a computer which provides data processing services for a fee). He found that about 51% of his 828 respondents were using a computer. The most frequent form of use was a service bureau which 58% of the users employed. Only 31% (135) of the users owned their computer, while 11% (47) leased them. Approximatly 12% (53) of the users had a microcomputer at that time. In a second study, Leicht (1982) used a more comprehensive questionnaire to survey 39 facilities in the state of Wisconsin. She found that the most prevalent use of computers was for administrative functions such as calculating the payroll, maintaining mailing lists, etc. She also found a great need for information concerning computer use in facilities. For instance, 80% of the respondents who were using computers desired information on useful commercially developed programs..

Leicht's findings point out that one of the themes which appears frequently in the literature dealing with the use of computers in rehabilitation facilities is that there is a great need for information about how to effectively and efficiently use them. Indeed, most of the papers cited above which deal with the use of computers in facilities (e.g., Cimler and Henderson, 1979; Pogorelc, 1982) were attempts to provide users and potential users with such information. In a similar vein, the survey discussed below was an attempt to gather and disseminate information on how to enhance the use of computers in rehabilitation facilities. The specific goals of the project were to: 1) identify the ways in which computers are currently being used in rehabilitation facilities and additional ways in which they could be used; 2) identify the information needs of facilities (e.g., books, articles, training, et .) that could enhance the ability of facilities to effectively use computers; 3) identify the various types of computer equipment and programs that are being used in facilities and the costs involved in

purchasing and operating such items; and 4) to develop a National Directory of Rehabilition Facilities Using Computers which could potentially serve as the basis of a user's network.

METHOD

The target audience of this survey included those facilities which offer any of a variety of (re)habilitation services to handicapped individuals. The majority of those facilities would be considered traditional not-for-profit rehabilitation facilities. Also included in the sample, however, were a number of schools, universities, and hospitals with rehabilitation programs. The questionnaire, included in Appendix A, was initially mailed to all 4181 facilities on the Research and Training Center's mailing list. There were 962 completed surveys in response to this first mailing and 600 "dead letters" returned by the Post Office as undeliverable. Three months after the initial mailing, a second mailing was sent to all facilities for which a completed survey or a dead letter had not been received. An additional 624 completed surveys were received from the second mailing, for a total of 1586 returns which equals a response rate of 44% of the 3581 facilities which received the questionnaire.

RESULTS AND DISCUSSION

The survey questions asked primarily about frequency of computer use but also asked for brand names and models of computers, the purchase costs of computer equipment and software, the costs of operating computers, the number of clients and employees in facilities, and the annual operating budgets of those facilities. The data analyses consisted of determining the frequencies of responses to various questions and the use of crosstabulations, chi-square tests, and analyses of variance where appropriate to determine whether group differences were statistically significant.

CHARACTERISTICS OF FACILITIES WHICH DO AND DO NOT USE COMPUTERS

Of the the 1586 facilities which responded to the survey, 864 (54%) are currently using computers, whereas 722 (46%) are not using them. Users may be timesharing, using a data processing bureau, or own or lease a computer(s). The percentage of users in this study (54%) was quite similar to the 51% that Miller (1981) found in his survey of users. It was surprising not to have seen a more substantial increase in the use of computers during the interval between the two studies, especially considering the increased availability of low cost microcomputers. As will be discussed below, however, there has been a dramatic increase in ownership (as opposed to lease/rental, etc.) of computers among users.

The relevant data were examined to determine how facilities that do (Users) and do not (Nonusers) have computers differ. The initial set of analyses examined the size of the facilities in terms of the number of clients served annually, the number of employees, and the annual budgets of the facilities. Table 1 presents a summary of the three analyses of variance

TABLE 1

Summaries of Analyses of Variance Comparing Computer Users and Nonusers on Number of Clients Served Annually, Number of Employees, and Size of Annual Budget

Source	Group Mean	df	Mean Squares	F	p
		Number of Clients			
Between		1	110,641,551	27.71	<.001
Users	1225				
Nonusers	614				
Within		1205	3,992,838		
		Number of Employees			
Between		1	3,121,645	79.23	<.001
Users	154				
Nonusers	51				
Within		1205	39,397		
		Annual Budget			
Between		1	882,109,816	133.39	<.001
Users	$2,820,495				
Nonusers	$1,096,821				
Within		1205	6,613,013		

which were calculated to compare the user and nonuser groups on these variables.

As can be seen from examining Table 1, there is a very substantial and statistically significant difference between users and nonusers on each of the three measures of facility size. Facilities which use computers serve, on the average, twice as many clients annually, have three times as many employees, and have annual budgets which are almost three times as large as do facilities which do not use computers.

A second set of analyses was calculated to determine whether the users and nonusers differ in the type of services they provide. Table 2 presents the percentages of each group which provide various services and the results of Chi Square (χ^2) tests that were performed on these data to determine whether any differences are significant. As is evident, significantly more of the Users provide each of the services listed in the table than do the Nonusers. The results of this set of analyses, taken in conjunction with the findings of the analyses listed in Table 1, indicate that it is the larger, more affluent and comprehensive facilities which are currently using computers.

ANALYSES OF FACILITIES WHICH CURRENTLY USE COMPUTERS

One of the primary interests of this survey related to how computers are currently being used in rehabilitation facilities in three areas: administration, production, and rehabilitation services. Table 3 presents the percentages of current users employing computers to perform various functions in each of these broad areas. As is evident from reading the table, the heaviest uses of computers by facilities at this time is for various administrative purposes. The most heavily used of these is accounting (70%), with bookkeeping and staff payroll used by more than 60%

TABLE 2

Chi Square Analyses of Frequency of Rehabilitation Services Between Users and Nonusers

Rehabilitation Service	N(%) of Users	N(%) of Nonusers	Chi Square	p
Vocational/Work Evaluation	613(71)	501(58)	27.99	<.001
Psychological Testing	493(57)	213(30)	10.83	< 001
Personal/Social Adjustment	624(72)	412(57)	40.34	<.001
Work Adjustment Training	604(70)	415(58)	26.79	<.001
Occupational Skill Training	497(58)	242(34)	91.53	<.001
On-The-Job Training	476(55)	283(39)	39.82	<.001
Job-Seeking-Skills Training	554(64)	357(49)	34.99	<.001
Job Placement Services	548(63)	336(47)	45.47	<.001
Sheltered Employment	488(57)	340(47)	13.89	<.001
Work Activities	541(63)	386(54)	13.57	<.001
Independent Living Training	487(56)	307(43)	30.16	<.001
Daily Living Skills Training	566(66)	369(51)	30.16	<.001
Recreation	498(58)	324(45)	25.92	<.001
Medical Services	401(46)	179(25)	79.92	<.001
Residential	334(39)	171(24)	40.84	<.001

TABLE 3

Current Computer Use in Administrative, Production, and Rehabilitation Services Applications

ADMINISTRATIVE Application	%	PRODUCTION Application	%	REHABILITATION SERVICES Application	%
Accounting	70%*	Production Control	12%	Assessment (Vocational Evaluation, Psychological Testing, etc.)	25%
Bookkeeping	64%	Production Scheduling	10%		
Word Processing	50%	Inventory	26%	Adjustment (Personal, Social, Work)	13%
Mailing Lists	53%	Motion-Time Study	6%		
Spreadsheets (Business Projections)	38%	Contract Bidding	9%	Residential	10%
		Cost Control	22%	Independent Living Training	9%
Staff Payroll	61%			Job Seeking Skill Training	16%
Client Payroll	48%	Production Records/Reports	31%		
		Other	4%	Other	11%
Program Evaluation	34%				
Other	21%				

* Percentage of current Users employing computers for this application.

of the facilities. The use of spreadsheets and program evaluation were the least often cited Administrative functions (38% and 34%, respectively). These data suggest that most of the facilities tend to use computers for more than one Administrative function.

The percentage of use of computers for Production functions is considerably lower than for Administrative ones. The most heavily used function in this category was Production Record Keeping/Reporting which is used by 31% of the facilities, followed by Inventory (26%) and Cost Control (22%). Computers were used for the remaining Production functions by 12% or less of the facilities.

The most frequent use of computers for providing Rehabilitation Services is for Assessment (25%), which includes both Vocational and Psychological Assessment. Use of computers for Personal, Social, or Work Adjustment, Residential Programs, Independent Living Training, and Job Skill Training ranges from 9% to 16%. Thus, the use of computers for production and rehabilitation functions is much less widespread than for administrative functions.

TYPES OF COMPUTERS IN USE

Another set of analyses examined information related to the types of computers facilities currently use. The first of these examined which class of computer - microcomputer, minicomputer, or main frame computer - they use. For the purposes of this study, microcomputers (sometimes called " personal computers") are the most inexpensive and least powerful of the three classes of computers in terms of memory and size. They typically are single user machines, although some can handle a limited number of users simultaneously. A minicomputer is normally capable of handling several users simultaneously and is considerably faster and has more memory capacity

than a microcomputer. The most expensive and powerful class of computers are "main frames" which are faster and have considerably more memory than the other classes. Table 4 presents the percentages of current users that either own or lease computers in each of the three categories just mentioned. As can be seen, almost half of the users own a microcomputer, whereas about one quarter own a minicomputer and very few own a main frame computer. In addition, 19% of the facilities which use computers stated that they use timesharing and 38% use a service bureau arrangement. With timesharing one rents time on someone elses computer ,whereas, with a service bureau one typically pays someone else to perform one's data processing activities.

There appears to have been a dramatic increase in the number of facilities which own computers, particularly microcomputers, compared to two and one half years ago when Miller (1981) conducted his survey. The data presented in Table 5 on page 13 illustrate the changes in the patterns of computer use since 1981. Miller found that only 31% of the users owned a computer whereas 66% of the users in the current study own at least one. He also found that 58% of his users employed a service bureau or timesharing service while only 48% of the users in the present study relied on such an arrangement. Most importantly, only 12% of Miller's users had a microcomputer. This is in sharp contrast to the present study which found that 47% of the users have one.

Users were also asked to list the brands and models of their computers. There were over 90 separate brands or models listed among the returns. The twenty most frequently cited models and the number of facilities using them are listed in Table 6. It can be seen that the Apple II is the most frequently cited computer, followed by the Radio Shack

TABLE 4

Percentages of Facilities Which Own or Lease
a Microcomputer, Minicomputer, or a Main Frame Computer

Type of Computer	Own	Lease
Microcomputer	47%	7%
Minicomputer	23%	7%
Main Frame	7%	14%

Table 5

Comparison of Computer Use and Ownership in Facilities - 1981 versus 1983/1984

Type of Use/Ownership	Miller's 1981 Findings	Current Findings 1983/84
Facilities owning computer of any type (micros, minis, main frames)	31%	66%
Facilities using Service Bureau/Time Share	58%	48%
Microcomputer owners	12%	47%

TABLE 6

The Brand and Model of the Computers Most Frequently Used in Rehabilitation Facilities and the Number of Facilities Using Them

Computer Brand/Model	# of Users
Apple II	224
Radio Shack (all models)	138
IBM Personal Computer	78
IBM System 34/38	67
IBM 360/370	52
ADP 1750	29
Digital Equipment PDP 11	23
Commodore 64	21
Burroughs	21
Datapoint	18
Hewlett Packard 3000	16
Texas Instruments	15
Compaq	15
Wang	14
Qantel System 20	12
Televideo	11
Altair 8800	11
Franklin Ace	10
Basic IV	10
Vector 3	9

(several microcomputer models) and the IBM Personal Computer. The fourth and fifth most frequently cited models are the IBM System 34, which is a minicomputer and the IBM 360, which is a main frame computer.

Approximately 52% of the respondents that own a computer have only one computer, 23% have two computers, and the remainder have more than two computers. Five percent of the respondents indicated that they have nine or more computers. The vast majority of the latter group are educational institutions.

COSTS OF COMPUTER PURCHASE AND OPERATION

A number of questions were asked which related to the costs of purchasing and operating a computer system. The facilities were asked for the total hardware, software (programs), and annual operating expenses for their computer systems. The hardware costs include peripheral devices such as printers, monitors, modems, etc. The costs for annual operating expenses include personnel costs. Separate analyses were conducted for facilities which have only microcomputers, only minicomputers, only a main frame computer, and for those with either timesharing or a service bureau only. This enabled a comparison of the relative costs of each class of computer system and of using timesharing or a service bureau. Table 7 presents the means for the hardware and software purchasing costs and the annual operating costs. As can be seen, there are sizeable differences in the costs of the different classes of computer systems. As the size and power of the machines go up, the costs also increase dramatically. One reason for the greater expense of using minicomputers and main frame computers is that a computer specialist is needed to run these systems thus adding considerable expense to their operation. It can also be seen in the table that the purchase costs for timeshare/service bureau users are comparable to those of

TABLE 7

Mean Costs of Hardware, Software, and Annual Operating Expenses for Users of Microcomputers, Minicomputers, and Main Frame Computers and Timeshare/Service Bureau Users

Type of Computer Use	N	Type of Expense		
		Hardware Cost	Software Cost	Operating Cost/Year
Microcomputers	231	$15,379	$2,304	$8,683
Minicomputers	86	$61,021	$11,137	$16,320
Main Frame	15	$453,283	$106,966	$191,214
Timeshare/Service Bureau	134	$14,667	$5,694	$14,515

microcomputer users whereas the operating expenses are more similar to those of minicomputer users.

Further comparisons were made between facilities which use either Timesharing/Service Bureau arrangements and those which Own or Lease a computer. There were 134 facilities using only Timesharing/Service Bureau and 448 facilities which either owned or leased one computer. Facilities which have a combination of these arrangements were excluded from these analyses.

There were some interesting differences found between these two groups. First, there were significant differences in the way these groups use computers as can be seen in Table 8. It can be noted that for 12 of the 18 uses listed in the table, the Own/Lease group has a higher percentage of useage of computers. In only two instances, Staff Payroll and Client Payroll, did the Timeshare/Service Bureau group have a significantly higher percentage of useage. Note that there are some very sizeable differences between these groups in the extent of useage of computers for various functions (e.g., Word Processing, Spreadsheets). These findings seem to suggest that Timesharing and Service Bureau arrangements have 1) more limited services to offer, and 2) that they tend to specialize in handling payrolls.

Another finding of interest was that the Timesharing/Service Bureau group has a significantly smaller percentage of facilities in which an employee has developed a computer program for use in the facility. This, no doubt, reflects the fact that the agency from which timesharing/service bureau services are purchased would normally be responsible for program development for their customers, particularly in the case of service bureaus.

TABLE 8

Chi Square Analyses of Frequency of Rehabilitation Services Between Facilities Which Either Own/Lease a Computer Versus Those With a Timeshare/Service Bureau Arrangement

Computer Application	N(%) Own/Lease	N(%) Timeshare/ Serv Bureau	χ^2	p
Administrative Uses				
Accounting	309(69%)	86(64%)	.99	>.05
Bookkeeping	282(63%)	72(54%)	4.18	<.05
Word Processing	228(51%)	25(19%)	44.46	<.001
Mailing Lists	246(55%)	34(30%)	26.38	<.001
Spreadsheets	166(37%)	19(14%)	25.31	<.001
Staff Payroll	246(55%)	105(78%)	22.17	<.001
Client Payroll	211(47%)	88(66%)	14.59	<.001
Program Evaluation	148(33%)	23(17%)	12.88	<.001
Production Uses				
Production Control	63(14%)	12(9%)	2.04	>.05
Production Scheduling	45(10%)	7(5%)	3.76	>.05
Inventory	130(29%)	17(13%)	14.57	<.001
Motion-time Study	36(8%)	4(3%)	3.58	>.05
Contract Bidding	45(10%)	4(3%)	6.67	<.05
Cost Control	99(22%)	21(16%)	2.02	>.05
Production Records/ Reports	148(33%)	38(28%)	.85	>.05
Rehabilitation Services Uses				
Assessment (Vocational/ Psychological)	112(25%)	9(7%)	.18	>.05
Adjustment(Personal/ Social)	63(14%)	5(4%)	10.67	<.001
Independent Living Training	40(9%)	8(6%)	1.04	>.05
Job Skill Training	72(16%)	8(6%)	8.89	<.01

TRAINING NEEDS OF FACILITIES

A number of analyses were performed to determine the training and software needs of current computer users. Table 9 lists the training needs of all current users and those needs broken down by class of computer (e.g., microcomputer, etc.). For the latter analyses, only facilities which have only one class of computer were included. As can be seen by examining the column for all users, the most frequently cited need was for training programs dealing with computer uses and applications, followed by programs on computer system management, then computer programming, and finally, computer selection. The same order of training needs held for the microcomputer and main frame users also. For minicomputer users, however, the need for training in computer system management was slightly higher than for training in the uses and applications of computers. The only significant difference found between the three groups was that a smaller proportion of minicomputer users had a need for training in computer uses and applications than did either the microcomputer or main frame computer users.

Some additional analyses concerning the training and information needs of facilities using computers were also examined. Sixty seven percent of all current users indicated a need for a rehabilitation facility computer user's network for the exchange of information about computer use. Sixty six percent also see a need for an introductory level handbook on the use of computers in rehabilitation. The respondents were also asked to rank the importance of various computer related information needs. The results indicated that the highest priority need for facilities was for customized software programs tailored to the needs of rehabilitation facilities, followed by the need for short term training, then an introductory handbook, and, finally, a computer user's network.

TABLE 9

Frequencies of All Users and Those With Only Microcomputers, Minicomputers, or Main Frame Computers Indicating a Need for Short-Term Training

Type of Training Needs	Type of Users N(%) Micro-computer	N(%) Mini-computers	N(%) Main Frame Computers	N(%) All Users
Computer Selection	60(26%)	21(24%)	5(32%)	268(31%)
Computer Uses/ Applications	169(73%)	50(58%)	11(74%)	570(66%)
Computer Pro-gramming	134(58%)	45(52%)	8(53%)	467(54%)
Computer System Management	148(64%)	52(60%)	9(63%)	553(62%)

Two other training related questions addressed the need for short term training programs on computer use by rehabilitation facilities. In response to the first of these, 50% of the respondents indicated that the training programs in their locale were adequate for meeting their training needs. For the second question, 65% of the respondents indicated that they would be willing to send staff to short term training sessions on computer use in rehabilitation.

Comparisons of facilities which own/lease a computer versus those with a timeshare/service bureau arrangement indicated that the latter group had a significantly higher percentage of facilities indicating a need for training in computer selection and computer applications (both χ^2s > 6.41, $p < .02$). This group also perceived a greater need for software customized for Administrative purposes ($\chi^2 = 3.94$, $p < .05$) and for Production uses ($\chi^2 = 11.31$, $p < .01$). The latter finding seems quite consistent with the information in Table 8 indicating that facilities which use timesharing or service bureau arrangements perform fewer computer functions than other facilities using computers. These findings suggest that timesharing services and service bureaus are much less likely to have specialized computer programs which meet the unique needs of rehabilitation facilities. This is certainly not to suggest that such services are inadequate, however, since substantial numbers of these facilities do use computers for many of the functions listed in Table 8.

SOFTWARE NEEDS OF FACILITIES

The need for software written specifically for rehabilitation facilities was also examined. The results of those analyses are presented in Table 10 for all users and are also broken down by the class of computer the facility uses. The most frequently cited need for customized software

TABLE 10

Percentages of All Facilities and Those Using Only Microcomputers, Minicomputers, or Main Frame Computers Indicating a Need for Customized Software

Type of Software Needed	Micro-computers	Mini-computers	Main Frame Computers	All Users
Administrative Uses	72%	64%	74%	66%
Production Uses	59%	61%	32%	58%
Rehabilitation Services Uses	73%	77%	79%	70%
Residential Program Uses	41%	37%	37%	40%

was in the area of rehabilitation services uses (e.g., in evaluation, placement, etc.), followed by the need for administrative programs, production programs, and, finally, software for residential programs. The only difference between the facilities which have different classes of computers is that significantly fewer main frame users perceive a need for software customized for use in production ($\chi^2 = 6.03$, $p < .05$). This may be because the main frame users were less likely to have a production component.

BACKGROUND INFORMATION ABOUT FACILITY COMPUTER USE

The next series of analyses examined a number of questions related to the "history", so to speak, of computer use in each facility. These included questions seeking to determine if the facility has had any customized software written, the usefulness of computers for various purposes, and any problems the users may have encountered in the use of computers. Comparisons of facilities using only microcomputers, only minicomputers, or only main frame computers were made because it was felt that the type of computer system a facility has might influence these factors.

It was found that significantly fewer facilities which have only microcomputers used a consultant when either purchasing or using their system (35% vs 50% vs 53% for microcomputers, minicomputers, and main frame computers, respectively). Conversely, facilities with only microcomputers were more likely to use volunteers in the selection and running of their systems (39% vs 30% vs 16%, respectively).

Table 11 presents the percentage of microcomputer, minicomputer, and main frame users who had either employees or nonemployees develop computer programs for administrative, production, rehabilitation services, or

TABLE 11

Percentages of Facilities With Micro-, Mini-, and Main Frame Computers Which Had Employees or Nonemployees Develop Custom Programs

Type of Program	Type of Computer System					
	Micro		Mini		Main Frame	
	Employee	Nonemployee	Employee	Nonemployee	Employee	Nonemployee
Administrative	31%	27%	35%	55%	47%	37%
Production	13%	13%	19%	38%	21%	26%
Rehab Services	20%	13%	19%	23%	21%	21%
Residential	6%	5%	10%	12%	5%	11%

residential uses. As can be seen, the facilities with only main frames were more likely to have an employee develop a computer program for administrative uses. Microcomputer users were significantly less likely to have an employee develop a program for Production uses. Microcomputer users were also less likely to have had an outside programmer develop programs for administrative, production, rehabilitation services, and residential program purposes. It seems likely that this was because of the expense involved in hiring someone to develop such programs.

The usefulness of computers in several areas was rated by current users. As can be seen in Table 12, the most highly rated use of computers was for administrative functions, followed by clerical functions, rehabilitation services, production, and program evaluation. The lowest rated use of computers was for residential program functions. As noted above, the latter is an area in which computers are used by only a relatively small percentage of facilities at present. Comparisons of micro-, mini-, and main frame computer users indicated a difference in the ratings of usefulness for only rehabilitation service functions. Minicomputer users rated computer use for rehabilitation services significantly lower than did microcomputer and main frame users. It is not clear why this latter finding is so. What was surprising about the overall findings was that in no instance were microcomputers rated significantly less satisfactory than either mini- or main frame computers.

PROBLEMS RELATED TO COMPUTER USE

A further set of analyses examined the problems the users have experienced with their systems. For these analyses, users with the three classes of computers were again compared. Table 13 presents data concerning all users and those having only a microcomputer, minicomputer, or main frame

TABLE 12

Mean Ratings of the Usefulness of Computers for Various Functions

Type of Program	Mean Usefulness Microcomputer (N=231)	Minicomputer (N=86)	Main Frame (N=15)	All Users (N=864)
Administrative	3.83*	4.01	4.06	3.94
Production	3.24	3.52	3.56	3.52
Rehab Services	3.75	3.22	3.78	3.54
Clerical	3.73	3.80	3.85	3.78
Program Evaluation	3.28	3.36	3.67	3.46
Residential	3.04	3.10	3.61	3.18

* Items were rated on a scale of 1 (little usefulness) to 5 (extremely useful)

TABLE 13

Percentages of All Users and Those With Only Micro-, Mini- or Main Frame Computers Experiencing Various Computer Related Problems

Type of Problem	Type of Computer User: Microcomputer	Minicomputer	Main Frame	All Users
Lack of adequate software	53%	48%	32%	45%
Inadequate training	50%	31%	11%	37%
Lack of support from computer vendor	24%	20%	5%	20%
Equipment breakdowns	19%	15%	16%	17%
Took a long time to become proficient	37%	27%	21%	28%
System is too limited to meet needs	30%	21%	21%	27%
Cost of software is unexpectedly high	25%	35%	21%	25%
Cost of peripherals is unexpectedly high	24%	22%	21%	16%
Maintenance costs are very high	10%	26%	11%	16%

computer. As can be seen by examining the column for all users, the most frequently cited computer related problem concerned a lack of adequate software. The next most frequently cited problem concerned a lack of adequate training. Interestingly, equipment breakdowns and high maintenance costs were the least often cited problems. A number of comparisons between micro-, mini-, and main frame computer users were significant. Main frame users were signficantly less likely to cite a lack of adequate software or a lack of adequate support from the vendor as problems. Microcomputer users were more likely to cite a lack of adequate training, excessively long training times, and system limitations as problems. Minicomputer users were significantly more likely to cite high software and maintenance costs as problems. In general, main frame users had a lower frequency of problems than the others. The overall findings suggest that most of the problems encountered by the computer users concern a lack of good software, difficulty in training people to use computers, and with hidden or unexpected costs.

Another set of analyses examined the types of computer related problems experienced by facilities which use Timesharing/Service Bureau arrangements as opposed to computer Owners/Leasers. As can be seen in Table 14, in seven of the eight areas a significantly smaller percentage of facilities using timeshare/service bureau arrangements indicated that they had problems. The two groups were comparable only in indicating that their systems were too limited. The finding that facilities which use timesharing/service bureau arrangements experience significantly fewer computer related problems is interesting because it highlights an advantage of this form of computer use. This seems to offset the disadvantage of this form of computer use involving an apparent lack of software suitable for use by rehabilitation facilities.

TABLE 14

Chi Square Analyses Comparing Frequency of Computer Related Problems Experienced by Facilities Which Own/Lease a Computer Versus Those Which Have a Timeshare/Service Bureau Arrangement

Problem with Computer System	N (%) Own/Lease	N (%) Timeshare/ Serv Bureau	χ^2	p
Lack of Adequate Software	206(46%)	43(32%)	8.13	<.01
Inadequate Training	170(38%)	29(22%)	12.18	<.001
Lack of Vendor Support	90(20%)	16(12%)	4.59	<.05
Equipment Breakdowns	85(19%)	7(5%)	15.72	<.001
Took a very long time to learn system	134(30%)	21(16%)	10.12	<.01
System is too limited for needs	112(25%)	34(25%)	.06	>.05
Software is unexpectedly expensive	130(29%)	19(14%)	12.23	<.001
Peripheral equipment is unexpectedly expensive	112(25%)	13(10%)	13.65	<.001
Maintenance costs are very high	81(18%)	11(8%)	8.24	<.01

COMPARISONS OF FACILITIES WITH AND WITHOUT SHELTERED EMPLOYMENT SERVICES

A series of analyses compared the extent and type of computer use by facilities which offer sheltered employment services and those without such services. Of the 1586 facilities which responded to the survey, 828 (52%) have sheltered employment services and 758 (48%) do not. As was indicated in Table 2, those facilities with sheltered employment are more likely to have a computer than ones without such services (59% vs 50%). It was assumed that such facilities would also differ in the way in which they use computers, particularly in terms of production uses.

There are 488 facilities in the sample of computer users that offer sheltered employment services and 374 which do not. The group without sheltered employment was found to have spent significantly more for both the purchase costs ($54,970 vs $29,539, $F = 9.65$, $p < .01$) and annual operating expenses ($19,927 vs $12,570, $F = 14.64$, $p < .01$) of their computer systems. The groups did not differ in terms of the cost of software, however. These groups also differ in the number of clients they serve annually (895 for those with sheltered employment versus 1337 for those without; $F = 8.37$, $p < .01$) but not in terms of the number of employees in the facility or in the size of the annual operating budget.

A series of Chi-Square tests compared facilities with and without sheltered employment on how they use computers. Table 15 shows the results of those comparisons. As can be seen, those facilities with sheltered employment use computers for accounting and bookkeeping to a greater extent than those without. More of the facilities with sheltered employment also use computers to perform their payroll functions. As expected, significantly more of the facilities with a sheltered employment component use computers for Production functions (Production Control, Contract Bidding, Cost Control, and Production

TABLE 15

Chi Square Analyses Comparing Frequency of Computer Use for Various Applications By Facilities Which Do and Do Not Provide Sheltered Employment Services

Computer Application	N (%) with Sheltered Employment	N (%) w/o Sheltered Employment	χ^2	p
Administrative Uses				
Accounting	361(74%)	248(66%)	5.85	<.05
Bookkeeping	337(69%)	218(58%)	11.55	<.01
Word Processing	234(48%)	196(52%)	2.59	>.05
Mailing Lists	249(51%)	211(56%)	1.31	>.05
Spreadsheets	195(40%)	128(34%)	2.66	>.05
Staff Payroll	332(68%)	196(52%)	22.79	<.001
Client Payroll	322(66%)	90(24%)	148.33	<.001
Program Evaluation	161(33%)	135(36%)	.45	>.05
Production Uses				
Production Control	73(15%)	34(9%)	6.15	<.02
Production Scheduling	44(9%)	38(10%)	.01	>.05
Inventory	127(26%)	98(26%)	.02	>.05
Motion-time Study	34(7%)	19(5%)	1.42	>.05
Contract Bidding	59(12%)	19(5%)	10.81	<.01
Cost Control	132(27%)	64(17%)	12.08	<.01
Production Records/ Reports	181(37%)	83(22%)	21.04	<.001
Rehabilitation Services Uses				
Assessment (Vocational/ Psychological)	107(22%)	105(28%)	3.27	>.05
Adjustment(Personal/ Social)	68(14%)	41(11%)	.66	>.05
Independent Living Training	44(9%)	38(10%)	1.31	>.05
Job Skill Training	78(16%)	60(16%)	1.60	>.01

Reporting) than do the other facilities. This was expected because facilities which offer sheltered employment have a need to perform various production tasks that facilities without a production component do not have. The same is true for the Client Payroll function. These two groups do not significantly differ in the number of facilities using computers for Rehabilitation Services.

The class of computer that these two groups use was examined. It was found that the facilities which offer sheltered employment are significantly less likely to own a microcomputer (39% vs. 57%; $\chi^2 = 26.92$, $p < .001$) or a main frame computer (10% vs. 5%; $\chi^2 = 7.34$, $p < .01$), and are less likely to use a timesharing arrangement (16% vs 23%; $\chi^2 = 7.01$, $p < .05$).

Comparisons of the training and information needs of facilities with and without sheltered employment were also made. It was found that more facilities with sheltered employment perceive a need for training in computer system management (66% vs 55%; $\chi^2 = 10.14$, $p < .01$) and see a need for customized software for administrative uses (71% vs 60%, $\chi^2 = 10.16$, $p < .01$), production uses (71% vs 40%; $\chi^2 = 81.83$, $p < .001$), rehabilitation services uses (76% vs 63%, $\chi^2 = 17.82$, $p < .01$), and for residential program uses (44% vs 33%, $\chi^2 = 9.22$, $p < .05$). The facilities with sheltered employment programs also indicated a greater willingness to send staff to short term training programs (71% vs 57%; $\chi^2 = 16.42$, $p < .001$).

Facilities with sheltered employment services also have a higher incidence of having specialized programs written for them (for Production, Rehabilitation Services, and Residential Programs (all χ^2's > 6.5, $p < .02$) by programmers who are not employed by them. This information, in conjunction with the finding that the annual operating expenditures are significantly less than for facilities without sheltered employment, probably indicates that

sheltered facilities are less likely to employ computer programmers. Analyses of the computer related problems encountered by these two groups indicated that in only one area was there a difference. The group offering sheltered employment had a significantly smaller number of facilities which indicated that it took a very long time for staff to become proficient with their computer system. Only 24% of those facilities indicated that this was a problem, whereas 31% of the facilities without sheltered employment did. This may be due to the fact that the facilities without sheltered employment are less likely to use microcomputers. Such facilities may be less likely to either spend money for training or to receive training from the vendor as part of a purchasing agreement.

The final set of analyses comparing these two groups examined the types of services they offer. The results of those analyses are presented in Table 16, which includes the percentages of the facilities, with and without sheltered employment, providing each type of service and the results of Chi-Square tests comparing the groups. As can be seen, in only two areas (Psychological Testing & Medical Services) are the two groups comparable. For all other items, the group which provides sheltered employment has a significantly higher percentage of facilities which provide the service.

COMPARISONS OF FACILITIES WITH AND WITHOUT MEDICAL SERVICES

A series of analyses also examined differences in computer use between facilities which offer any type of medical services (Medical facilities) and those which do not offer those services (Nonmedical facilities). Of the 1586 facilities which responded to the survey, 37% offer medical services and the remaining 63% do not. Among the Medical facilities, 69% use computers, whereas, among Nonmedical facilities only 46% use computers (= 79.92, p < .001). Almost half of the computer users offer medical services

TABLE 16

Chi Square Analyses Comparing Facilities Which Do and Do Not Provide Sheltered Employment on the Frequency With Which They Provide Other Rehabilitation Services

Rehabilitation Service	N (%) with Sheltered Employment	N (%) w/o Sheltered Employment	Chi Square	p
Vocational/Work Evaluation	410(84)	207(55)	87.74	<.001
Psychological Testing	278(57)	214(57)	1.36	>.05
Personal/Social Adjustment	400(82)	226(60)	49.28	<.001
Work Adjustment Training	444(91)	162(43)	232.32	<.001
Occupational Skill Training	346(71)	150(40)	85.28	<.001
On-The-Job Training	346(71)	132(35)	110.36	<.001
Job-Seeking-Skills Training	381(78)	173(46)	95.39	<.001
Job Placement Services	395(81)	154(41)	144.87	<.001
Work Activities	420(86)	124(33)	249.79	<.001
Independent Living Training	317(65)	173(46)	32.08	<.001
Daily Living Skills Training	361(74)	207(55)	32.98	<.001
Recreation	307(63)	192(51)	14.76	<.01
Medical	220(45)	180(48)	4.05	>.05
Residential	220(45)	113(30)	20.56	<.001

whereas only 25% of the nonusers have such services.

The first set of analyses comparing these groups, which can be seen in Table 17, compared the size of these groups on a number of dimensions. As was surmised, medical facilities serve over twice as many clients yearly, average over four times as many employees and have annual budgets almost four times as large as do nonmedical facilities. Medical facilities also spend significantly more money on the purchase (both hardware and software) and operation of computer systems as can be seen in Table 18. The results of analyses of variance used to examine these data indicated that these differences were all statistically signficant (all $Fs > 5.29$, $p < .05$).

Chi-square tests were used to determine whether these groups differ in the way they use computers. The results of those analyses are presented in Table 19. As can be seen, fewer Medical facilities use computers for Client Payroll functions, but more of them use computers for Accounting, Word Processing, Inventory, and a number of Rehabilitation Services (Personal/Social Adjustment, Independent Living Training, Job Skill Training). Overall, the differences in the way these groups use computers are relatively small.

Further chi-square analyses revealed a variety of other significant differences between these two groups. For instance, it was found that more medical facilities own minicomputers (28% vs 20%) and main frame computers (9% vs 5%) than nonmedical facilities. Analyses of software and training needs revealed that fewer medical facilities indicate a need for customized software for client payroll (52% vs 63%) but more of them need software for residential programs (45% vs 34%). The medical facilities are also more favorable to local computer training opportunities (54% vs 47%) and are more willing to send staff to short term training programs (69% vs 61%). Medical

TABLE 17

Summaries of Analyses of Variance Comparing Medical and Nonmedical Facilities on Number of Clients Served Annually, Number of Employees, and Size of Annual Budget

Source	Group Mean	df	Mean Squares	F	p
		Number of Clients			
Between		1	124,460,816	23.04	<.001
Medical	1791				
Nonmedical	946				
Within		739	5,401,945		
		Number of Employees			
Between		1	8,481,620	160.04	<.001
Medical	266				
Nonmedical	59				
Within		794	52,995		
		Annual Budget			
Between		1	917,412,489,350	120.04	<.001
Medical	$3,329,376				
Nonusers	$1,261,077				
Within		1205	7,642,556,559		

TABLE 18

Mean Costs of Hardware, Software, and Annual Operating Expenses for Medical and Nonmedical Facilities

Type of Facility	N	Type of Expense		
		Hardware Cost	Software Cost	Annual Operating Cost
Medical	587	$85,271	$5,070	$32,314
Nonmedical	999	$37,802	$4,280	$16,266

TABLE 19

Chi Square Analyses Comparing Frequency of Computer Use For Different Applications by Medical and Nonmedical Facilities

Computer Application	Medical Facility	Nonmedical Facility	χ^2	p
Administrative Uses				
Accounting	434(74%)	669(67%)	4.82	<.05
Bookkeeping	393(67%)	619(62%)	2.97	>.05
Word Processing	323(55%)	460(46%)	7.25	<.01
Mailing Lists	329(56%)	509(51%)	1.86	>.05
Spreadsheets	229(39%)	360(36%)	.91	>.05
Staff Payroll	364(62%)	599(60%)	.60	>.05
Client Payroll	235(40%)	549(55%)	19.24	<.001
Program Evaluation	211(36%)	330(33%)	.47	>.05
Production Uses				
Production Control	59(10%)	140(14%)	2.44	>.05
Production Scheduling	65(11%)	90(9%)	.81	>.05
Inventory	170(29%)	230(23%)	4.29	<.05
Motion-time Study	29(5%)	70(7%)	1.81	>.05
Contract Bidding	47(8%)	100(10%)	.47	>.05
Cost Control	135(23%)	220(22%)	.13	>.05
Production Records/ Reports	170(29%)	320(32%)	1.17	>.05
Rehabilitation Services Uses				
Assessment (Vocational/ Psychological)	158(27%)	230(23%)	2.00	>.05
Adjustment(Personal/ Social)	88(15%)	100(10%)	4.05	<.05
Independent Living Training	70(12%)	70(7%)	4.26	<.05
Job Skill Training	117(20%)	130(13%)	7.19	<.01

facilities are also more likely to have employed a consultant to assist in the development of their computer system (43% vs 36%). Finally, medical facilities are more likely to have had an employee develop software for them in administrative, rehabilitation services, and residential programs. This finding, coupled with the finding that medical facilities spend over twice as much money on annual operating expenses, probably indicates that medical facilities are more likely to employ their own computer programmers.

The final set of analyses comparing these groups examined the types of services they provide. As can be seen in Table 20, there are a number of differences between the groups in the types of services they offer. For 11 of the 14 services listed in the table, a significantly higher percentage of medical facilities provide the service than do nonmedical facilities. In no instance is the reverse true.

ANALYSES OF FACILITIES WHICH CURRENTLY DO NOT USE COMPUTERS

One of the principle questions of interest concerning the 722 Nonusers that responded to the questionnaire was whether they planned to purchase a computer within the next 18 months. It was assumed that any facility that did not intend to purchase a computer within that time frame was probably not serious about purchasing one. In response to that question, 27% stated that they would definitely purchase a computer within the next 18 months, 43% said they may purchase one, and 24% stated that they definitely would not purchase one. The latter group was asked why they would not be purchasing a computer. A summary of their responses are presented in Table 21. As can be seen, the lack of financial resources is the primary reason that this group will not be purchasing a computer within the next 18 months. Only 15% of the respondents indicated that they are not convinced that computers could benefit their facility.

TABLE 20

Chi Square Analyses of Frequency of Rehabilitation Services Provided by Medical and Nonmedical Facilities

Rehabilitation Service	N (%) of Medical	N (%) of Nonmedical	Chi Square	p
Vocational/Work Evaluation	446(76)	679(68)	7.19	<.05
Psychological Testing	470(80)	380(38)	152.40	<.001
Personal/Social Adjustment	505(86)	609(61)	69.19	<.001
Work Adjustment Training	434(74)	669(67)	4.81	<.05
Occupational Skill Training	399(68)	490(49)	32.99	<.001
On-The-Job Training	352(60)	509(51)	7.97	<.05
Job-Seeking-Skills Training	382(65)	639(64)	1.05	>.05
Job Placement Services	376(64)	629(63)	.05	>.05
Sheltered Employment	317(54)	589(59)	1.72	>.05
Work Activities	399(68)	579(58)	9.51	<.05
Independent Living Training	434(74)	410(41)	92.83	<.001
Daily Living Skills Training	493(84)	500(50)	104.84	<.001
Recreation	458(78)	400(40)	127.99	<.001
Residential	317(54)	250(25)	73.40	<.001

TABLE 21

Reasons Why Facilities May Not or Will Not Be Purchasing A Computer Within Next 18 Months

Reason For Not Purchasing	% of Facilities
Lack of financial resources	71%
Lack of Experienced Personnel	35%
Not Convinced of Benefits	15%
Insufficient Knowledge of Computers	31%
Other	11%

The facilities which stated that they either would (the " Yes" group) or might (the "Maybe" group) be purchasing a computer within the next 18 months were asked to indicate how they planned to use these machines. The responses, which can be seen in Table 22, were very similar to those of current computer users. The heaviest use is anticipated to be for administrative functions with considerably less use expected for production and rehabilitation services. These groups were largely comparable in how they plan to use computers except that significantly more of the Yes group indicated that they will use them for word processing (65% vs 52%) and spreadsheet (52% vs 41%) functions.

These groups were also asked to indicate how much they anticipated spending for computer hardware, software, training, and consulting services. These data are presented in Table 23. Only facilities which actually included estimates of their anticipated expenditures were included in these analyses. As can be seen, the amounts that facilities expect to spend are very similar to those spent by current microcomputers users and timesharing/service bureau users (see Table 6). The total average expenditure is estimated to be almost $21,000, about 40% of which will be spent on software, training, and consulting.

The groups which will or may purchase a computer were also asked to indicate the anticipated source(s) of revenues for the purchase of their computer systems. The data relevant to this issue are presented in Table 2 , where it can be seen that 60% of the facilities indicated that they would use operating revenues to fund at least some part of their purchase. Twenty four percent stated that they would use a special fund raiser, 44% would use grant funding, 45% would use donations (either money or equipment), and 11% would use some "other" source of funding. These figures

TABLE 22

Anticipated Computer Use in Administrative, Production, and Rehabilitation Services Applications by Nonuser Facilities Which Will or May Purchase a Computer

ADMINISTRATIVE Application	%	PRODUCTION Application	%	REHABILITATION SERVICES Application	%
Accounting	71%*	Production Control	32%	Assessment (Vocational Evaluation, Psychological Testing, etc.)	42%
Bookkeeping	70%	Production Scheduling	21%	Adjustment (Personal, Social, Work)	30%
Word Processing	57%	Inventory	51%	Job Placement	23%
Mailing Lists	51%	Motion-Time Study	23%	Residential	15%
Spreadsheets (Business Projections)	45%	Contract Bidding	33%	Independent Living Training	22%
Staff Payroll	53%	Cost Control	43%	Job Skill Training	27%
Client Payroll	54%	Production Records/Reports	52%	Other	6
Program Evaluation	63%	Other	5%		
Other	17%				

* Percentage of Nonusers desiring to employ computers for this application.

TABLE 23

Anticipated Expenditures for Hardware, Software, Training, and Consultation by Facilities Which Definitely Will or May Purchase a Computer (N=470)

Item	Mean Expenditure	Standard Deviation
Hardware	$12,926	$18,623
Software	$5,239	$11,201
Training	$1,573	$5,022
Consultants	$1,035	$3,953
Total	$20,773	

TABLE 24

Anticipated Sources of Revenue for Facilities Which Definitely Will or May Purchase a Computer

Revenue Source	% Using Source
Operating Revenues	60%
Special Fundraising	24%
Grant Funding	44%
Donations	45%
Other	11%

suggest that many facilities will probably attempt to use multiple funding strategies to obtain their computer equipment.

As was indicated in Table 1 above, facilities which do not currently have a computer tend to be signficantly smaller and have less financial resources than computer users. A similar set of analyses was also conducted to determine whether the facilities considering the purchase of a computer system (the "Yes" and "Maybe" facilities) might be larger than those which do not intend to purchase one (the "No" facilities). As can be seen in Table 25, these groups are comparable in the number of clients that they serve annually but they differ significantly in the number of people they employ and in their annual budgets. The facilities which are considering the purchase of a computer employ more people and have larger budgets than facilities which are not considering such a purchase.

The final set of analyses compared the types of services provided by the Yes/Maybe facilities with those provided by the No facilities. As can be seen in Table 26, for 10 of the 15 services listed in the table, a significantly higher percentage of the Yes/Maybe group provides the service. This finding, plus those presented in Table 25, clearly reveal that the facilities which are currently contemplating a computer purchase tend to be larger and to provide a wider variety of services than facilities which are not considering buying such equipment.

SUMMARY AND CONCLUSIONS

Although there was a substantial amount of data analyzed from this survey, there are a number of findings which stand out. Foremost among these is the dramatic increase in computer ownership, particularly of microcomputers, which has occurred in the past two and one half to three

TABLE 25

Summaries of Analyses of Variance Comparing "Yes/Maybe" And "No" Groups on Number of Clients Served Annually, Number of Employees, and Size of Annual Budget

Source	Group Mean	df	Mean Squares	F	p
		Number of Clients			
Between		1	126,884	.60	>.05
Yes/Maybe	614				
Nonusers	581				
Within		508	211,473		
		Number of Employees			
Between		1	560,125	3.71	<.055
Users	58				
Nonusers	36				
Within		598	15,089		
		Annual Budget			
Between		1	1,874,404,510	6.32	<.02
Users	$1,171,073				
Nonusers	$722,938				
Within		508	296,610,330		

TABLE 26

Chi Square Analyses of Frequency of Rehabilitation Services Among Nonusers Which May and Will Not Purchase A Computer System Within the Next 18 Months

Rehabilitation Service	N (%) of Yes/Maybe Group	N (%) No Group	Chi Square	p
Vocational/Work Evaluation	325(63)	98(57)	1.49	>.05
Psychological Testing	165(32)	45(26)	2.28	>.05
Personal/Social Adjustment	320(62)	96(56)	1.69	>.05
Work Adjustment Training	325(63)	91(53)	4.29	<.05
Occupational Skill Training	196(38)	50(29)	4.11	<.05
On-The-Job Training	217(42)	64(37)	1.40	>.05
Job-Seeking-Skills Training	289(56)	72(42)	8.85	<.01
Job Placement Services	273(53)	65(38)	10.12	<.01
Sheltered Employment	273(53)	65(38)	10.41	<.01
Work Activities	304(59)	84(49)	5.28	<.05
Independent Living Training	237(46)	69(40)	1.97	<.05
Daily Living Skills Training	289(56)	81(47)	4.22	<.05
Recreation	248(48)	76(44)	.77	>.05
Medical	144(28)	33(19)	4.73	<.05
Residential	139(27)	31(18)	6.03	<.05

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years. Only 31% of Miller's (1981) users owned a computer, whereas, 66% of the users in this study do. Also, only 12% of Miller's users had a microcomputer, whereas, 47% of the users in the present study do. This dramatic increase in the number of computer owners no doubt resulted from the fact that microcomputers are relatively inexpensive to purchase and operate (see Table 6) and yet are quite capable of providing very satisfactory performance. The latter point is illustrated by the finding that the degree of satisfaction with the computer system was as high for microcomputers as for minicomputers and main frames. There were some drawbacks to microcomputer use which were found, however. Microcomputer owners were more likely to cite inadequate training, the fact that it takes a long time to learn to use the system, and system limitations as problems.

One of the implications of the dramatic increase in computer ownership seems to be that there will be an increase in the number of computer programs written to fulfill the needs of rehabilitation facilities. Evidence in support of this can be seen in the finding that computer owners were more likely to have had custom programs developed for them than were facilities which have only a Timesharing/Service Bureau arrangement. It seems likely that future program development will focus largely upon production and rehabilitation services uses, as well as, on program evaluation and client payroll functions. The latter assumption is based upon the finding that the heaviest use of computers at present is for admininstrative uses. This suggests that the greatest opportunity and need for program development will be in production and rehabilitation services uses.

Another clear finding of the present study is that rehabilitation

facilities have a great need for information concerning computer use. More than 60% of the respondents that are currently using computers indicated a need for training on such things as computer system management and computer uses and applications. More than 30% of the users indicated a need for training on computer selection and over half need information on computer programming. There is also a strong need among current users for customized software for a variety of purposes. For instance, two thirds of the current users indicated a need for custom programs for administrative and production uses. Also, two thirds of the users expressed an interest in an introductory handbook on computer use in facilities and in the formation of a facility computer users network for the exchange of information.

Examination of the data from facilities which are currently not using computers indicated that a lack of financial resources, was the primary reason given by those who may not or will not be purchasing a computer in the near future. A lack of experienced personnel and insufficient knowledge of computers were also cited by approximately one third of this group as reasons they may not purchase a computer system. Responses from those facilities which either will or may purchase a computer within the next 18 months suggest that most of them will be purchasing microcomputers or minicomputers. The majority of these facilities have also indicated that they have budgeted for both training and professional consultation on the use of computers. Such planned expenditures seem well advised considering the fact that a lack of training and system limitations were frequently cited by microcomputer users.

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APPENDIX A

Survey of Computer Use in Rehabilitation Facilities

Section I

LABEL HFRE

(✓) Appropriate Column

	Yes	No
A. [illegible]		
Does your facility currently use a computer(s) for any purpose?	____	____

If you answered "No", please skip to Section II, which is on the last page of this survey.

If you answered "Yes", continue with questions below.

RETURN ENTIRE SURVEY

Below is a list of ways in which computers can be used. Please mark each category as it applies to your facility.

Applications	Yes	No
Accounting	____	____
Bookkeeping	____	____
Word Processing	____	____
Mailing Lists	____	____
Spreadsheets (Business Projections)	____	____
Staff Payroll	____	____
Client Payroll	____	____
Program Evaluation	____	____
Other (Specify) _____	____	____

	Yes	No
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____

	Yes	No
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____
[illegible]	____	____

B. COMPUTER HARDWARE/EQUIPMENT

3. Indicate in each column to the right the number of computers in each class your facility owns or leases. Use the number 0 (zero) if you have none.

CLASS OF COMPUTER	Own	Lease
Microcomputer (e.g., Apple II or Radio Shack)	____	____
Minicomputer (32 bit multi-user)	____	____
'Main Frame' Computer	____	____

4. List the name and models of each computer used in your facility (e.g., IBM 3250, Apple II, etc.) (Skip this question if you have a timesharing arrangement).

NAME	MODEL
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

	Yes	No
5 Do you rent time on a timesharing system?	____	____
6 Does your facility employ a Data Processing Bureau to perform any computing services for you (e.g., bookkeeping, mailing lists, etc.)?	____	____

COSTS OF COMPUTER USE

	Amount
7 Please estimate the total direct purchase cost of all of your computer hardware (e.g., computers, modems, printers, monitors, etc.)	$_____
8. Please estimate the total purchase price of all of your computer software (programs).	$_____
9 Please estimate the total of all other annual operating expenses (e.g., lease of equipment, timesharing, cost of supplies, personnel costs, etc.) resulting from computer use in your facility.	$_____

1

D TRAINING NEEDS OF FACILITY

10 Indicate which items you feel would help your facility make better use of existing or future computer equipment and software

a Short term regional training programs in

SUBJECT AREAS	Yes	No
1 Computer Selection	____	____
2 Computer Uses Application	____	____
3 Computer Programming	____	____
4 Computer System Management	____	____

b Software customized for rehabilitation facilities for

1 Administrative Uses	____	____
2 Production Uses	____	____
3 Rehabilitation Uses	____	____
4 Residential Program Uses	____	____
5 Other (Specify) _____	____	____

c A rehabilitation facility user's network (with a directory of facility computer users you could contact for assistance) ____ ____

d An introductory handbook describing how rehabilitation facilities can use computers in their overall operations ____ ____

e Other (Specify) _____ ____ ____

11 Please rank the importance (1 = most important, 2 = next most important, etc.) of the following items for using computers in your facility

RANK

____ Short-term training

____ Software customized for rehabilitation facilities

____ A national directory of rehabilitation facilities using computers

____ An introductory handbook on using computers in rehabilitation facilities

____ Other (Specify) _____

12 Do you feel that the computer related training resources (e.g., continuing education courses, technical support courses, etc.) available in your area are adequate for your needs?

Yes	No
____	____

13 Would your facility send a staff member to (1) short-term training sessions on planning computer use in rehabilitation activities?

____	____

E BACKGROUND INFORMATION

	Yes	No
14. Did your facility use a paid computer consultant to assist you in developing your computer system?	____	____
15. Has your facility used volunteers (e.g., a board member, a student, or a local computer club member) to help you select hardware, develop software, etc.?	____	____

16. Indicate whether any of the employees of your facility have developed computer programs in any of the following areas:

	Yes	No
Administration	____	____
Production	____	____
Rehabilitation Services	____	____
Residential Programs	____	____
Other (Specify) _____	____	____

17. Indicate whether any programmers who are not employees of your facility have written programs for use in any of the following areas:

	Yes	No
Administration	____	____
Production	____	____
Rehabilitation Services	____	____
Residential Programs	____	____
Other (Specify) _____	____	____

18. Rate the usefulness of computers, based on your own first-hand experience on a scale of 1 (little usefulness) to 5 (extremely useful). Use "N/A" for uses with which you have no direct experiance.

RATING	
____	Administrative
____	Production
____	Rehabilitation Services
____	Clerical
____	Program Evaluation
____	Residential
____	Other (Specify) _____

(Continued left column, page 3)

E. BACKGROUND INFORMATION (Continued)

19. Indicate whether you have had any significant problems with your computer system:

	Yes	No
a. Lack of adequate software	____	____
b. Inadequate training	____	____
c. Lack of support from computer vendor	____	____
d. Equipment breakdowns	____	____
e. Took a very long time for staff to become proficient with system	____	____
f. System is too limited to do what we need	____	____
g. Cost of software is unexpectedly high	____	____
h. Cost of peripheral equipment is unexpectedly high	____	____
i. Maintenance costs are very high	____	____
j. Other (Specify) _____	____	____

F. GENERAL FACILITY CHARACTERISTICS

20. How many clients did your facility serve in the last fiscal year? _____

21. How many fulltime employees (not including clients) does your facility have? _____

22. What was your annual budget? $_____

23. Indicate whether or not your facility provides the services listed below:

	Yes	No
a. Vocational/Work Evaluation	____	____
b. Psychological Testing	____	____
c. Personal/Social Adjustment	____	____
d. Work Adjustment Training	____	____
e. Occupational Skill Training	____	____
f. On-The-Job Training	____	____
g. Job-Seeking Skills Training	____	____
h. Job Placement	____	____
i. Sheltered Employment	____	____
j. Work Activities	____	____
k. Independent Living Training	____	____
l. Daily Living Skills Training	____	____
m. Recreation	____	____
n. Medical Services (including OT, PT)	____	____
o. Residential	____	____
p. Other (Specify) _____	____	____

24. We will be sending you a follow-up questionnaire concerning further details about computer use in your facility in about 4-6 weeks. That questionnaire will take approximately 30 minutes to complete. Please list below your name, job title, and full facility address so that we can send the follow-up questionnaire directly to you personally.

Your Name _____ Job Title _____

Facility Name _____

Street Address _____

City/State _____ Zip _____

Phone Number (___) ___ - _____

Thank you very much for your cooperation. Please place the survey form in the enclosed postage-paid envelope and mail it to us by

_____

Research and Training Center, Stout Vocational Rehabilitation Institute, University of Wisconsin-Stout, Menomonie, WI 54751.

Section B

Complete this section only if your facility is not using computers at present.

25 Please check the statement below which best describes your plans for computer use (✓ one only)

a. We definitely will be purchasing/leasing a computer(s) within the next 18 months ____

b. We may or may not purchase/leare a computer within the next 18 months ____

c. We definitely will not be purchasing/leasing a computer within the next 18 months ____

26 If you checked b or c in the previous question, indicate why you may not or will not be purchasing computer equipment within the next 18 months.

	Yes	No
a. Lack of financial resources	____	____
b. Lack of experienced personnel	____	____
c. Not convinced of the benefits of computers	____	____
d. Insufficient knowledge about computers	____	____
e. Other (Specify) _____	____	____

If you are certain you will not be purchasing/leasing a computer within the next 18 months, skip to Question 30

27 If you anticipate possibly purchasing a computer, indicate how you plan to use it

	Yes	No
ADMINISTRATIVE		
Accounting	____	____
Bookkeeping	____	____
Word Processing	____	____
Mailing Lists	____	____
Spreadsheets (Business Projections)	____	____
Staff Payroll	____	____
Client Payroll	____	____
Program Evaluation	____	____
Other (Specify) _____	____	____

Continued right column, this page

PRODUCTION	Yes	No
Production Control	____	____
Production Scheduling	____	____
Inventory	____	____
Motion-Time Study	____	____
Contract Bidding	____	____
Cost Control	____	____
Production Records/Reports	____	____
Other (Specify) _____	____	____

REHABILITATION		
Assessment (Vocational Evaluation, Psychological Testing, etc.)	____	____
Adjustment (Personal, Social, Work)	____	____
Job Placement	____	____
Residential	____	____
Independent Living Training	____	____
Job Skill Training	____	____
Other (Specify) _____	____	____

28. How much money do you anticipate spending in each of the following areas within the next 18 months?

	Amount
Computer Hardware	$ _____
Computer Software	$ _____
Computer Training	$ _____
Computer Consulting Services	$ _____

29 What revenues will you use to purchase your computer equipment?

REVENUE SOURCE	Yes	No
Operating Revenues	____	____
Special Fundraising	____	____
Grant Funding	____	____
Donations (equipment or money)	____	____
Other (Specify) _____	____	____

30 How many clients did your facility serve in the last fiscal year? _____

31 How many fulltime employees (not including clients) does your facility have? _____

32 What was your annual budget? $_____

33 Indicate whether or not your facility provides the services listed below

		Yes	No
a	Vocational/Work Evaluation	____	____
b	Psychological Testing	____	____
c	Personal/Social Adjustment	____	____
d	Work Adjustment Training	____	____
e	Occupational Skill Training	____	____
f	On-The-Job Training	____	____
g	Job-Seeking Skills Training	____	____
h	Job Placement	____	____
i	Sheltered Employment	____	____
j	Work Activities	____	____
k	Independent Living Training	____	____
l	Daily Living Skills Training	____	____
m	Recreation	____	____
n	Medical Services (including OT, PT)	____	____
o	Residential	____	____
p	Other (Specify) _____	____	____

You are finished with the questionnaire. Please insert it in the enclosed postage-paid envelope and mail it to us by

Research and Training Center, Stout Vocational Rehabilitation Institute
University of Wisconsin-Stout, Menomonie, WI 54751

THANK YOU VERY MUCH FOR YOUR COOPERATION