

THE UNIVERSITY OF CALGARY

**DESCRIPTORS AND PREDICTORS
OF HUMAN SERVICE MANAGERS'
INFORMATION TECHNOLOGY USE**

by

BRIAN HOFFART

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
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DEGREE OF MASTER OF SOCIAL WORK

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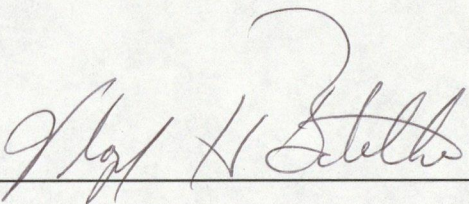
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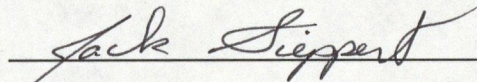


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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "Descriptors and Predictors of Human Service Managers' Information Technology Use" submitted by Brian Hoffart in partial fulfilment of the requirements for the degree of Master of Social Work.



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Date

April 28, 1993

ABSTRACT

DESCRIPTORS AND PREDICTORS OF HUMAN SERVICE MANAGERS' INFORMATION TECHNOLOGY USE

The use of information technology will inevitably continue and likely increase in both society and the human services sector. However, little is understood about information technology use by the focal point of a human service organization - the manager.

This study was undertaken to gain a better understanding of human service managers' information technology use. A review of the literature guided development of a research model intended to empirically describe and predict human service managers' information technology use.

A questionnaire was mailed to 366 randomly sampled human service managers. The findings demonstrated that human service managers' primary use of information technology included word processing, data base management, and statistical applications. Two variables (proximity and age) were found to significantly predict human service managers' information technology use, explaining 39% of the variance in use. Discussion of findings, implications to the human services and recommendations for research were provided.

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Finally, I would like to express my appreciation to Dr. Floyd Bolitho. Dr. Bolitho's expertise in the area of information technology has encouraged me to continue exploring computer applications in social work. His tireless search for purpose and incredible skill at asking just the right question has been essential in completion of this thesis.

DEDICATION

To my parents John and Caroline for my life.

To my brothers Gary and Bob and their families whose unending support and example I try to live by.

To Irene who I live for.

-- V --

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Chapter 1 - INTRODUCTION

Computer technology has become an integral part of our society. Ranging from personal banking to international communications, computers and society are fusing. The pivotal factor causing this union is the transference of information. To this end, computers serve as the basis of information technology (Schoech, 1990).

The use of information is particularly important to human service organizations. Whether information is used by administration, management, or direct service personnel, it is basic to the functioning of all human services (Hammer & Hile, 1985). For example, Caputo (1988) and Bloom (1975) indicate that information assumes a central role in decision making, practice-wisdom and professional judgment. Smith and Bolitho (1989) and Smith (1985) describe it as a key resource and tool in social welfare, and Schoech (1990) and Neilson (1985) suggest that information is a pervasive and essential ingredient of informed decision making and service delivery.

Since information is crucial to the human services, it is greatly affected by the technologies that collect, store, manipulate, and communicate information (Schoech, 1990). It can be further stated that the need for and use of information serve as links between social welfare and information technology (IT) (Smith, 1985) because IT brings power to those who generate and use information (Smith & Bolitho, 1989). Individuals with this power receive accrued benefits. For example, within the human services, social planners (Murphy & Pardek, 1988) researchers

(Gibbs, 1990), and direct practitioners (Schoech, 1989) receive benefits such as financial savings, enhanced and quicker access to critical information, and more efficient and effective service delivery. Yet, as numerous as the benefits are, so too are the barriers of using IT.

Generally, the barriers, or resistance to IT use, are grouped into organizational, technological, and individual characteristics (Mutschler & Hoefer, 1990; Pavri, 1986). For example, research shows that the availability of resources, availability of relevant software, and user training result in greater usage of IT (Mutschler & Hoefer, 1990). It is also suggested that there is a relationship between the individual characteristics and the user's attitude toward using IT. The attitudes in particular can often act as barriers to IT usage (Davis, 1986).

Literature that describes how, what, when, and where, IT is used is abundant. However, in the burgeoning literature on IT in human service organizations little has been written to describe the patterns of use by human service managers and to empirically identify those factors which contribute to their use of IT. Few of the articles reviewed for this thesis empirically studied predictors of IT use, and even fewer discussed user attitudes towards its use. Given that barriers to IT use continue to exist regardless of its numerous benefits, there is need to better understand the trends in IT use and predictors that effect its use in the human services.

Human service managers tend to be the ultimate decision-makers in regards to the organizations IT use. Typically, if the manager is in favor or a user of IT

then the organization tends to use IT. An understanding of human service managers individual IT use should be able to provide some insight to human service organizations use of IT (Holbrook, 1988).

This study focused on identifying the descriptors and predictors of human service managers' use of IT. More specifically, the intent of this study was to answer the following research questions:

1. How and to what extent do human service managers' use IT in their practice? and,
2. What are the predictors of human service managers' use of IT?

A description of IT use by human service managers will permit an understanding of how, and to what extent various information technologies may be used by human service managers. A review of the literature allowed the author to review descriptors of how and to what extent human service managers' use IT in their practice.

To accomplish this study's second question an extension of Davis's (1986) Technology Acceptance Model, which reflects an adaptation of Fishbein's Theory of Reasoned Action (Fishbein & Ajzen, 1975) for predicting behavior was used. The ability to better predict human service managers' IT use will provide an opportunity for human service professionals to minimize barriers to usage, and to allow managers to take full advantage of its benefits.

Study results have significance for the human service manager, educator,

practitioner, student, and IT consultant. Also, this knowledge can be useful in the areas of policy, practice and theory of IT use within human services.

OVERVIEW

This chapter outlined the intent of this thesis and posed two research questions. The remaining chapters present a review of the literature, describe the study's conceptual framework, its methodology, as well as present and discuss its findings. Chapter 2 reviews the literature on utilization, benefits and barriers of IT use in the human services. In chapter 3, the study's conceptual framework is developed and described. Chapter 4 presents the research methodology. Results are presented in chapter 5, and a discussion of their significance and recommendations for human services in chapter 6.

Chapter 2 - LITERATURE REVIEW

INTRODUCTION

This chapter provides a review of the literature significant to information technology (IT) use in human service organizations (HSO). The review provides the basis for selecting descriptors and predictors of human service managers' IT use. The review begins by describing how and to what extent IT is used in HSO.

UTILIZATION OF INFORMATION TECHNOLOGY IN THE HUMAN SERVICES

This section of the review has nine sub-sections and summarizes the context, and 'how' and to 'what' extent IT is used in the human services. The first eight sub-sections provide the context surrounding the use of IT in the human services and include historical, specific settings, direct practice, hospitals, mental health, specific populations, knowledge systems, and computerized assessment utilization. The last subsection provides the reader with a list of descriptors of IT use and the extent to which they are used in the human services. This format was created to provide the reader with an understanding of both the descriptors of IT use in the human services that are identified by the literature, as well as the context they operate within.

Historical Utilization

In an ever changing and rapidly advancing field such as IT even one year-old literature must be regarded as obsolete (Levitan, Willis, & Vogelgesang, 1985). In the present study historical utilization refers to the earliest uses of IT in the human services.

North American governmental social service departments were the first users of computers. The computer was used to process large amounts of information and easily handled routine tasks (Flynn, 1990a; Smith, 1985). Later developments included computer-assisted instruction courses in basic social work concepts (Ehlers, 1969), and, in the early 1960's, mental health applications (Hedlund, Vieweg, & Cho, 1985a). To date, the computer is one form of IT that is used in most spheres of social work (LaMendola, 1987). The phenomenal rise in microcomputer purchases by human service agencies from 7,908 in 1983 to 67,502 in 1985 confirms this increasing usage (Overman, 1988).

Specific Settings Utilization

The use of IT in specific settings is generally described in terms of its applications - that is how to integrate IT into a particular type of agency. The examples include integration of IT in public child welfare (Cooper, 1989), residential agencies (Raider, & Moxley, 1990; Alberts, 1990), small social agencies (Taber, & DiBello, 1990), nonprofit agencies (Tovey, Savicki, & White, 1990), income security (Rike, McIntyre, Zane, James, & MacPherson, 1989; Dukler, 1989), and child and

family services (Grasso, & Epstein, 1989).

Use of IT in specific settings usually corresponds with specific intervention strategies. For example, IT use and specific intervention strategies have been pioneered in self-help groups (Smith, 1987; Madara, Kalafat, & Miller, 1988), behavior therapy (Holbrook, 1988; Lambert, 1989), and games (Resnick, & Sherer, 1989). The narrow focus on IT integration usually resulted in an absence of any data on the extent of utilization of IT in specific settings.

Direct Practice Utilization

Information technology is also used in direct practice (Nurius, & Hudson, 1988; DeGroot, Gripton, & Licker, 1986; Velasquez, & Lynch, 1981; Boyd, Hylton, & Price, 1978), but its use is not a predominant feature. For example, an American national study completed in 1984 reported that 33.3% of responding HSO use microcomputers (Lamb, 1990). A 1987 Canadian national study obtained similar results. When asked if computers are used in their practice setting 35% of human service professionals responded affirmatively (Canadian Association of Social Workers, Canadian Association of Schools of Social Work, 1985/86/87). In a comparative study of four human service professional associations in one American state and one Canadian province 34% and 45.4% of respondents (respectively) used computers in the office (Senner, Young, Gunn, & Schwartz, 1988).

Hospital Utilization

Information systems constitute the primary use of IT in hospitals. Whether on a national (Friedman 1990) or on a local level (Cohen, Nizza, Rock, & Smith, 1989; Lyons, Hammer, & White, 1987) most hospitals already use or are in the process of information system development (Romano, Conklin, & Fisher 1985).

Though information systems serve as the primary focus of IT use in hospitals, other types of utilization are also present. For example, Ellis (1987) offers guidelines for computer-based patient education. DeGroot, Peabody, Sheppard and Stalinski (1991) discuss a system designed to profile and predict social work resource requirements in hospitals. Although no study describes the magnitude of IT use in hospitals, Friedman (1990) suggests that between four and five hundred hospitals are using the Hospital Social Work Information System.

Mental Health Utilization

There is a plethora of IT usage in the area of mental health. Hedlund, Vieweg, & Cho (1985a,b) describe clinical applications in mental health. Cox, Erickson, Armstrong, and Harrison (1985) report on a computer simulation of community health centres and a model of service delivery. Information technology use is described extensively in mental health and the descriptions range from general discussions of management issues (Sherman, 1989) and the processes of implementation (Larsen, 1987) to specific uses in chronic mental illness (Taintor, 1987), interactive video disc applications (Olevitch, & Hagan, 1989), feasibility

analyses of automating the psychiatric record (Alexander, Siegel, & Murtaugh, 1985), clinical and financial records (Newkham, & Bawcom, 1981) and purchase of service contracting (Hile, & Hedlund, 1989). Butterfield (1988) reports that by 1980 more than 75% of all community mental health centres were using IT. A more modest level of IT use in community mental health centres (55%) was reported by Jaros, Levi, Larson, Baskin, & Seiffer (1985). However, Butterfield (1988) estimates that state mental health departments may be approaching a 100% utilization rate.

Specific Populations Utilization

Although IT is apropos to all functions and areas of the human services, applications to specific population groups are most common. IT is used with youth (DeJacimo, Kropp, Zefran, 1985), college students (Arbona, Perrone 1989), the elderly (Reinoehl, Brown, & Iroff, 1990; Blazyk, Wimberley & Crawford, 1987; DeJong, 1982), developmentally disabled (Saka, 1985; Schoech, Cavalier, Hoover, Kondraske, & Brown, 1989), in child welfare (Macfadden, 1989; Sicoly, 1989; Fuchs, 1989; Poertner, & Rapp, 1980), with flood victims (Echterling & Hoschar, 1989), minorities (Davidson, 1989), aphasia suffers (Petherman, 1989), and AIDS victims (Schinke, Orlandi, Gordon, Weston, Moncher, & Parms, 1989). Unfortunately few of the above studies provide numbers of those using IT with specific populations. In one rare example, DeJong (1982) reports that among agencies working with the aged, 54% used IT.

Knowledge Systems Utilization

Knowledge systems are a relatively new area of IT (Gingerich, 1990a), but have recently exploded in their application in the human services. Under the rubric of knowledge systems are expert and decision support systems. Although each is different, expert system techniques may be considered a part of decision support systems (Schoech, 1990).

Though knowledge systems have been introduced into the human services only recently, numerous articles depicting existing knowledge systems and their development have been published. For example, systems have been developed for treatment resistant clients (Sherman, 1989); in child welfare (Schwab, Bruce, & Wilson, 1990; Schwab, & Wilson, 1989; and Winfield, Simpson, & Bayliss 1989, Schuerman, Mullen, Stagner, and Johnson, 1989; Fluke, & O'Beirne, 1989); clinical information processing (Carlson, 1989); in-home supportive services (Boyd, Pruger, Chase, Clark, & Miller, 1981) and for family therapists (Goodman, Gingerich, & Shazer, 1989). Additionally, many authors describe knowledge systems, their shells, and how to create them (Mutschler, 1990; Gingerich, 1990a; Gingerich, 1990c; Butterfield, 1988; Schuerman, 1987; Schoech, Jennings, Schkade, Hooper-Russell, 1985; Vogel, 1985; Gingerich, 1990b). However, no known literature describes the extent of knowledge system use.

Computer Assisted Assessment Utilization

A wealth of literature concerning computer assisted assessment and diagnosis has been written (Hudson, & Bronson, 1988; Hudson, Nurius, & Reisman, 1988; Erdman, & Foster, 1988; Murphy, Pardek, Nolden, & Pilotta, 1987; and Levitan, Willis & Vogelgesang, 1985). Publications by Nurius, (1990), and Nurius and Hudson, (1989) along with a descriptive evaluation of the benefits and problems by Merrell, (1985), and Hart, and Goldstein, (1985) provide an excellent overview of computer assisted assessment and diagnosis. Specific applications include diagnosis of alcoholism (Malcolm, Sturgis, Anton, Williams, 1989); diagnostic interviews for emotionally disturbed children (Knight-Law, Mathisen, Calandra, Evans, Salierno, 1989); mental retardation and developmental disabilities (Hile, 1989); and diagnosis in psychiatry (Erdman, Greist, Klein, & Jefferson, 1987). Though many computer assisted assessments have been developed, it is surprising no one describes the extent of their use.

Extent of Information Technology Use

Given the literature discussed above some understanding of specific IT applications and the extent to which they are used is needed. The following section presents a list of typical computer applications and the extent to which each is used in the human services. In order to present all of the information in a concise manner a table (see Table 2.1 page 13) is provided to summarize the descriptors and the extent to which they are used. A description of one of the

applications is provided as an example of how to interpret the table.

Available literature was used to create a list of descriptors that identify a variety of ways IT is used in the human services. Table 2.1 lists identified descriptors and associated studies' findings on the extent of use for each descriptor. Study findings are presented in the form of percentages that represent the extent of use for each descriptor. For example, in a study of 60 human service administrators, managers and direct service practitioners Mutschler and Hoefer (1990) found that 70% use computers for word processing. Each identified descriptor was used to address this study's first research question, 'How and to what extent do human service managers' use information technology in their practice?'

Table 2.1
Descriptor and Extent of Information Technology Use

Descriptor (Applications)	Extent of Use
Word processing	27.5% ¹¹ , 62% ⁵ , 64% ⁴ , 70% ¹ , 70% ⁶ , 72% ¹⁰ , 78% ⁸ , 79% ¹² , 93.3% ⁷ ,
Spreadsheet	30.6% ¹¹ , 55% ¹² , 58% ⁸
Data base management	25.2% ¹¹ , 49% ¹ , 63% ¹² ,
Statistical	72% ¹ ,
Accounting	49% ⁶ , 51% ⁸ , 64.4% ⁷ , 69% ⁵ , 76% ¹
Budgeting	24% ⁹ , 69% ⁵ , 96% ³
Fund raising	17% ⁶ , 22% ¹⁰ , 34% ⁵ , 56% ⁴
Payroll	35.6% ⁷ , 43% ¹ , 77% ⁴
Personnel	37.7% ⁷ , 43% ⁸ , 57% ⁴ , 68% ⁶ , 71% ¹⁰
Scheduling	20% ⁷ , 45% ⁴
Inventory	48% ⁴ ,
Mailing lists	54% ⁶ , 66% ¹⁰ , 71% ⁴ , 80% ⁷
Membership	18% ⁶ , 28% ¹⁰ , 30% ⁵ , 46% ⁴
Internal reports	72% ¹
External reports	67% ¹
Research	22% ⁵ , 24.4% ⁷ , 29% ⁹ , 43% ⁴ , 64% ⁶ , 67% ¹⁰ , 75% ³
Client/patient intake	7% ⁹ , 22% ¹ , 43% ²
Interviewing clients/patients	6% ¹
Assessment	5% ⁹ , 10% ¹² , 24% ² , 43.8% ³
Diagnostic	43.8% ³ ,
Client/patient records	18% ² , 21% ⁹ , 46% ¹ , 55.6% ⁷ , 58% ⁴ , 61% ⁸ , 66% ⁶ , 76% ¹⁰ , 83% ⁶
Treatment planning	9% ¹ , 50% ³
Case management	22% ⁸
Client/patient tracking	38% ⁸ , 45% ² , 46% ¹²
Client/patient outcome	19% ⁹ , 68% ⁸ , 87.5% ³
Clinical decision-making	6.6% ⁷ , 7% ¹ , 28.1% ³
Inter-agency networking	20% ⁷
Training	20% ¹
Literature search	15% ¹

¹Mutschler, Hoefer (1990); ²Nurius, Hooyman, Nicoll (1988); ³Nurius, Richey, Nicoll (1988); ⁴Gunderson (1983); ⁵Rousmaniere (1984/85); ⁶Nutter, Gripton, & Murphy (1986); ⁷Finn (1988/89); ⁸Jaros, Levi, Larson, Baskin, & Seiffer (1985); ⁹Pardek, Umfress, & Murphy (1987); ¹⁰Canadian Association of Schools of Social Work, Canadian Association of Schools of Social Work (1985/86/87); ¹¹Doucette reported in Lamb (1990); ¹²Hooyman, Nurius, & Nicoll (1990).

Summary

This section has reviewed the literature concerning the context of, and described 'how and to what extent' information technology is used in the human services. Information technology use in the human services ranges from as diverse areas as the advertising of services (Ruberg, 1989), to health resource centres for insurance companies (DiBenedetto, & Pirie, 1989). Eight areas: historical, specific settings, direct practice, hospital, mental health, specific populations, knowledge systems, and computerized assessment utilization, were used to describe the context of IT use in the human services. Twenty-nine descriptors of IT use in the human services and the extent to which each was used were identified (see Table 2.1).

Although there is research that reports 'how and to what extent' information technology is used, it offers only a partial understanding of the issues surrounding information technology use in the human services. One could assume that the use of IT is effected by the associated benefits and costs of its use. However, it is unclear what causes differential IT use. Therefore, it is necessary to examine why some computer applications are so heavily utilized in the human services while others are not (Overman, 1988). This variance in use may lead to identification of predictors of HSO managers IT use. In order to understand the variance in IT use among human service managers it is helpful to first understand why IT is used at all in the human services. Thus, the next section addresses the benefits of using IT in HSO.

BENEFITS OF INFORMATION TECHNOLOGY USE IN THE HUMAN SERVICES

This section helps to provide a context for the examination of the issues surrounding the second research question of this thesis, 'What are the predictors of human service managers' use of information technology?' It provides a description of the benefits of IT use in the human services and, thus, some understanding of possible predictors of the behavioral intention of human service managers' IT use. This section uses specific examples to describe what are considered universal benefits of IT use.

The early benefits of IT use in HSO were financially motivated. For example, IT use was encouraged when the government matched the funds agencies generated and had 'tagged' for IT (Neilson, 1985). Albeit some agencies did use the open-ended funds for actual system development, most agencies used the money for direct service delivery.

During the late 60's and early 70's human service administrators were benefiting the most from IT use. Administrators could conduct policy impact studies, determine areas for essential service and where service was duplicated, increase the number of clients, and bring research within the reach of direct practitioners (Fuller, 1970). Primarily benefits result from performing administrative tasks - the intended purpose of earlier systems. Evaluations of administrative applications have demonstrated their value as well as their cost-effectiveness to managers (Larsen, 1987).

Until the mid-70's, few benefits of IT were realized by the direct practitioner.

One early IT application assisted in the routine assessment and modification of marital verbal behavior (Thomas, Walter, & O'Flaherty, 1974). Boyd, Hylton, and Price (1978) reviewed the literature from 1970 - 1976 suggested that direct practitioners benefited indirectly and only in the area of time-consuming tasks reduction.

Although direct benefits of IT use to direct practice were few and a long time in coming, the benefits today are many and far reaching. DeGroot, Gripton, and Licker (1986) suggest that IT has several advantages for clinicians: performance, accuracy and reliability, productivity, and revelation (*"computers can reveal hitherto undiscovered relationships between data items, which would not be apparent to the 'naked brain' alone."*) IT sharpens thinking about accountability, and business practices, as well as facilitates written communication (Hamilton, 1983). After using IT, practitioners usually recognize the need to modify their approach with clients who are computer literate.

Assessment of software traditionally used in direct practice has been favorable (Hug, 1990; Gibbs, 1990; Simon, & Button, 1990; Iroff, 1990; Janzen, & Lewis, 1990). Evaluation of the issues and benefits suggest that IT software can be useful in direct practice (Flynn, 1990a; Cnaan, 1989a, 1989b; MacFadden, 1989; Hudson, 1988; Nurius, & Hudson, 1988; Reamer, 1986; Miller, 1986; Alter, 1985; McIntyre, 1984; Geiss, 1983; Gripton, 1983; Hoshino, & McDonald, 1975). For example, Greist (1984) writes that, *"The potential for computer applications in psychiatry and psychology remains enormous."* Also, many have documented the

successful development of clinical computer applications (Mathisen, 1987; Hedlund, Vieweg, & Cho, 1985b).

Davidson (1989) argues a case for the use of IT with specific groups. Davidson writes,

"If disparities are to be uncovered and if equity is to be enhanced in society, a relevant information, technological monitoring system must be developed. The importance of an information network which is designed to encompass local, regional, national, and international data across policy and program areas for all citizens but especially those subject to racial discrimination is clear. To do otherwise, is to abrogate our professional responsibility for social justice in society and in the human services delivery system."

To date, the literature indicates that the benefits of specific IT applications to clients are related to specific client groups. For example, computer-assisted therapy has been most successful with children (Murphy, & Pardek, 1986). In some agencies, IT has allowed staff to spend more time with children (Mentis, 1983). Additionally, the handicapped benefit from IT by being able to communicate, take courses, and request resources (LaMendola, 1985). Lamendola suggests that with IT use the mentally challenged become more mobile, experience a responsive environment, and communicate better. IT may bring sight to the blind, limbs to the handicapped, and assistance to the elderly - increasing the employability of all these groups.

Though prohibitive in the past, the cost of IT and the size of HSO are no longer barriers to IT use. Miller (1986) reviewed the literature and suggested that, *"...any agency, no matter how small, will find its administration and management enhanced by the new technology."* Ragland (1989) suggested that IT is easily

within the reach of the limited resources of a small rural agency. *"This agency's experience with IT rendered an annualized cost savings of over \$4,000.00. The majority of cost savings was in the form of saved staff time that directly translated into benefits for service delivery."*

Just as specific groups benefit by IT, specific IT offers unique benefits. For example, knowledge systems provide benefits for knowledge advancement and training (Gingerich, 1990c; Schoech, Jennings, Schkade, & Hooper-Russell, 1985). The knowledge systems enhance availability of scarce expertise. Some examples include assessment of suicide potential and risk of domestic violence, advise on intervention strategy, psychiatric diagnosis, and the monitoring and evaluation of client change (Gingerich, 1990a).

Computer assisted assessment is one area where IT has proven results and a firm groundwork of development. Computer assisted assessments tend to be more detailed, complete, faster, and less susceptible to errors or the influences of extraneous variables (Nurius, & Hudson 1989; Millstein, 1987; Angle, Ellinwood, Hay, Johnsen, & Hay, 1977; Byers, 1981; Yardman, Klein, & Griest, 1985; Fowler, 1985; Hedlund, Vieweg, & Cho, 1985; Schwartz, 1984). Contrary to clinicians' perceptions, a significant percentage of clients indicate a preference for computer assisted assessments over conventional methods (Knight-Law, Mathisen, Calandra, Evans, & Salierno, 1989; Hart, & Goldstein, 1985; Klinger, Johnson, & Williams, 1976; Lucas, 1977; Maultsby, & Slack, 1971; Moore, Summer, & Bloor, 1984).

Summary

The previous section reviewed the literature concerning the benefits of using IT in the human services. All interested administrators, practitioners, and clients benefit from IT use. In a discerning editorial, Slavin (1981) writes, *"Where the primary orientation is to the quantity and quality of client service, the computer can be an aid, not an impediment, to the central objectives of service delivery."* However, the benefits of IT applications have little chance of impact if they are not used (Hedlund, 1987). Notwithstanding the apparent widespread use and benefits, barriers to IT use are also widespread and constitute the next and final topic of this chapter.

BARRIERS TO INFORMATION TECHNOLOGY USE IN THE HUMAN SERVICES

This final section continues the examination of the issues surrounding this study's second research question 'What are the predictors of human service managers' use of information technology?' The section presents a description of the barriers to information technology use in the human services. Given the preceding section's description of the benefits to IT use, this section compliments and completes the basis for understanding what may predict the behavioral intention of human service managers' IT use.

Literature on barriers to IT use can be organized into three sub-sections; technological, organizational and individual characteristics. Several researchers have used a similar organization (Mutschler, & Hoefer, 1990; DeGroot, Gripton, &

Licker, 1986; Lamb, 1990; Mathisen, 1987). Although the specific terminology may differ among these studies, the models used to explain IT use are very similar. For example, Mutschler and Hoefer (1990) propose a four factor model. The first three are technology, organizational, and user-related factors, and the fourth interrelates the first three and their affect on IT utilization. DeGroot, Gripton, and Licker (1986) suggest that the barriers to IT use can include development and maintenance of hardware and software (technological characteristics), staff training (organizational characteristics), and differences between interest groups (individual characteristics). Lamb (1990) suggests that reasons for barriers to IT use fall into the categories: equipment and software limitations (technological characteristics), expense (organizational characteristics), ethical practice concerns, and practitioner resistance (individual characteristics), and interestingly notes that all but the last seem to be in the process of being resolved.

The focus of this study is on individual characteristics and, thus, a more lengthy review is provided in this area. A brief review of technological and organizational characteristics is presented first to provide a complete background to potential barriers of IT use in HSO.

Technological Characteristics

Historically many technological characteristics have served as barriers to IT use. For example, Poertner and Rapp (1980), Vogel (1985), Mutschler (1987a), and Sherman (1987) all propose that technology itself created resistance. While

Mathisen (1987), Schoech (1989), and Caputo (1989) suggest that IT designers created barriers to IT use, and Schoech and Arangio (1979), Mathisen (1987), Ellis (1987), and Sherman (1987) all submit that IT was so expensive that the number of those who could afford it was limited. Mathisen (1987) maintains that lack of relevant or useful software promoted barriers in IT use by forcing use of software not suited to HSO. Others suggest that lack of human services' own computer language served as another barrier to IT use (Schoech, & Arangio 1979). However, this is generally no longer accepted as a valid argument (Miller, 1986; Mutschler, 1987a).

There are many technological characteristics that create barriers to clinical applications' use. Mutschler (1987a) suggests that a number of factors have delayed clinical applications: early programs were time consuming to prepare and often operated only in the batch mode, and, initially too many problems arose at the person-machine interface. Mathisen (1987) suggests two reasons for slow acceptance. First, computers cost too much and inexpensive computers were unreliable and lacking power needed for serious applications. Existing programs were generally difficult to use and programmers were expensive and not understanding of clinical realities. Secondly, clinicians were slow to accept IT applications.

Miller (1986) posits a common argument to resistance stating that "*even if hardware was available, software was not.*" However, a perusal of current literature would seem to suggest otherwise. For example, *Computer Use in Social Services*

Network Volume 10 issues 2/3 list over 500 software packages that are available.

As a result of the technological revolution, technological characteristics are no longer creating the extent of barriers that existed even a few years ago (Pardeck, & Murphy, 1986). For example, many of the problems in decision support system design are related more to the state of knowledge about decisions and decision making than to technical issues (Vogel, 1985; Mutschler, 1987a). The computer revolution has made powerful, reliable, easy to use, and inexpensive computers available (Fuchs, 1989). The focus is no longer on how can HSO get IT, but how can human service professionals be encouraged to use IT.

Organizational Characteristics

Organizational characteristics surrounding barriers to IT use are typically financially or administratively related. For example, many authors comment that the cost of using IT in a human service organization is excessive (Mathisen, 1987; Ellis, 1987; Sherman, 1987; Schoech, & Arangio, 1979; Mathisen, 1987; Holbrook, 1988). Similarly, although numerous applications have been developed and some have been rigorously tested and found helpful, there are very few that have been integrated into the administrative activities of the practicing organization (Mathisen, 1987). *"There is an unfounded belief that HSO will realize their need of IT, that the introduction of IT into the agency or system will be desirable, and that the act of having IT on the property represents 'success'. However a sizable body of research indicates these assumptions are false (Larsen, 1987)."*

Few organizational resources assist practitioners in management or practice to learn about the new technology (Mathisen, 1987). In addition, human service organizations cannot discount the costs of new equipment as a cost of doing business, but must either finance or divert existing funds.

Staff barriers often stem from the organization's failure to involve clinicians and administrators in discussing and designing the system (Larsen, 1987). Additionally, the degree of cooperation and coordination among the various disciplines of human service providers influences the effectiveness of IT (Mutschler, & Hoefer, 1990) and may result in each occupational group becoming disinclined to utilize a computer system developed to meet the needs of the other group (DeGroot, Gripton, & Licker, 1986). However, total organizational involvement is now widely accepted as a pre-condition to any kind of IT development and/or use (Schoech, 1990).

Some organizational barriers to IT use persist due to the difficulty in developing standardized measurable units of service (Boyd, Hylton, & Price, 1978; Schoech & Schkade, 1980; Lohmann, 1990). For example, is the user of a human service a 'client' upon initial contact with the agency or only when, and if, direct service is provided. That is, if the organization has difficulty defining its service (an essential step in direct practice IT utilization) the organization will not likely be able to use IT.

Some HSOs experience IT resistance because little is offered as rewards to workers who use IT (Nurius, Hooyman, & Nicole, 1988; DeGroot, Gripton, & Licker,

1986). For example, Hedlund, Vieweg, & Cho (1985a) report that clinicians' issues with IT usually involve the use of standardized forms, stereotyped reports about clients, increased paperwork, errors, and delays. Unfortunately it is often the clinicians who bare the burden of IT, but rarely reap any significant results.

Schoech and Schkade (1980) and Schoech (1990) suggest that employees will not use the system if the organizations' leaders do not take it seriously. Holbrook (1988) suggests that human service managers serve as the key to the success of using computer technology. Involvement and support of top management from the early stages (Overman, 1988) to completion in systems development determines success (Bruwer, 1984; Sanders, & Courtney, 1985). Riley, and Ickes (1989) suggest starting with management to empower human service staff to utilize information technology. Larsen (1987) suggests that it is managers who are responsible for the decision to introduce and promote use of IT in HSO.

Individual Characteristics

The range of individual characteristics that produce resistance to IT are as varied as there are managers. From thinking styles to gender, individual characteristics influence IT use. Whether we call '*it*' - 'computer anxiety,' 'techno-stress,' or 'computerphobia,' all estimates indicate that as many as one out of three adults suffer from aversive reactions to computer-related technology (Weil, Rosen, & Sears 1987). Dowling (1980 cited in Mandell, 1989) found that '45% of

the institutions surveyed experienced staff resistance to computers that ranged from passive resistance (avoidance of instruction) to active sabotage (destroying terminals).'

Managers individual characteristics can cause resistance to IT use in a variety of ways. Murphy, Pardeck, Nolden, & Pilotta (1987) suggest that most practitioners' critiques of IT use are logistical in nature (eg. confidentiality, organizational role and training). Schoech (1989) offers several different arguments against the use of IT: IT poses a threat to the view of human services away from one of humanness; IT use has unanticipated consequences which must be estimated; IT has a power beyond other technologies and thus need special attention; there exists no appropriate use of IT in the human services. However, more barriers have been documented to exist among practitioners than among clients (Mutschler, 1987a). Levitan, Willis, and Vogelgesang, (1985) claim that barriers come primarily from within the profession. Mathisen (1987) and Jaros, Levi, Larson, and Seiffer (1985) suggest some clinicians are threatened by the computer performing their clinical duties. IT use in HSO opens up a full spectrum of traditional practices, received (and perhaps revered) ways of doing things, and standard operating procedures to consideration. Even if productivity was increased the efforts and expenditures freed by IT may not be "rechanneled" into existing unmet needs (Lohmann, 1990). At best, direct service personnel envision IT as doing nothing more than assisting in case management (Boyd, Hylton, & Price, 1978).

Several authors have taken a 'blame the victim' approach in explaining the barriers to IT use. Hedlund, Vieweg, and Cho (1985a) suggest that computers support left brain logic while the recognition of patterns in clinical decision making may be more right-brain determined. Murphy, Pardeck, Nolden, & Pilotta (1987) suggest that practitioners resist IT use because of the insensitivity of technological reasoning, and the altered meaning of data.

Another common theme revolves around the practitioners' belief that IT dehumanizes the client (Mandell, 1989; Schoech, & Arangio, 1979; Murphy, Pardeck, Nolden, & Pilotta, 1987; Murphy, & Pardeck, 1986; Jaros, Levi, Larson, & Seiffer, 1985). However, Murphy and Pardeck, (1986) provide a convincing argument that computer generated data are not value-free because they were created with all the biases, and values of humans, and, thus, not possibly dehumanizing. A study by Quintanar, Crowell, Pryor, and Adamopoulous (1982) support this argument by demonstrating that while respondents do perceive computers as more mechanistic relative to human interviewers, it was the very quality that prompted more honest and open responses.

Levitan, Willis, and Vogelgesang, (1985) suggest that barriers within the area of computerized assessment stems from issues of the equivalency and validity of test administration, validity and potential abuse of computerized interpretation, and problems of confidentiality and access by the unqualified.

Lack of training in IT has been endorsed by many authors as the reason for barriers to IT use among human service professionals. Pardeck and Murphy

(1986) submit that clinical social workers do not have a strong scientific orientation, and that they do not have a history of employing psychometrics or other types of quantitative measurement. Pardeck, Umfress, and Murphy (1987) report that little or no computer training was provided in respondents' professional education, or in-service training. Lamb (1990) advances the opinion that human service education has not moved quickly enough to adopt IT because of faculty barriers.

Gender and age factors among faculty may influence student advising and access to training opportunities. Nurius, Richey, and Nicoll (1988) suggest that gender and age factors may affect student perceptions of computer ability and aptitude. "High Tech" is presently a "male" technology in both content and employment patterns (LaMendola, 1985). Fewer girls and women than boys and men are learning how to use computers. For example, one effect of the requirement for students to buy a personal computers was a 13 % drop in applications from women (Fiske, 1984, in LaMendola, 1985). Yet, the human services have been and will probably continue to be dominated by females.

Kimberly and Evanisko (1981) studied predictors of adopting innovations like IT and found that educational level was a significant predictor of use. Of the literature reviewed, no study used major or highest level of education as a predictor of IT use. However, Munson (1988) suggests that there is a more pronounced lack of understanding of IT in the 'helping professions' than in the 'hard sciences'. This author's university experience suggests that some faculties incorporate the training and use of IT to their curricula more than others.

Another barrier to IT use is the issue of confidentiality. Human service workers have questioned the capacity of IT to protect confidentiality for many years (LaMendola, 1985). Erdman and Foster (1988) outline the following factors: protecting the clients sense of dignity and worth, dehumanization, test interpretation, fairness and cultural bias, and covert evaluations. However, many authors feel that only the evaluation issues cannot be "dealt with easily". Schoech, Jennings, Schkade, and Hooper-Russell (1985) advance that expert system developers can be liable for the degree and impact of systems' use by human service professionals, clients, and the general public. Grenier (1970) looked at confidentiality from a legal standpoint and suggested that solutions belong to the computer industry itself and not to the users of IT. He felt that, in some respects IT is more secure than paper record-keeping systems. Confidentiality was one of the first ethical issues raised surrounding computer use, but seems to be resolved in the literature. The practitioners knowledge that computer files can be made safer and more secure than a file cabinet should add to reduced anxiety about the issue of confidentiality regarding IT use in the human services.

In analyzing five studies of computerphobia Rosen, Sears, and Weil (1987) suggest computerphobia is not math anxiety in disguise nor is it the result of lack of exposure to computers, nor can it be completely explained by computer illiteracy. Computerphobia can take at least three forms: computerphobics may display anxiety about computers, may have negative attitudes about computers, or may engage in disabling internal self-critical dialogues when interacting with

computers (Rosen, Sears, & Weil, 1987). Within the human service literature, the second form of 'computerphobia', - negative attitudes about computers - is given substantial mention, but is rarely researched. The following discusses the negative attitudes towards IT use as barriers to IT use.

The general population have both positive and negative attitudes towards computers (Rosen, Sears, & Weil, 1987). Clark (1988) reports that the attitude of the individual or group before a computer is purchased could be a key element in determining the motivation of computer use once purchased. It seems likely that a certain level of positive attitude is needed for initial use of IT; subsequent experience with IT influences attitudes. If this experience is positive, attitudes will become more favorable, creating a positive cycle between use and attitudes (Lucas, 1978).

Larsen (1987) suggests that the attitude towards IT use might be different between administrators and staff. Fuchs (1989) supports this view by suggesting the attitudes and perceptions of staff regarding computer technology in their organizations seemed to vary by position. Managers' perceived an increase in their productivity and in the amount of control over their work more so than direct service staff. Levi (1985) reports on four surveys of human service computer use. In one survey of mental health agencies administrators' attitudes toward computers tended to be the key factors related to the agency's decision to computerize.

Lucas (1978) summarized the findings of nine empirical studies to develop a descriptive model of IT implementation and found that user attitudes are related

to successful implementation. Probably the most significant finding from all of the studies is the positive relationship between attitudes and perceptions and implementation success.

Hedlund, Vieweg, and Cho (1985b) report that prior experiences, fear of being replaced by computers, and questions about risk and compromises have negatively influenced attitudes about the potential utility of the computer in clinical functions. Most clinicians have had experiences with computers that produced frustration and irritation and further entrenched subjective opinions or attitudes about the utility of computer in work (Hedlund, Vieweg, & Cho, 1985b). Clinicians' attitudes towards computers, toward their application, toward the impact of the application on their working conditions and autonomy and on their clinical prerogatives may all play an important role in utilization of an application (Siegel, & Alexander, 1987).

In Mandells' (1989) survey of a social service department, the majority of respondents indicated that computers offered benefits, that their use was appropriate and highly reliable. However, the respondents also indicated that computers are dehumanizing and a threat to the delivery of quality services. These results suggest a favorable attitude towards the computer 'itself', but a negative attitude regarding the effect that computers have.

Mutschler and Hoefer (1990) indicate that attitudes are often assumed to be important factors in IT use, but found the assumption false. However, their results are suspect. For example, they also found that not one respondent perceived

computer use led to breaches of client confidentiality. Similarly, in Grasso, Epstein, and Tripodi's (1988) study attitudes explained only 3.5% of variance in computer utilization. However, the Grasso et al. study was concerned with attitudes towards agency-based research utilization before and after introduction of an automated management information system. These discrepancies are examples of the often contradictory research in the literature surrounding IT use and attitudes.

This study suggests that differences exist between attitudes towards IT and attitudes towards utility and ease of using IT. Various research in the area of attitudes and technology support this same contention (Davis, 1986; Floyd, 1986; Pavri, 1986). For example, results of Pardeck, Umfress, and Murphy's (1987) study indicate that social workers attitudes towards IT were very positive. Specifically attitudes towards computers improving effectiveness and enabling practitioners to assist more clients were both positive. However, social workers' attitudes towards the utility of computers in direct practice or towards the issue of confidentiality were less than promising. For example, when asked if computers could conduct an interview, and if computers were a threat to client confidentiality, social workers responded negatively. Karger, and Kreuger (1988) go as far as to suggest that the involuntary user of computers perceives this technology not as an inert object, but an omnipresent force that monitors and controls work.

Schoech, and Arangio (1979) submit that the most important questions in human service organizations use of IT, should ask: *"What is the attitude of human service personnel toward computerization? Can previous findings of 'stiff*

opposition' be substantiated? If so, why do these attitudes exist and how can they be changed?"

Research on the attitudes of users has often targeted receptive groups and was based on the assumption that positive attitudes would be related to system acceptance and use (Siegel, & Alexander, 1987; Kjerluff, Counte, Salloway, & Campbell, 1984; Thoren, Smith, & Gould, 1969).

Specific attitudes serve as good predictors of certain types of behavior, since attitudes have an action component (Lucas, 1978). Knowing a person's attitudes about something helps predict his or her behavior. The present study's research model described in the following chapter also suggests that attitudes are a good predictor of use. If computers are to play a role in social welfare agencies, as they likely will, first impressions in regards to this technology are important in shaping users future attitudes and IT's future uses (Flynn, 1990b).

Summary

This section reviewed the literature on the barriers to information technology use in the human services. Three general areas of barriers were identified: technological, organizational, and individual characteristics. Individual characteristics in the form of attitudes towards the perceived utility and usefulness of information technology were identified as a predominant barrier and predictors of information technology use. Additional identified predictors were the human service managers' gender, age, and educational background.

CONCLUSION

As demonstrated in the preceding literature review, information technology is used in a variety of ways and there are benefits and barriers to human service managers' and organizations' information technology use. The literature reviewed in this chapter enabled selection of descriptors and predictors of human service managers' information technology use. Further explanation of the descriptors and predictors is provided by the operational definitions given in chapter 4. However, a framework is needed before the predictors of information technology use by human service managers can be conceptualized. The following chapter presents a conceptual framework that describes the theoretical and empirical support for the research model developed and used for the present study.

Chapter 3 - CONCEPTUAL FRAMEWORK

INTRODUCTION

This chapter describes the theoretical and empirical support for the research model developed by the author to address the study's second research question, "What are the predictors of human service managers' use of IT?" Fishbein and Ajzen's theory of reasoned action (TRA) provides a theoretical basis for the research model, and Davis's Technology Acceptance Model (TAM) provides empirical support for the research model. An overview of the TRA is provided first and a review of studies using the TRA and TAM follows. The TRA and the TAM will be contrasted in order to develop a research model that provides a framework for conceptualizing the predictors of human service managers' information technology use.

FISHBEIN'S THEORY OF REASONED ACTION

The TRA is an intention model that was developed in social psychology and is used to assist in the explanation of intended behaviours. As illustrated in Figure 3.1 (next page) Fishbein and Ajzen's TRA model describes the determinants of consciously intended behaviours (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975). The intention to perform a specific behaviour is determined by the behavioral intention (**BI**) to perform the behaviour. **BI** measures the strength of one's intention to perform a particular behaviour (Fishbein & Ajzen, 1975).

The TRA has substantial theoretical and empirical support. Several authors have tested the TRA's theoretical limitations, assumptions and have offered refinements and extensions (Bagozzi, 1981, 1982, 1984; Saltzer, 1981; Warshaw, 1980a, 1980b; Warshaw & Davis, 1984, 1985; Davis, 1986; Davis, Bagozzi & Warshaw, 1989). Extensive empirical support for the TRA also exists (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975; Ryan & Bonfield, 1975; Davis, 1986; Davis, et al. 1989; Pavri, 1986).

Figure 3.1
Theory of Reasoned Action

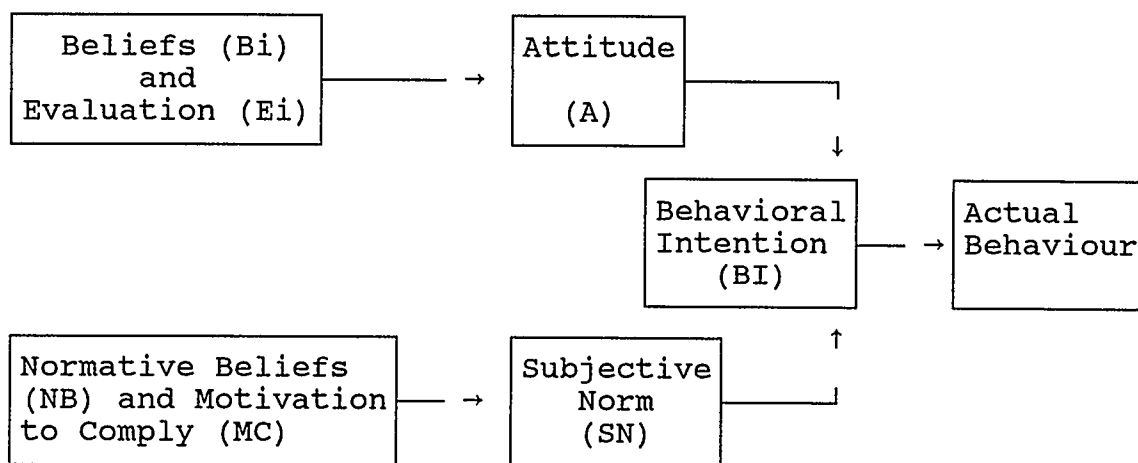


Figure 3.1 Schematic of theoretical framework for the prediction of intentions and behaviours. Fishbein and Ajzen, (1975). *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Don Mills, Ontario: Addison-Wesley Publishing Company.

BI is established by both a person's attitudes (**A**), which describes an individual's positive or negative feelings about performing the behaviour and subjective norm (**SN**). The later constitutes a person's perception about whether those who are important to him/her, think he/she should perform the behaviour.

$$BI = A + SN$$

Fishbein and Ajzen (1975) also advance that external variables to the model indirectly influence **BI**. External variables can include demographic or personality characteristics. For example, gender, age and educational background are considered demographic characteristics and can be considered external variables. Thus, gender, age, and educational background were included in this study.

Fishbein and Ajzen suggest that people's attitudes are determined by their beliefs (**B**) and that performing the behaviour will lead to consequence(s) (**i**) multiplied by the evaluation (**E**) of each **i**. Beliefs (**B**) are designated as the individual's subjective probability that rendering the behaviour will result in consequence **i**. Evaluation (**E**) is the implicit evaluative response to each **i**.

$$A = \sum Bi * Ei$$

Fishbein and Ajzen propose that **SN** are made of normative beliefs (**NB**) (perceived expectations by an individual of referent individuals and groups on whether or not to perform a specific behaviour) and by (**MC**) (the motivation to comply with the expectations).

$$SN = \sum NB * MC$$

The TRA is a well-researched intention model used in social psychology. Its aim is to explain almost any human behaviour (Ajzen & Fishbein, 1980). Therefore, the TRA is well-suited to address the second research question of this study, "What are the predictors of human service managers' use of information technology?"

RESEARCH ON THE THEORY OF REASONED ACTION IN RELATION TO INFORMATION TECHNOLOGY USE

Pavri (1986) used the TRA as a theoretical base to describe factors contributing to microcomputer usage. He elaborates on the framework and suggests that 13 constructs measure the factors contributing to microcomputer usage: belief, skills, quality, support, policies, peer usage, management usage, subordinate usage, secretarial usage, anxiety, attitude, subjective norms, and usage. Figure 3.2 depicts Pavri's conceptual model of microcomputer usage.

Figure 3.2
Microcomputer Usage Model

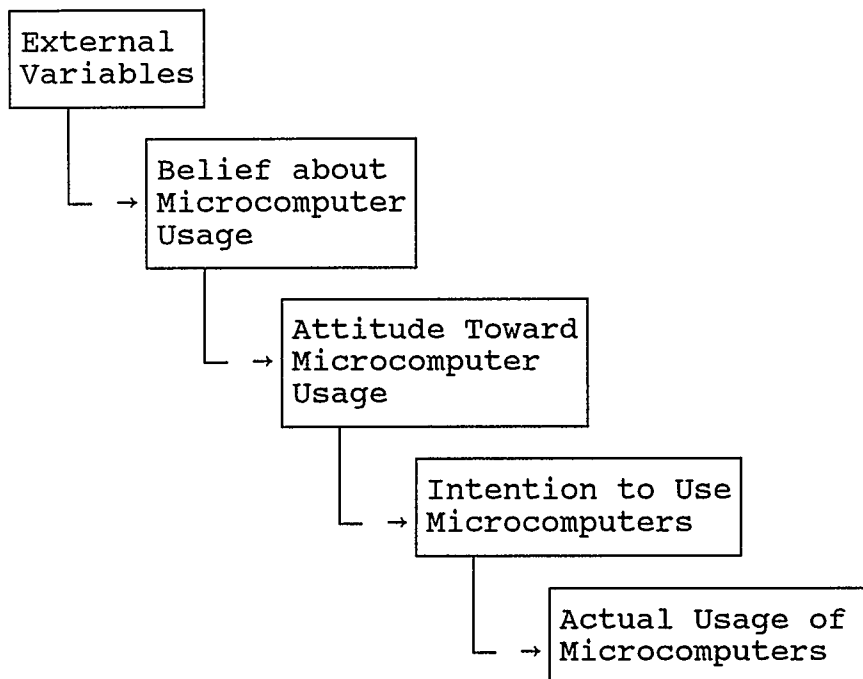


Figure 3.2 Conceptual model of microcomputer usage. Pavri, F. (1986). *An Empirical study of the factors contributing to microcomputer usage*. PhD. Dissertation, The University of Western Ontario.

Davis (1986) used the TRA as a theoretical basis, for an adapted version, (the Technology Acceptance Model (TAM)), that modeled user acceptance of information systems (see figure 3.3). The goal of the TAM was, "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis, 1989). Primary differences between the TRA and the TAM exist in the determination of **A** and the elimination of **SN** as discussed below.

Figure 3.3
Technology Acceptance Model

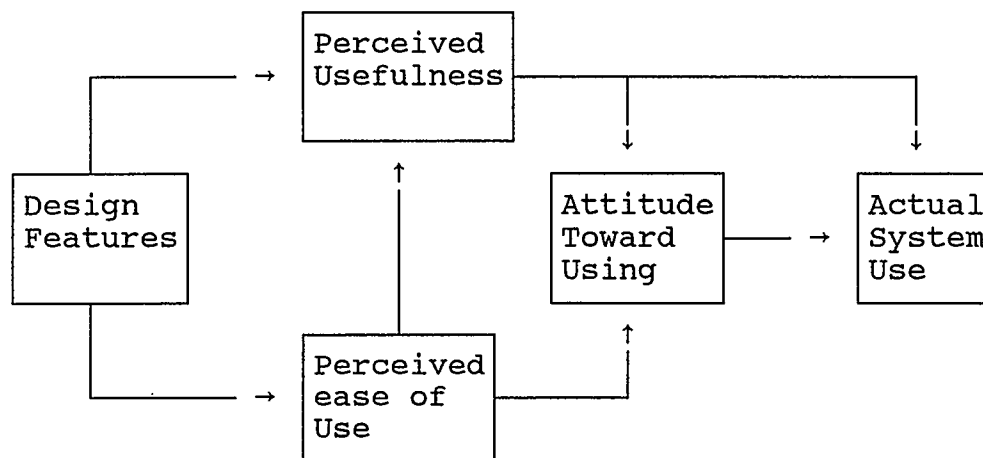


Figure 3.3 Conceptual model of technology acceptance. adapted from Davis, F. *A technology acceptance model for testing new end-user information systems: Theory and results*. PhD. Dissertation, Massachusetts Institute of Technology, (1986).

The TAM suggests that **BI** is determined by the person's attitude toward using the system (**A**) and its perceived usefulness (**U**).

$$\mathbf{BI} = \mathbf{A} + \mathbf{U}$$

However, the TAM differs from the TRA's position that sums beliefs **Bi** multiplied by the corresponding evaluation **Ei** to form a single construct. Instead the TAM suggests that beliefs, perceived usefulness (**U**) and perceived ease of use (**EOU**), are two separate constructs. Perceived usefulness (**U**) is defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" and perceived ease of use (**EOU**) is defined as "the degree to which the prospective user expects the target system to be free of effort" (Davis, 1989).

The TRA and the TAM also differ in how beliefs determine **BI**. In the TRA **Bi** and **Ei** determine **A**, which in turn, with **SN** determines **BI**. The TAM suggests that the belief **U** acts on **BI** and on **A**, and that **A** is jointly determined by **U** and **EOU**. The TAM points out that self-efficacy and instrumentality are the basic mechanisms of **EOU** and **U**, and describes how **EOU** and **U** influences **A**.

$$\mathbf{A} = \mathbf{U} + \mathbf{EOU}$$

The TAM does not suggest that beliefs (**U** and **EOU**) operate within a vacuum but, that they are both affected by various design features (**DF**). **DF** can include components such as windows or icons intended to enhance usefulness (**U**). **DF** could also be represent different printers equally easy to use (**EOU**) but one offers letter quality print while the other does not, thus the former is more

useful. Also, **U** is affected by **EOU** in that if **EOU** increases, the effort saved may be deployed to accomplishing more work, thus affecting **U**.

$$\mathbf{U} = f(\mathbf{EOU}) + f(\mathbf{DF})$$

$$\mathbf{EOU} = f(\mathbf{DF})$$

Development of a Research Model

In using the TRA, Pavri (1986) attempted to ascertain IT usage and opted not to use **BI** as a construct. Pavri assumed that the "intention to perform a behaviour will always predict the behaviour". This results in a departure from the TRA - a person's performance of a specific behaviour is determined by his or her behavioral intention to perform the behaviour in question. However, even with this limitation Pavri did find that the use of TRA explains a significant amount of variance in determining IT usage by surveying 519 managers in 77 of the largest 500 Canadian companies ($R^2 = .535$, $p < .05$).

Davis (1986) developed the TAM from the TRA. Using the TAM, Davis found notable relationships between the model's constructs and the **BI** of IT use. For example, in a counterbalanced within subjects design, 40 students were given a questionnaire. Davis found 'perceived usefulness' and 'perceived ease of use' are useful constructs in the prediction of IT ($R^2 = .385$, $p = <.004$; $R^2 = .467$, $p < .000$, respectively). In a later study of 107 managers' using the TAM Davis, Bagozzi, and Warshaw (1989) found that the model explained a moderate amount of variance in IT use ($R^2 = .47$, $p < .001$). Additionally, perceived usefulness contributes more than perceived ease of use in explaining IT use, but both

contribute significantly ($\beta = .61, p < .001$; $\beta = .24, p < .01$ respectively).

In a longitudinal study that compared the TRA with the TAM, Davis Bagozzi, and Warshaw (1989) found that **SN** of 107 users had little significant contribution in the determination of the **BI** to IT use ($\beta = 0.06$, time 1; $\beta = 0.08$, time 2, $p > .05$). Also, Pavri (1986) found that **SN** contributed little in the determination of **BI** to use IT ($\beta = .160, p < .001$). Given these findings, and Fishbein's and Ajzen's (1975) acknowledgement that **SN** is one of the least understood aspects of the TRA, the present study will not include the construct of **SN**.

The research model used in the present study is based on the author's adaptation of TRA and a modification of the TAM (see figure 3.4). The author made refinements as suggested by Fishbein and Ajzen (1975, 1980), and Davis (1986) and Davis, Bagozzi, and Warshaw (1989).

Figure 3.4
Research Model

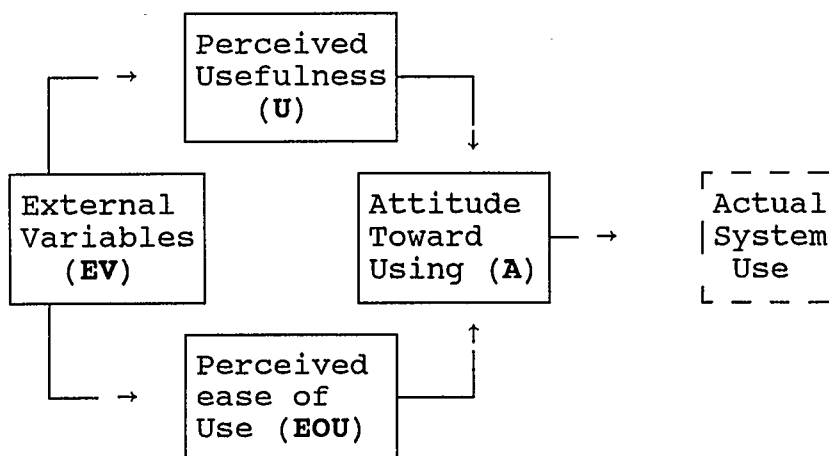


Figure 3.4 Research model based on the Theory of Reasoned Action (Fishbein & Ajzen 1975, 1980; Pavri, 1986) and Technology Acceptance Model (Davis, 1986; Davis, Bagozzi, & Warshaw, 1989):

In summary, given the:

- 1) theoretical and empirical support of the TRA for predicting behavioral intention (see page 34-35),
- 2) TAM is based on the TRA and has empirical support in determining the behavioral intention to use IT "... *across a broad range of end-user computer technologies and user populations*,..." (Davis, 1986), (see pages 37-40),
- 3) empirical support for perceived ease of use and perceived usefulness as two separate attitudes of IT use (see page 40),
- 4) empirical rejection of the construct 'Subjective Norms' in predicting behavioral intention to use IT and the overall theoretical confusion concerning its use (see page 41),
- 5) acceptance of demographic characteristics as external variables (see page 36), and
- 6) the need to empirically demonstrate if the constructs of perceived usefulness and perceived ease of use can be used to predict IT use,

the present study research model was used to predict the effect of human service managers' attitudes on their use of IT as well as to provide a framework for the other independent variables under consideration.

SUMMARY

The research model based on the theoretical and empirical support of the theory of reasoned action, the technology acceptance model, and the refinements made by the author address this study's second research question "What are the predictors of human service managers' use of IT?" The model was based on a review of the literature explaining the theory of reasoned action and the technology

acceptance model. The theory of reasoned action is a well researched model for the explanation of behavioral intention. The technology acceptance model was developed from the theory of reasoned action and is specific to the behavioral intention of information technology use by different user populations. The following chapter provides a description of the methodology employed and an operationalization of the research model presented in this chapter.

Chapter 4 - METHODOLOGY

INTRODUCTION

The first chapter described the intent and purpose of this study. Chapter two provided a review of the literature on utilization, benefits, and resistance to information technology (IT) in human service organizations (HSO). Chapter three described the conceptual framework and developed a research model that was used in this study. This chapter provides an operationalization of the research model that includes description of the study's design and procedure, data analysis techniques employed, and methodological limitations. A summary describing the highlights of the chapter is provided.

STUDY DESIGN AND PROCEDURE

This study was a quantitative descriptive study - a one-test or a single observation research design. Human service managers' attitudes towards the use of IT were surveyed using an extension of the Davis (1986) Technology Acceptance Model for predicting IT usage which was an adaptation of the Fishbein and Ajzen Theory of Reasoned Action (Fishbein & Ajzen, 1975). The intent of this study was to answer two research questions: 1) How and to what extent do human service managers' use IT in their practice?; and 2) What are the predictors of human service managers' use of IT?

A quantitative descriptive design (Tripodi, Fellin & Meyer, 1969) was selected because few studies have empirically examined the effect of attitudes on IT use in HSO, and, as discussed in chapter two, those that have, appear more to 'cloud' the issue than clarify it. Descriptions of the design and procedure of this study include setting, data collection method, pilot test of questionnaire, sampling method, sample characteristics, and operational definitions of study variables.

Setting

Calgary is a metropolitan centre located in the province of Alberta, Canada. The population of Calgary at the time of data collection (April, 1991) was 708,634. A wide array of HSO in Calgary includes eight major hospitals, six post secondary institutions, municipal and Royal Canadian Mounted Police law enforcement services, 17 nursing homes, provincial government social services, municipal social services, and hundreds of voluntary for profit and non-profit social services.

Data Collection Method

As is typical of most quantitative descriptive studies a self-administered questionnaire was used to obtain data for this study (Hyman, 1955, Moser, 1958 in Tripodi, Fellin & Meyer, 1969). This method was selected because of its ease of use, the increased confidentiality of responses, and cost efficiency (Grinnell, 1993). Data were collected between August 1, and October 31, 1991.

Pilot Test of Questionnaire

A pilot test of the questionnaire was used to establish content validity by assessing the correspondence between the measurement items and the underlying constructs they were intended to measure. Eight human service managers were given the questionnaire to complete and critique. Suggestions for modification were incorporated into the mail-out version of the questionnaire.

Sampling Method

Random sampling procedures were used to select a 30% sample from a population of 366. The Calgary Community Services Directory lists HSO in the city of Calgary and was used as the sampling frame for the study (Information Centre, Public Information Department, The City of Calgary, 1991). A sample size equal to 30% of the population was selected as 10% of the population is considered minimally sufficient for control over sampling error (Grinnell & Williams, 1990).

To ensure a high response rate, an adaptation of cluster random sampling was employed. A similar approach was used in a national study conducted by the Canadian Association of Social Workers and the Canadian Association of Schools of Social Work (1985/86/87). Each of the 366 listed agencies in the directory was randomly assigned to one of 122 clusters. As a result each cluster contained three agencies. A questionnaire was mailed on August 1, 1991 to the first of the three agencies listed in each of the clusters. The second mail-out was drawn only from those clusters not returning a completed questionnaire by August 31, 1991. The

first of the two remaining agencies listed in each of these clusters received a questionnaire on September 1, 1991. The third and final mail-out occurred on October 1, 1991 and only included clusters not returning a questionnaire from either of the first two mail-outs by September 30, 1991.

Response rates were high and consistent between mail-out dates (see Table 4.1). The percentage of questionnaires returned ranged between 66% and 75%. The mean response rate was 70.5% with a total 117 responding on time and a total of 12 responding late. Thus, the total sample size was 129.

Table 4.1
Month Mailed by Response Rates

Month Mailed	Questionnaires Sent		Returned On Time		Returned Late		Reply Rate
	n	%	n	%	n	%	%
August	122	63	69	59	10	83	70.5
September	53	27	33	28	2	17	66.0
October	20	10	15	13	0	-	75.0
Total	195	100	117	100	12	100	\bar{X} 70.5

The Chi-square, Student's *t*-test, and Kruskal-Wallis statistics were used to test for differences between respondents returning questionnaires on-time and those who were late. Findings indicated no statistically significant differences existed between groups on all independent variables. Therefore, respondents returning questionnaires late were included in the study group.

Sample Characteristics

A community directory containing descriptions of private non-profit agencies, government services and voluntary organizations that provided human services was used as a sampling frame (Information Centre, Public Information Department, The City of Calgary, 1991). The description of the manager's name and the mailing address of the organization were included.

Either the manager of the agency or the managers' designate became the respondent. To ensure that designates were appropriately included 'Chi-square, Student's *t*-test, and Kruskal-Wallis' statistics were used to test for differences between their and managers' responses. Findings indicated that no statistically significant differences existed between the managers and their designates across every independent variable. Therefore, managers' designates were included in the study group. Table 4.2 offers a break-down of respondents by position. 83.7% of the questionnaires were completed by managers and 8.5% by their designate.

Table 4.2
Respondent's Position

Position	n	%
Manager	108	83.7
Manager's designate	11	8.5
Missing cases	10	7.7
Total	129	99.9 ^a

^a not equal to 100 due to rounding.

Gender and age group make-up two typical ways of describing respondents' characteristics. Male respondents represented 40.3% of the sample and females 56.5% (see Table 4.3). This is consistent with the literature: there are more women than men in HSO (Reisman, 1990; Nurius, 1990; Lamb, 1990). Most respondents (36.4%) were in the 40 to 49 age group (see Table 4.4).

Table 4.3
Gender of Study Group

Gender	n	%
Males	52	40.3
Females	73	56.5
Missing cases	4	3.1
Total	129	99.9 ^a

^a not equal to 100 due to rounding.

Table 4.4
Age Groups of Study Group

Age Group	n	%
20 - 29	13	10.0
30 - 39	24	18.6
40 - 49	47	36.4
50 - 59	25	19.3
60 - 69	10	7.7
Missing cases	10	7.7
Total	129	99.7 ^a

^a not equal to 100 due to rounding.

Respondents' educational backgrounds were divided into three components: level, recency of graduation, and major. Most respondents (65%) have a university education (see Table 4.5). Most respondents' highest level of education was Bachelors (34.8%), the next largest group (21.7%) have Masters degrees. The largest number of respondents completed their highest level of education between 1980 to 1984 (16.2%) (see Table 4.6). Since 1980, almost one third (32.4%) of respondents completed their highest level of education. Most respondents (16.2%) majored in social work with the next largest group (12.4%) majoring in management (see Table 4.7).

Table 4.5
Highest Level of Education

Educational Level	n	%
High school diploma	19	14.7
College diploma	21	16.2
Bachelor's	45	34.8
Master's	28	21.7
Doctorate	11	8.5
Missing cases	5	3.8
Total	129	99.7 ^a

^a not equal to 100 due to rounding.

Table 4.6
Year of Graduation of Highest Level of Education

Graduating Year	n	%
1945 - 1949	3	2.3
1950 - 1954	4	3.1
1955 - 1959	4	3.1
1960 - 1964	8	6.2
1965 - 1969	15	11.6
1970 - 1974	20	15.5
1975 - 1979	15	11.6
1980 - 1984	21	16.2
1985 - 1989	15	11.6
1990 -	6	4.6
Missing cases	18	13.9
Total	129	99.7 ^a

^a not equal to 100 due to rounding.

Table 4.7
Major of Highest Level of Education

Educational Major	n	%
Management	16	12.4
Medicine	5	3.8
Psychology	12	9.3
Social Work	21	16.2
Nursing	3	2.3
Science	7	5.4
Education	10	7.7
Secretarial Arts	2	1.5
Law	2	1.5
Computer Science	1	.7
General Studies	7	5.4
Missing cases	43	33.3
Total	129	99.5 ^a

^a not equal to 100 due to rounding.

Operational Definitions of Study Variables

The literature reviewed in chapter two, the conceptual framework of chapter three and accepted guidelines of ethical research contributed to the design of the data collection instrument. For example, the front page of the questionnaire (Appendix A) potential respondents were informed of the study purpose and asked for their consent and involvement in the study. The following discusses operationalization of the descriptors, predictors (independent variables) and the dependent variables used in the present study.

Descriptors

The second section of the questionnaire (Appendix B) was based on a review of the literature and the author's experience with IT in human services. This section was created to address the study's first research question, "How and to what extent do human service managers' use IT in their practice?" Since no discriminant validity testing was employed, items can only be assumed to be distinct. Thirty-two descriptors of IT use by human service managers were used. Twenty-nine were identified by the literature presented in chapter two, and three (simulation, intra-agency networking, and desktop publishing) were added by the author. Respondents were asked to indicate the frequency of their weekly use of each descriptor of IT. For ease of use a range from '0 through 5' was provided along with a blank space.

Independent Variables

Independent variables were identified by the literature or from the author's experience and are included in the research model of this study. Each independent variable provides part of the answer to the study's second research question, "What are the predictors of human service managers' use of IT?"

Many instruments measure attitudes toward IT usage, but were deemed inappropriate for use in this study. For example, Reece and Gable (1982), Loyd and Gressard (1984), Popovich, Hyde, and Zakrajsek (1987) developed scales based on students' responses, and Brown and Brown, (1988) on the responses of elderly adults. Doll and Torkzadeh (1988) developed a scale that emphasized the end-user environment. Floyd (1986) developed a set of scales determining use of IT by managers from an organizational structure perspective.

Davis Bagozzi, and Warshaw (1989) developed an attitude scale with the intent of "...explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified." This attitude scale is comprised of two sub-scales, 'perceived ease of use' and 'perceived usefulness'. Items for the scale were derived from a content analysis of literature using the following definitions:

Perceived ease of use: *The degree to which an individual believes that using a particular system would be free of physical and mental effort,*

Perceived usefulness: *The degree to which an individual believes that using a particular system would enhance his or her job performance.*

The scale's strength and utility can be estimated from its reliability and validity. Davis (1986) achieved high Cronbach alpha reliabilities for each set of ten items used in this study to measure 'perceived ease of use' and 'perceived usefulness' attitudes (.91, .97, respectively, $n = 112$). Estimates of convergent validity for the items Davis used to assess 'perceived ease of use' and 'perceived usefulness' had moderate to high correlations ($r = .40$ to $r = .79$, $r = .54$ to $r = .93$ respectively).

The section of the questionnaire that was used to assess attitudes (Appendix C) contained 20 statements concerning the use of computers was developed by Davis (1986). For each of the twenty items respondents were asked to indicate, on a seven point Likert scale the extent of their agreement with each statement. The first ten statements related to the sub-scale 'perceived ease of use', and the remaining ten pertained to the sub-scale of 'perceived usefulness'. Of the twenty statements, ten were reversed scored - five for each sub-scale, numbers 2, 4, 6, 8, 10, 11, 13, 14, 17, and 20. Each sub-scales' totals could range from 10 to 70. The overall attitude score could range from 20 to 140. Higher scores indicated more positive attitude.

Five demographic variables were also included: gender, age, highest level of education, year of graduation of highest level of education, and major of highest level of education. 'Proximal availability' as an independent variable was identified by the author and also included. These six variables are found on the fourth page of the questionnaire (Appendix D).

Dependent Variables

Measuring human service managers' IT use becomes a useless exercise if the extent of IT use is not given within an appropriate context. For example, percentages of agencies using IT are often reported (Butterfield, 1988; Siegel & Alexander, 1987; Overman, 1988). However, reporting IT use in this way usually does not indicate the context for the extent of use. While suggesting if IT is used, it does not indicate how often, how long or what duration use occurred within.

The present study measured the dependent variable in three different ways. The measures are related to the different aspects of the dependent variable (human service managers' use of IT) and included: frequency of using IT, magnitude of using IT, and duration of using IT (see questions 26 - 28, Appendix D). All three dependent measures were reported, thus providing context for describing how IT was used by human service managers. However, for the purposes of prediction it was decided to include only the magnitude of IT use. The findings that the magnitude of IT use was part of the regression model most predictive of human service managers' IT use served as the basis for this decision.

DATA ANALYSIS TECHNIQUES EMPLOYED

This study intended to answer two questions: 1) How and to what extent do human service managers' use IT in their practice? and 2) What are the predictors of human service managers' use of IT? Descriptive and inferential data analysis techniques were used to address these two questions.

Descriptive statistics were used to address this study's first research question. Specifically, percentages, mean as a measure of central tendency, and standard deviation as a measure of variability.

Inferential statistics, specifically multiple regression were used to address the study's second research question. Eight predictors (X_{1-8}) of human service managers' IT use (Y) were identified. Kerlinger and Pedhazur (1973) suggest that multiple regression is used when "... a method of analyzing the collective and separate contributions of two or more independent variables, X_i , to the variation of a dependent variable Y " is needed. Together, gender, age, highest level of education, graduating year of highest level of education, major of highest level of education, proximal availability, perceived ease of use, and perceived usefulness are the independent variables that contribute to cause variation in the dependent variable human service managers' IT use. Multiple regression techniques allow the assessment of the relative contributions of each of the study's independent variables toward predicting the dependent variable (Tabachnick, & Fidell, 1983; Norman, & Streiner, 1986).

The use of multiple regression requires a model which reflects hypothesized relationships between independent variables and the dependent variable. The relationships used in this study were determined by theory and empirical research and were described in the form of a research model presented in the previous chapter. The following multiple regression equation describes the model.

$$Y_1 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 \text{ where}$$

Y_1	=	magnitude of IT use,	a	=	the intercept constant,
b_{1-8}	=	regression coefficients,	X_1	=	gender,
X_2	=	age,	X_3	=	highest level of education,
X_4	=	graduating year,	X_5	=	educational major,
X_6	=	proximal availability,	X_7	=	perceived ease of use, and
X_8	=	perceived usefulness.			

By way of analysis, independent variables were assigned a partial regression coefficient (b_{1-8}) relative to their importance in predicting human service managers' IT use. Step-wise regression was used to understand the relative contributions of the independent (predictor) variables. A variable was included into the equation if it met or exceeded a significance level of .05, and excluded if it exceeded a significance level of .10 or greater. In step-wise regression these weights (b_{1-8}) and their associated part correlation coefficients (R^2) served as estimates for predicting human service manager's IT use based on the model.

Categorical variables must be re-coded if used in a multiple regression analysis (Kerlinger, 1986). Gender, highest level of education, educational major, and proximal availability are categorical variables and were re-coded to form dichotomous 'dummy' variables (ie. all responses are coded as either '0' or '1').

The potential of multicollinearity in the regression analysis was not ignored. Collinearity diagnostics indicated a low variance inflation factor of 1.002 (well below the guideline of 10) as well as a low condition index of 11.01 well under the general guideline of 100. Correlations between all but two independent variables were low (see Appendix E) and did not exceed levels accepted by other researchers (Kimberly & Evanisko, 1981). Respondents' age and year of graduation were strongly correlated ($r .75$). However, this is expected given the nature of the

variables in question, and therefore both were included in the analysis. Thus, overall it would seem multicollinearity was not a problem for this model.

METHODOLOGICAL LIMITATIONS

The following describes several limitations contained in the study's methodology. Threats to external and internal validity are included.

It is assumed that the random sample used in the present study was representative of the general population. However, since HSO in the Calgary Community Services Directory volunteer to be listed they may differ from those HSO that did not volunteer. Thus, it is not possible to generalize findings to managers of other HSO without substantially increasing the possibility of error.

Respondents may have reacted to a request for participation in a research study in manner that discredits their response and/or does not allow for findings to be generalized beyond the sample used. Although a letter of consent stated that responses were confidential, respondents may still have provided responses that would make them or their agency be viewed in a positive way. For example, many agencies identify computers on-site as a 'status symbol' (Larsen, 1987). Additionally, those who were sent a questionnaire, but choose not to respond may be different in some way from those who responded. However, it is assumed that random sampling would account for respondent differences.

The questionnaire mail-outs were sent-out over a three month period beginning in August and ending in October, 1991. Between July and September,

1991 mail service was disrupted by a rotating strike by Canada Post employees. Although questionnaire return rates were similar for each month, a decrease in late returns and an increase for on-time returns was evident. However as mentioned earlier, there were no statistically significant differences between respondents who returned questionnaires on-time and those who were late.

SUMMARY

This chapter described how the research variables were operationalized. A single observation research design and an adaptation of cluster random sampling were used. Managers from 366 human service organizations in Calgary, Alberta were mailed a pilot-tested questionnaire. The questionnaire formed the basis for operational definitions of the independent and dependent variables and was used to collect information about the study sample (see Appendices A, B, C, and D). Brief description of, and justification for using descriptive and multiple regression statistics was provided. Additionally, an explanation of the methodological limitations and how they were addressed was presented. The next chapter presents the findings that answer both of this study's research questions: 1) How and to what extent do human service managers' use IT in their practice?; and 2) What are the predictors of human service managers' use of IT?

Chapter 5 - RESULTS

INTRODUCTION

This chapter presents the analysis of the study findings. Descriptive statistics address how and to what extent human service managers apply information technology (IT) to their practice. Stepwise regression was used to predict human service managers' IT use. The descriptive findings are reported first followed by the predictors of human service managers' IT use.

DESCRIPTORS OF HUMAN SERVICE MANAGERS' INFORMATION TECHNOLOGY USE

In keeping with a quantitative descriptive focus, the study used descriptive procedures for data analysis (Tripodi, Fellin, & Meyer, 1969). The descriptive procedures included percentages, mean, and standard deviation. Percentages were used to provide the opportunity for comparison to other studies. Mean and standard deviation were used as they are useful and complimentary descriptive statistics (Weinbach & Grinnell, 1991) and taken together the three descriptive procedures answer the study's first research question: "How and to what extent do human service managers' use IT in their practice?"

The specific descriptors of human service managers' IT use operate within the context of three measures of IT use, frequency, magnitude and duration. Human service managers answered three separate questions to determine the

frequency, magnitude, and duration of IT use (see Appendix D, question numbers 26, 27, and 28). As presented in Table 5.1, managers' mean frequency of using IT was 19.5 times per week with an average magnitude of 10.03 hours per week (equal to approximately .5 hours each time) for a duration of 5.71 years.

Table 5.1
General Measures of Information Technology Use

Measure of Use	\bar{X}	<i>SD</i>	<i>n</i>
Frequency ^a	19.50	30.82	123
Magnitude ^b	10.03	9.21	123
Duration ^c	5.71	4.14	124

^a times used per week; ^b hours used per week; ^c years used.

Human service managers were asked to indicate the frequency of their weekly use in regards to 32 different computer applications (see Appendix B). Table 5.2 (page 61) presents a list of 32 types of IT (how) by percentages (extent) of human service managers' IT use.

As demonstrated in Table 5.2 managers' extent of using IT varies according to the descriptor (application) of IT. The five most used applications by human service managers are word processing, internal reports, external reports, statistical, and data base management (77.8%, 71.4%, 59.8%, 58.4%, and 58.3% respectively). The three least used applications by human service managers are simulations, clinical decision-making, and diagnostic (6.2%, 7.0%, and 7.8%).

Table 5.2
Descriptor by Extent of Information Technology Use

Descriptor (Applications)	Extent of Use (percentages)			
	Not Used	Used	Missing Cases	Total
Word processing	18.6	77.8	3.9	100.3
Spreadsheet	40.3	49.6	10.1	100.0
Data base management	31.8	58.3	10.1	100.2
Statistical	32.6	58.4	9.3	100.3
Desktop publishing	60.5	31.1	8.5	100.1
Accounting	45.0	45.8	9.3	100.1
Budgeting	48.1	42.6	9.3	100.0
Fund raising	65.9	23.4	10.9	100.2
Payroll	58.9	30.3	10.9	100.1
Personnel	54.3	33.5	12.4	100.2
Scheduling	53.5	33.5	13.2	100.2
Inventory	62.8	25.0	12.4	100.2
Mailing lists	40.3	49.0	10.9	100.2
Membership	51.2	38.9	10.1	100.2
Internal reports	19.4	71.4	9.3	100.1
External reports	31.0	59.8	9.3	100.1
Research	48.1	42.7	9.3	100.1
Client/patient intake	63.6	26.5	10.1	100.2
Interviewing clients/patients	75.2	14.8	10.1	100.1
Assessment	77.5	12.5	10.1	100.1
Diagnostic	82.2	7.8	10.1	100.1
Client/patient records	55.0	35.9	9.3	100.2
Treatment planning	74.4	15.6	10.1	100.1
Case management	69.8	20.2	10.1	101.1
Client/patient tracking	61.2	28.1	10.9	100.2
Client/patient outcome	70.5	19.5	10.1	100.1
Clinical decision-making	82.9	7.0	10.1	100.0
Intra-agency networking	62.8	28.7	8.5	100.0
Inter-agency networking	62.8	28.7	8.5	100.0
Simulations	82.9	6.2	10.9	100.0
Training	68.2	22.5	9.3	100.0
Literature search	69.8	20.3	10.1	100.2

Note: totals not equal to 100 due to rounding; $N = 129$.

PREDICTORS OF HUMAN SERVICE MANAGERS' INFORMATION TECHNOLOGY USE

This section will present the findings from the multiple regression that were used to answer the second research question of this study, "What are the predictors of human service managers' use of IT?" The section contains three parts: the description of the predictors of 'human service managers attitudes' towards the use of IT, a description of the 'predictor demographic variables' as they relate to attitudes of human service managers' IT use, and, finally the findings complimenting the regression equation identified in chapter four.

Managers' Attitudes Toward Information Technology Use

Human service managers were asked to respond to two sets of ten questions to determine their attitude towards IT use. The first set of ten questions determined respondents' 'perceived ease of use' score (see Appendix C questions 1 to 10). The second set of ten questions ascertained human service managers' 'perceived usefulness' score (see Appendix C questions 11 to 20). Table 5.3 displays the respondents' mean attitude scores for 'both perceived ease' of use and 'perceived usefulness', as well as an overall, or combined, mean score. The mean score for 'perceived usefulness' was higher than the mean attitude score for 'perceived ease of use' ($M = 57.78$, $M = 43.97$ respectively). A value of 101.77 represents respondents overall mean attitude score.

Table 5.3
Attitudes Toward the Use of Information Technology

Attitude	\bar{X}	<i>SD</i>	<i>n</i>
Perceived Ease of Use ^a	43.97	9.30	122
Perceived Usefulness ^a	57.78	7.53	118
Overall ^b	101.77	14.20	116

^a minimum score = 10, maximum score = 70; ^b minimum score = 20, maximum score = 140.

Description of Demographic Variables

The literature identified six demographic variables. This section describes each in relation to the managers' mean attitude scores of 'perceived ease of use' and 'perceived usefulness' towards IT use. Demographic variables included: gender, age, highest level of education, year of graduation with highest level of education, major of highest level of education, and proximal availability.

As can be seen in Table 5.4 (following page) there are two key findings concerning respondents' gender. One, females' mean scores across both 'perceived ease of use' and 'perceived usefulness' attitudes were higher than males' ($M = 45.18$, $M = 42.28$; $M = 58.33$, $M = 57.14$ respectively). Two, overall mean 'perceived usefulness' attitude scores were higher than 'perceived ease of use' attitude scores ($M = 57.84$, $M = 44.00$).

Table 5.4
Gender by Attitudes Towards the Use of Information Technology

Gender	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	SD	n	\bar{X}	SD	n
Female	45.18	9.33	72	58.33	7.82	69
Male	42.28	9.16	49	57.14	7.14	48
Overall	44.00	9.34	121	57.84	7.54	117

Human service managers were asked to indicate the date of their birth (see Appendix D, question 21). Table 5.5 on the following page presents respondents' mean attitude scores by age groups. Across all age groups, the mean scores and variability of 'perceived ease of use' are lower than the mean scores and variability of 'perceived usefulness' ($M = 51.92$, $SD = 4.57$, $M = 63.33$, $SD = 4.37$, $M = 41.54$, $SD = 8.89$, $M = 55.04$, $SD = 7.54$, $M = 44.26$, $SD = 8.64$, $M = 58.17$, $SD = 8.47$, $M = 41.69$, $SD = 9.65$, $M = 57.08$, $SD = 5.30$, $M = 41.37$, $SD = 12.21$, $M = 59.42$, $SD = 9.12$ respectively). Respondents in the youngest age group had the highest mean scores for both 'perceived ease of use' and 'perceived usefulness' attitudes towards the use of IT ($M = 51.92$, $M = 63.33$ respectively). Also, it is important to note that the second youngest age group had the lowest mean score for 'perceived usefulness' and the second lowest mean score for 'perceived ease of use' ($M = 55.04$, $M = 41.54$ respectively).

Table 5.5
Age Groups by Attitudes
Towards the Use of Information Technology

Age Group	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	SD	n	\bar{X}	SD	n
20 - 29	51.92	4.57	13	63.33	4.37	12
30 - 39	41.54	8.89	24	55.04	7.54	23
40 - 49	44.26	8.64	46	58.17	8.47	46
50 - 59	41.69	9.65	26	57.08	5.30	25
60 or higher	41.37	12.21	8	59.42	9.12	7
Overall	43.78	9.26	117	57.92	7.58	113

Human service managers were asked to indicate their highest level of education (see Appendix D, question 23). Table 5.6 (next page) displays respondents' highest level of education by mean scores of 'perceived ease of use' and 'perceived usefulness' attitudes toward IT use. Between the two attitudes, the latter had higher overall mean scores across all levels of education ($M = 56.38$, $M = 42.73$, $M = 58.50$, $M = 46.61$, $M = 57.23$, $M = 44.48$, $M = 58.85$, $M = 43.35$, $M = 59.70$, $M = 41.90$ respectively). Additionally, there seems to be an association of higher levels of education with higher mean 'perceived usefulness' scores ($M = 56.38$, $M = 58.50$, $M = 57.23$, $M = 58.85$, $M = 59.70$ respectively). However, the reverse seems to be true for mean 'perceived ease of use' scores and education ($M = 42.73$, $M = 46.61$, $M = 44.48$, $M = 43.35$, $M = 41.90$ respectively).

Table 5.6
Educational Level by Attitudes
Towards the Use of Information Technology

Educational Level	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	<i>SD</i>	<i>n</i>	\bar{X}	<i>SD</i>	<i>n</i>
High School Diploma	42.73	7.86	19	56.38	7.41	18
College Diploma	46.61	10.64	21	58.50	8.02	20
Bachelor's	44.48	9.30	41	57.23	8.28	39
Master's	43.35	10.14	28	58.85	6.74	28
Doctorate	41.90	7.10	10	59.70	6.29	10
Overall	44.10	9.34	119	57.93	7.53	115

Respondents were asked to indicate the year they graduated with their highest level of education (see Appendix D, question 23). Table 5.7 (page 68) breaks-down 'perceived ease of use' and 'perceived usefulness' by graduating year. All 'perceived ease of use' mean scores were lower than 'perceived usefulness' mean scores for all groups ($M = 41.00, M = 63.00, M = 35.00, M = 56.50, M = 35.00, M = 57.25, M = 47.25, M = 60.00, M = 43.00, M = 58.60, M = 44.05, M = 56.68, M = 43.42, M = 55.28, M = 43.76, M = 58.05, M = 48.26, M = 57.46, M = 50.00, M = 66.75$ respectively). Respondents graduating with their highest level of education since 1990 have the highest mean scores for both attitudes ($M = 50.00, M = 66.75$). The lowest mean 'perceived ease of use' score belonged to respondents graduating between 1950 and 1959 ($M = 35.00$). However, it was those who graduated between 1975 and 1979 who received the lowest 'perceived usefulness' mean scores ($M = 55.28$).

Table 5.7
 Graduating Year by Attitudes
 Towards the Use of Information Technology

Graduating Year Group	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	<i>SD</i>	<i>n</i>	\bar{X}	<i>SD</i>	<i>n</i>
1945 - 1949	41.00	13.74	3	63.00	9.89	2
1950 - 1954	35.00	9.89	2	56.50	7.77	2
1955 - 1959	35.00	13.61	4	57.25	7.50	4
1960 - 1964	47.25	11.34	8	60.00	7.91	7
1965 - 1969	43.00	7.55	15	58.60	7.04	15
1970 - 1974	44.05	10.42	18	56.68	6.54	19
1975 - 1979	43.42	7.60	14	55.28	9.32	14
1980 - 1984	43.76	7.55	21	58.05	7.52	20
1985 - 1989	48.26	11.39	15	57.46	8.18	15
1990 - present	50.00	3.34	6	66.75	4.27	4
Overall	44.36	9.48	106	57.92	7.64	102

Human service managers were asked to indicate their educational major (see Appendix D, question 23). Table 5.8 compares mean attitude scores across levels of education. In all but one major (computer science) the mean scores of 'perceived ease of use' are lower than the mean scores of 'perceived usefulness' (management $M = 40.81$, $M = 57.80$, medicine $M = 40.20$, $M = 61.60$, psychology $M = 48.27$, $M = 61.72$, social work $M = 44.45$, $M = 56.16$, nursing $M = 44.33$, $M = 55.66$, science $M = 39.50$, $M = 59.66$, education $M = 48.90$, $M = 57.90$, secretarial arts, $M = 62.00$, $M = 68.00$, law $M = 53.50$, $M = 65.50$, computer science $M = 41.00$, $M = 38.00$, general studies $M = 44.14$, $M = 55.57$ respectively).

Table 5.8
Educational Major by Attitudes
Towards the Use of Information Technology

Educational Major ^a	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	<i>SD</i>	<i>n</i>	\bar{X}	<i>SD</i>	<i>n</i>
Management	40.81	8.68	16	57.80	8.08	15
Medicine	40.20	8.13	5	61.60	5.85	5
Psychology	48.27	7.93	11	61.72	6.54	11
Social Work	44.45	10.11	20	56.16	6.93	18
Nursing	44.33	2.30	3	55.66	10.59	3
Science	39.50	14.81	6	59.66	6.37	6
Education	48.90	9.33	10	57.90	8.60	10
Secretarial Arts	62.00	8.48	2	68.00	2.82	2
Law	53.50	4.94	2	65.50	0.70	2
Computer Science	41.00	0.00	1	38.00	0.00	1
General Studies	44.14	8.25	7	55.57	8.84	7
Overall	44.74	9.85	83	58.28	7.89	80

^a major of the highest level of education.

Human service managers were asked to indicate to what extent computers are currently available for their personal use (see Appendix D, question 25). Table 5.9 (page 70) reports findings associated with the proximal availability of IT and the associated mean attitude scores of 'perceived ease of use' and 'perceived usefulness'. Across all locations of IT the mean scores for 'perceived ease of use' were lower than 'perceived usefulness' scores ($M = 42.66$, $M = 53.37$, $M = 43.22$, $M = 57.61$, $M = 44.62$, $M = 58.43$ respectively).

Table 5.9
Proximal Availability by Attitudes
Towards the Use of Information Technology

Proximal Availability	Attitudes					
	Perceived Ease of Use			Perceived Usefulness		
	\bar{X}	SD	n	\bar{X}	SD	n
Not at all	42.66	8.73	9	53.37	9.48	8
Within office, but not at desk	43.22	9.92	44	57.61	6.15	44
At my desk	44.62	9.05	69	58.43	8.03	66
Overall	43.97	9.30	122	57.78	7.53	118

Predictor Variables

Predictor variables included in the stepwise multiple regression analysis, were described by the equation introduced in chapter four and are provided here again: $Y_1 = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8$ where,

Y_1	=	magnitude of IT use,	a	=	the intercept constant,
b_{1-8}	=	regression coefficients,	X_1	=	gender,
X_2	=	age,	X_3	=	highest level of education,
X_4	=	graduating year,	X_5	=	educational major,
X_6	=	proximal availability,	X_7	=	perceived ease of use,
X_8	=	perceived usefulness.			

As presented in Table 5.10 there were two significant variables in the equation that were part of the research model - age and proximal availability. Age and proximal availability each had moderate r (raw correlations) values (-.42 and .40 respectively), but made significant contributions (partial regression coefficients) in predicting human service managers' IT use ($\beta = -.40$, and $\beta = 8.84$ respectively).

The research model used for this study explains 39% (R^2 part correlation coefficient) of the variance in human service managers' use of IT ($p < .0000$). The resulting equation of the significant variables is $Y_1 = 22.78 (a) + 8.84(X_8) - .40(X_2)$, where,

SUMMARY

This chapter presented findings based on the analysis of data collected for the present study. Tables and text were used to describe how and to what extent managers in human service organizations apply information technology to their practice. Additionally, findings depicting the contributions of the variables identified in the research model that predict human service managers' IT use were presented. The following chapter discusses these findings, offers implications to the human services and makes recommendations for future research.

Chapter 6 - DISCUSSION

INTRODUCTION

This chapter presents a discussion of this study's findings. The first and second sections present the descriptors then the predictors used to address this study's two research questions and, thus, realize the intent of this study, 'How and to what extent do human service managers' use IT in their practice?'; and 'What are the predictors of human service managers' use of IT?' The third section discusses the implications of this study's findings for human service managers, human service educators, practitioners, students, and information technology (IT) consultants. Recommendations for future research conclude this chapter.

DESCRIPTORS OF HUMAN SERVICE MANAGERS' INFORMATION TECHNOLOGY USE

This section discusses the study's findings as they relate to the research question, "How and to what extent do human service managers' use IT in their practice?" First, a discussion on the context (or measurement) of how human service managers use IT in their practice is presented. It is followed by a discussion of the specific descriptors (applications) used within this context.

Human Service Manager's General Information Technology Use

There is no known research that studied 'frequency', 'magnitude' and

'duration' of IT use by human service managers. Additionally, no human service research measured the 'magnitude' of IT use.

Although some research has measured the 'frequency' of using IT, no consistent format of measurement exists. For example, Pardek, Umfress, and Murphy (1987) measured 'frequency' of using IT among 59 human service workers by reporting the findings in the following way: 12% used IT daily, 7% used IT 1 to 4 times a day, 7% used IT monthly, with 35% never using IT even though it was available to them. In another study by Mandell (1989), among 44 human service professionals 33% were using IT 'occasionally (a few times a week)'. This study found that human service managers' average 'frequency' of IT use was 19.5 times per week. Due to the variety of formats measuring the 'frequency' of IT use, no direct comparison can be made.

Human service managers' 'magnitude' of using IT was on average 10.03 hours per week. This would indicate that, on average, human service managers' use of IT lasted approximately one half hour each time they used IT.

Upon comparison of current to previous studies the 'duration' (number of years) human service professionals have been using IT has dramatically increased. However, previous findings were reported four years prior to the collection of data for the present study. Taking into account this time difference, the present study's findings of 5.71 years average 'duration' in using IT is very similar to Wagner's (1987) findings of 1.6 years average 'duration' of using IT.

As can be noted, the current study's findings are comparable to other

literature when common measurement was used. It is also the only study that combines 'frequency', 'magnitude' and 'duration' in describing IT use. For example, in the context of this study findings indicate human service managers have been using IT one half hour at a time, twenty times per week for almost six years. By comparison to the literature, this change in IT use, did not result from increased 'duration' of use (six years), but from increases in 'frequency' (20 times per week) and 'magnitude' (½ hour) of use. It is suggested here that a more comprehensive description must be applied to enable cross study comparisons. The rapidly increasing rates of IT use make this a necessary condition so that current technology use and the ability to predict IT use can be better understood.

Human Service Managers' Specific Information Technology Use

This study found that human service managers primarily use IT in their practice for the purposes of 'word processing', 'data base management', 'statistical', and 'internal' and 'external reports'. The extent of usage is very similar to that reported by other authors (see page 13, table 2.1). However, whether 'internal and external reports' are applications or the end products that more commonly known applications (word processing, data base management, statistical) are used for seems less obvious.

This study found that human service managers use 'word processing' in their practice the most of all applications. Second most used are 'internal reports' and third are 'external reports'. One would assume that the production of an

internal and/or external report minimally requires the use of 'word processing', and/or 'data base management', and/or 'statistical' applications. 'Data base management', and 'statistical' applications were the next two most used applications by human service managers. This could indicate that human service managers use 'word processing', 'data base management', and 'statistical' applications for 'internal reports' and 'external reports'.

This study found the extent of human service managers' and human service professionals' use of 'word processing', 'data base management' and 'statistical' applications are approximately the same (see page 13 and page 61). This would seem to contradict the assumption that human service managers have clerical staff use 'word processing' on their behalf. However, the contradiction may be partly explained by the study's respondents' misinterpreting the questionnaire that asked for managers' personal 'frequency' of weekly use and not the managers' staff use.

Human service managers use IT in their practice the least for 'diagnostics', 'clinical decision making', and 'simulations'. Again, the literature reviewed in chapter 2 support these findings (Mutschler & Hoefer, 1990; Nurius, Richey & Nicoll, 1988; and, Finn, 1988/89). These findings do not seem surprising, as it is assumed that most managers do not use computers for the purposes of non-managerial work ('diagnostics', 'clinical decision making', and 'simulations').

Human service managers' use of the remaining IT applications range between approximately 20% and 40%. As compared to the literature (see table 2.1) this study's findings show less frequent use. The difference becomes

explainable if one assumes that human service managers do not have many direct client/patient work responsibilities.

In summary, how human service managers' use IT in their practice is comparable to findings in the literature. For example, human service managers and human service personnel in general seem to use the most and least popular applications to about the same extent. However, less frequent use exists in human service managers' than human service personnel in use of all other applications. The next section presents a discussion that addresses this study's second research question 'What are the predictors of human service managers' use if IT?'

PREDICTORS OF HUMAN SERVICE MANAGERS' INFORMATION TECHNOLOGY USE

Literature reviewed in chapter two identified gender, age, highest level of education, year of graduation of highest level of education, educational major, proximal availability, perceived usefulness, and perceived ease of use as variables that predict human service managers' IT use. Before interaction of these predictors are discussed variables are individually related to the literature. One of the premises of this thesis - human service managers' 'perceived ease of use' and 'perceived usefulness' of IT use play a significant role in predicting human service managers' intention to use IT - provides the context for this first section. Thus, a discussion of human service managers' 'perceived usefulness' and 'perceived ease of using' IT attitudes is presented first. Discussion of demographic predictors within

the context of these two attitudes follows. The discussion of the variables in the research model predicting human service managers' IT use concludes this section.

Managers' Attitudes Toward Information Technology

This study found that, human service managers' find IT more useful than easy to use. No empirical research compares human service managers' perception of usefulness or ease of using IT. However, some contradictory propositions have been made. For example, Reinoehl and Hanna (1990) suggest that a thinking perspective that views IT as *"...moving beyond being a tool, to becoming intellectual partners in learning and thinking"* is needed before the human services will perceive IT as being useful. Reinoehl, and Hanna (1990) also suggest that the overall attitude towards the utility of IT by human service professionals has increased over time. Yet Nurius (1990) suggests that lack of use by those in the human services is in part due to their failure to recognize the utility of computer applications. Poulin and Walter (1990) found that it was only after human service students used IT did they have a more positive perception of the ease of using IT. However, as demonstrated, other literature seems to question whether attitudes in general need to increase before there will be increases in the use of IT or if the reverse is true. This seems to suggest that, when attempting to determine which needs to increase first, human service managers attitudes about or their use of IT, a form of 'chicken or the egg' logic is used. Stated differently, before a manager has a more positive attitude about using IT, the human service manager must use

IT, but, to increase the use of IT the human service manager must have a positive attitude towards using IT.

Combining the 'perceived ease of use' and 'perceived usefulness' scores provides an overall attitude score of human service managers' attitudes towards IT use. Human service managers overall attitudes towards IT use when compared to samples of human service professionals seems somewhat higher. This would seem to support the idea that like in the past, the present IT use in human service organizations is still of most benefit to human service managers specifically and not human service personnel in general.

Demographic Predictors

This section discusses each of the demographic predictors in the study in relation to the human service managers' mean scores of 'perceived ease of use' and 'perceived usefulness' towards IT use. Predictors include: gender, age, highest level of education, year of graduation with highest level of education, major of highest level of education, and proximal availability.

There were fewer male respondents in this study. This corresponds with the perception of the human services as female dominated (Reisman, 1990; Cnaan, 1989). However, management is often assumed to be a male dominated position (Reisman, 1990). Use of managers' designates in the study sample may provide a partial explanation for this finding.

In the current study, female human service managers seem to have a more

positive attitude towards IT than male human service managers. Even though the difference is small, it is opposite to what has been previously found with human service personnel in general (Reisman, 1990; Nurius, 1990) and contradicts previous suggestions of computers as a male technology (LaMendola, 1985). This may indicate that, within the human services, it is the female rather than the male manager who is more likely to recognize the benefits of IT. It is also possible that, it is within professions other than the human services, females have a less positive attitude towards IT. It is, however, more likely that the previous research simply highlighted gender biased assumptions. The discrepancy between the present study and past research may suggest that increasing acceptance of women in all professions has extended to IT use as well.

The differences in attitudes towards IT use between younger and older human service managers has long been assumed. In fact this study confirmed that not only do younger human service managers have a more positive attitude towards IT, but the amount of variation in their attitudes is more than half that of the older manager. However, this study's second youngest age group had one of the least favourable attitudes towards IT. In the available literature, only Rosen, Sears, and Weil (1987) studied age and attitudes. They found that older students had a more favourable attitude towards IT use than younger students. These conflicting and limited findings suggest that it is erroneous at best and incorrect at worst to assume that younger age is associated with a more positive attitude towards IT. It is possible that as IT use is taught as early as elementary school,

age may no longer be a distinguishing factor in IT use.

Human service managers' 'educational level' seems to interact with their attitudes regarding 'perceived ease of use' and 'perceived usefulness' of IT. It appears that, the higher the level of human service managers' educational attainment, the higher their 'perceived usefulness' of IT. However, conversely when human service managers with 'higher levels of education' use IT they have a low perception of its ease of use. There is no literature testing for the effect of highest level of education and attitudes towards IT. It can be suggested that the higher educated human service managers' increased 'perceived usefulness' of IT is the result of their experiences in using more forms of IT in pursuit of higher education. However, the higher educated managers' increased experience in using IT does not necessarily translate to their perceptions of IT as easy to use. Perhaps, the reputation of IT as not easy to use stems from the incongruence between the large number of applications available and their lack of applicability to human service managers' work. It is possible that human service managers' opinion of IT as not being easy to use results more from a low number of IT applications relevant to human services and less from difficulty of IT use.

Human service managers who 'graduated' most recently find IT easier to use than those graduating later. The 'perception of the usefulness' of IT is the highest for those most recently 'graduating' and least for those 'graduating' 10 - 20 years ago. The suggestion that recent advances in technology have made it both easier to use IT and made IT more useful are often cited in the literature

(Fuchs, 1989; Pardek, & Murphy, 1986). This study found support for this literature in that those graduating most recently had the highest mean scores for both 'perceived ease of use' and 'perceived usefulness'. Martyn (1987) also found that 'recent' graduates did have more knowledge about IT than 'seasoned' graduates. Having a more recent education about IT does not seem to effect to the same extent human service managers' attitudes about IT usefulness upon graduation, but rather its ease of use. It is suggested that, perhaps the applications that educational institutions are teaching to students are in and of themselves easy to use, but once the student becomes a manager of a human service, these same easy to use applications have little utility.

It has been suggested that 'educational major' is related to the attitude towards IT (Rosen, Sears & Weil, 1987). This study found that, human service managers with a 'soft major' have a more positive attitude towards the 'usefulness' of IT than those with a 'hard major'. Interestingly Rosen, Sears, and Weils' (1987) findings suggested the opposite. It is also generally assumed that individuals with 'hard majors' (eg. science) would have more use for, have more training in and, thus, a higher 'perceived ease of using' IT. Even though managers of human service may have 'soft majors' their more positive attitudes towards IT might be the result of the use to which they applied their education (ie. management), and not so much the 'softness' or 'hardness' of their educational major.

It would seem an obvious assumption that the closer the physical 'proximity' of IT (computer), the more likely is a positive attitude towards its use - an

assumption supported by this study's findings. However, the attitudes are most positive toward IT use only when the computer is on the human service manager's desk. One study that examined the relationship between 'proximal availability' of IT and attitudes towards using IT surveyed 60 human service administrators, managers, and direct service practitioners and found that use of IT increased when IT was available in their office versus off-site (Mutschler & Hoefer, 1990). Munson (1988) poses the argument that increased use of IT by human service students is affected by the availability of IT to students. Munson suggests that increases in the negative attitudes towards IT is partially due to lack of direct and immediate access to IT for students. Therefore, it can be suggested that, human service managers' use of IT will not only increase, but that their attitudes towards IT will be more positive if they have direct 'proximal availability' to IT.

Model Analysis

Of the eight predictors of human service managers' use of IT two (age and proximal availability) were statistically significant in the prediction of human service managers' IT use. The research model used for the present study explained 39% of the variance in human service managers' use of IT. The following discusses the significance and contribution of each of the predictors of human service managers' IT use.

A human service managers' 'gender' does not play a significant part in the prediction of their use of IT. Numerous studies have shown that there are

differences in males and females attitudes towards using IT (Reisman, 1990; Nurius, 1990). Females are assumed to have more fear, or less positive attitudes towards using IT than males that are assumed to result in reduced IT use. However, there seems to be little evidence in this study to suggest that 'gender' is predictive of human service managers' IT use, which further confirms earlier propositions that females are becoming more active IT users. Although professionals in the human services are assumed not to use IT as much as they could, 'gender' does not significantly account for the prediction of human service managerial IT use.

Human service managers' 'highest level of education' was not a significant predictor of IT use. This finding both confirms and contradicts previous research. Kimberly and Evanisko (1981) found that the higher the level of education the more likely an individual is to use an innovation like IT. However, Mandell (1989) found that among human service professionals there was no significant difference in the resistance to use IT based on 'highest level of education'. Thus, it appears that although higher levels of education among individuals may predict increased IT use 'highest level of education' does not seem to predict human service managers' IT use.

The 'graduating year' of the human service managers' highest level of education contributed the least of all variables studied in the prediction of IT use. It was assumed that those graduating most recently would have the most 'up to date' educators who have exposure to IT and, will thus, be the most likely to use

IT. However, this is not a correct assumption when it comes to human service managers. Lamb (1990) confirms that the process of adoption of IT by human service educators has been slow. Perhaps even the most 'up to date' human service educators are 'too far behind' the process of adopting IT that recent human service graduates are not transferring the knowledge of IT use to practice. However, at least two other explanations are possible. One, some variable at the recent human service graduates place of employment inhibits IT use. Two, IT applications used while obtaining an education are not transferable to a human service managers' practice.

Although recent human service management graduates may have been exposed to the 'latest and best' human service IT applications, they do not transfer this to the performance of their managerial roles any more than seasoned graduates. Although explanations that blame the manager for not using IT, or the human service organization for not being ready to receive the 'latest and best' IT are easy, it seems more likely that the lack of use stems from a technology that has not met the needs, or at the very least, expectations of the human service manager.

A human service managers' 'educational major' does not contribute significantly to the prediction of IT use. In Senner, Young, Gunn and Schwartz' (1988) comparisons of Canadian and American psychologists and social workers differed significantly on the extent of IT use. It would seem that, although there may be differences between human service professionals' extent of using IT there

is no predictive power in the 'educational major' of human service managers and IT use.

Perhaps changes in pedagogical approach, or the knowledge base in educating human service managers may increase IT use, but of those human service managers sampled, 'educational major' does not predict IT use. Different 'educational majors' have fundamental philosophical differences and perspectives that may explain how, and the extent human service managers' use IT, but again not if they will use IT. The assumption that human service managers 'educational major' is a predictor of IT use perhaps offers insight into erroneous principles behind traditional hiring practices of human service organizations.

Among the predictors of the research model used for this study 'perceived ease of use' was one of two attitudes suggested to have significant predictive power in human service managers' IT use. However, this study demonstrated that, 'perceived ease of use' contributes minimally to the prediction of human service managers' IT use. Interestingly this finding is contradictory to previous research (Davis, 1986; Davis, Bagozzi & Warshaw, 1989).

There are several explanations for why this study did not find 'perceived ease of use' as a significant predictor of human service managers' IT use. First, previous research used different populations and were conducted at different points in time. Though, the construct of 'perceived ease of use' was created with the intention of application to different populations the ten items used to formulate 'perceived ease of use' may have not measured the human service managers'

'perceived ease of use' accurately. However, there is substantial theoretical and empirical support for 'perceived ease of use' as one of two constructs that measure any persons' attitude towards the use of IT. Second, it is possible that an unaccounted for variable intervened into the relationship between 'perceived ease of use' and the prediction of human service managers' IT use. Even though research suggested the possible exclusion of constructs (subjective norms, beliefs and evaluation, normative beliefs and motivation to comply) from Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) it is possible that these constructs would have increased the predictive power of the research model used in the present study.

'Perceived usefulness' was the second of two attitudes suggested to contribute, in a significant way, to the prediction of human service managers' IT use. However, this study found that 'perceived usefulness' was not a statistically significant predictor. Instead it appears to be the second weakest predictor of human service managers' IT use. Given previous research findings that 'perceived usefulness' is statistically significant in the prediction of IT and that it also contributed the most to the prediction of IT use this is a very surprising finding (Davis, 1986; Davis, Bagozzi & Warshaw, 1989).

The absence of predictive ability of 'perceived ease of use' for human service managers' IT use may be explained by the reasons provided above for 'perceived usefulness' (poor construct validity, and/or intervening variables). Also, it is possible that IT developers are not able to deliver to human service managers

usable IT. Indeed, DeJong (1982) found that the functional areas used the most are the areas agencies find the use of IT least useful.

It has been generally assumed that attitudes about IT effect the extent of its use (Rode, 1986). However, this study seems to indicate that the assumption is false. There is research confirming these results. For example, Mutschler, and Hoefer (1990) found that among 60 human service administrators, managers, and direct service practitioners there were no attitudinal differences between who used and those who did not use IT. Therefore, it seems that the construct of attitude as measured by 'perceived ease of use' and 'perceived usefulness', does not appear to predict human service managers' IT use.

There were two predictors, 'age' and 'proximal availability', that were found to significantly estimate human service managers' IT use and explained 39% of the variance in their use of IT. This is respectable, considering the multiple number of determinants that can be used to predict any human behaviour (Floyd, 1986). The following first discusses 'age' then 'proximal availability'.

Between the two statistically significant predictors of IT use by human service managers the 'age' of the human service manager contributed the second most. Nurius, Hooyman, and Nicoll (1988) and Martyn (1987) found that IT is more familiar to and ubiquitous among the younger rather than the older human service professional. However, Floyd (1986) found that a managers' 'age' does not play a large role in determining the use of IT. It is possible that study group differences contributed to the disparity in findings.

These results may suggest that human service agencies having hiring criteria that include 'computer literacy' may favour younger human service manager job applicants. However, this would seem to indicate some element of ageism at play. This may be seen positively by the younger human service worker who wants to be a manager. Conversely this study's results may be not welcomed by the older human service worker or older non-human service manager making a career change and wanting to be a human service manager.

Of the two statistically significant predictors of human service managers' IT use 'proximal availability' contributed the most. It seems tautological that human service managers' IT use should be predicted by proximal availability. Not surprisingly Mutschler and Hoefer (1990) also found that easy access is one of the strongest factors in the prediction of IT use by human service professionals. The current and previous research seems to reaffirm that the more immediately available IT is, the more likely the human service manager will use IT.

In the past there was large variance in the findings regarding IT availability. In 1985 Jaros, Levi, Larson, Baskin and Seiffer reported that of 44 human service agencies contacted, 40 were using IT processing that was not within their agency. Yet, in 1986 Nutter, Gripton and Murphy reported that human service professionals used computers external to the agency less than five percent of the time.

As presented earlier, most respondents had computers available at their desks with more than 85% having either computers on their desk or in their office. It seems that the more recent findings reflect the growing influx of IT into human

service organizations. It was assumed that the introduction of IT into the office will increase IT use. The current study suggests that even smaller distances between IT and the user seem to significantly predict IT use.

IMPLICATIONS FOR THE HUMAN SERVICES

Implications of this study's findings have relevance for many human service groups. The following section presents the implications of this study's findings for human service managers, educators, students, and information technology consultants.

Manager

Human service managers have one of the most important roles to play in a society that is experiencing what can be called the 'Information Age.' Human service managers must be computer literate enough not only to use IT themselves, but to advocate for the clients that use their agencies in the 'information age'.

Human judgements define the IT system. Human service managers who create and use IT take responsibility for how IT is used. Thus, responsible information technology is generated if managers participate in its generation and use - to do otherwise means surrendering responsibility and what some call 'abdicating ethical responsibility.' *"It is without the hands and minds of human beings, an inert collection of material stuff waiting to serve or dis-serve. The computer in of itself is neither good or evil (Miller, 1986)."*

Human services have traditionally serviced more female than male clients. Current study findings demonstrate a similar division in human service management. Perhaps increased use of IT has allowed women to gain a more equal access to a workplace in which intellectual rather than physical strength is the criteria to success. If direct correspondence between IT use and gender equality in the workplace does exist, then human services can expect a further increase in female managers and decrease in female front-line workers to coincide with the increase of males among the clientele.

Gender does not any longer seem to predict human service managers IT use. However, the use of human service managers' alternates as respondents may have skewed the results. It is still possible, that the positions of managers' substitutes (ie. executive assistants, secretaries, etc.) may have necessitated their continuous IT use and may not have been representative of the computer use by their human service manager. If the number of females in management positions is to increase, and if they are to be responsible for IT dissemination and use, their education must correspond with the future employment demands. The presence of appropriate role models (ie. female computer experts who can educate future female managers) is necessary.

The urgency for human service managers to take responsibility for IT can be expressed best by Stewart (1988) *'At stake is the economic and political strength of the nation, if not the survival of the human species.'* It becomes the responsibility of human service managers to not only respond to, but more

importantly be proactive in IT use.

Given the current study's findings, it maybe suggested that human service managers may be more motivated to provide IT to their employees and in so doing, only fulfil one aspect of responsible IT use. They do not feel the responsibility to personally use IT to any great extent. As a result, many human service managers may be missing out on the applications most useful to their every day work. Such applications may include spreadsheets for budgeting, daily calenders and project managers for short - and - long-term planning.

The study's findings seem to indicate that human service managers in the future will find IT use both easier and more useful. Given a time lapse between recent human service management graduates, who are typically young, and their employment in top human service management positions there may also exist a lapse between increased IT use among present and future human service managers. Perhaps if the recent graduate is hired in a middle management position, the lapse will not be too long.

This study's findings seem to reflect a trend in IT use. The trend is the use of 'laptops' and 'notebook' computers. This form of IT is highly portable and, thus, has the potential for continuous proximal availability. If proximity of IT is predictive of human service managers' IT use, then one may extrapolate to a prediction of an increasing trend in the use of 'laptops' and 'notebook' computers by human service managers. It would also seem likely that those human service managers using these forms of IT would be more younger than older.

Educator

There is a growing awareness that human service schools play a fundamental role in preparing students to meet the demands of a changing job market with respect to IT. Presently, in Canada, there are no universally applied standards for IT content in human service education administration courses. For example, among the accredited social work programs in Canada, less than two percent address computer applications (Parker, Chynoweth, Blankinship, Zaldo & Matthews, (1987). Therefore, it is likely that many graduating students will complete their education with no formal introduction to IT. However, even if IT is introduced educators erroneously assume that, the students will use the applications taught to them upon graduation. Given the present and predicted use of IT in human service agencies, human service educators should treat computer literacy of human service managers as an essential skill for today, and not the distant future (Finn, 1988-89). Additionally, for computer skills to be enhanced, training should be integrated into the complete array of courses in ways that allow for hands-on experience.

Educators need to work in collaboration with professionals in the field to define computer literacy, assess the potential and limits of IT, and to develop IT applications that are responsive to field-based needs. A professional socialization that provides human service management students with computer literacy, and applications that have utility in the field should become part of the process. Educators must find ways to become IT literate and incorporate this into the

classroom in ways that offer IT utility to the student manager upon graduation.

Human service faculty deans and department directors need to recognize that instructors' levels of computer literacy range widely. Human service educators who have become computer literate need to be recognized and rewarded for any IT development and contribution to the human service knowledge base that includes IT.

Student

In the same way that the constantly changing services need to match an ever changing population, human service students need an education that matches the demands of a changed working environment - one that includes IT. Students need to advocate for inclusion of an IT component in their education. This education should include an understanding in the three basic areas of IT, informational, evaluative and user skills (Hooyman, Nurius & Nicoll, 1990).

With a preponderance of females in the human services, Reisman (1990) suggests that human service students should be wary of facing the same gender inequalities that the administrative training fields experienced. This gender inequality contributed to the two to one ratio of male to female administrators in the human services (Brandwein, Herzberg & McDonald, 1981, in Reisman 1990).

The treatment of IT as a fad in education may have contributed to students reluctance to use IT upon graduation. Munson (1988) suggests that many human service programs have taught the use of IT as if it were a passing fad, and, thus

when the student graduated, the student lacked the substantive skills necessary to solve IT problems in practice. Perhaps a more serious approach to education of IT could expose human service management students to IT that has more to offer in the way of on-the-job utility. This exposure may not necessarily be an addition to, or a replacement of 'traditional' forms of training. Rather, it may provide exposure to different ways of using the same applications so that they can be directly applied upon graduation.

Information Technology Consultants

The most important implication of this study is that attitudes do not predict human service managers IT use. Differences in perceptions of the 'usefulness' and 'ease of using' IT suggest that IT consultants are not meeting human service managers' demands for IT. This implication is especially important and relevant to IT application developers. It is assumed that the easier IT is to use, the more uses human service managers' would find for IT. Developers hope that their applications are easy to use, but must at a minimum design applications that are useful. However, a choice between using IT of little utility and not using it at all is unacceptable.

The present uses of IT are defined by the software packages available. Overman (1988) suggests that IT has its greatest financial success when it can be used for high volumes of highly repetitive tasks. Yet, almost by definition, human service applications are needed for case by case processing of unique attributes

and needs. This is different from the traditional IT applications.

Cnaan (1988) suggests that because of the multiplicity of needs in the human services, IT consultants do not get the monetary rewards needed to create software that meets individualized needs. However, Neilson (1985) suggests that the potential for long-term growth will entice consultants towards IT development in the human services.

Traditionally IT consultants have attempted to create applications that are useful and easy to use and assumed a corresponding increase in IT use. However, this study suggests that, element(s) other than users' attitudes must better predict IT use. Proximal availability is one such predictor. Alternatively, one would have to suggest that, no matter how useful or easy to use an application may be, neither predicts whether the human service manager will use it.

IT consultants need to determine how to get IT into the direct physical proximity of the human service manager. Due to the increasing portability of powerful IT, the consultant can take IT to the human service manager for demonstration purposes. For example, powerful lap and palm-tops can directly demonstrate ease and usefulness in the human service managers' office. With lower IT costs 'loaners' or demonstration models and applications can be left with managers for review purposes. It is suggested here that the more direct the exposure the human service manager has to IT, the more likely they are to continue using IT.

The perception of IT as more useful than easy and the absence of

predictability by attitudes have implications for training of human service managers and IT application development for their use. Consultants who develop new applications need to increase the ease of using applications. Also, there would seem to be great opportunities for the entrepreneurial IT consultant who can match training needs with human service managers' perceptions of the usefulness and more specifically address the ease of using IT.

IT consultants who develop new applications also need to address the non-traditional IT needs specific to human service managers. For example, such applications as genogram, client tracking and monitoring applications that collect and report information and are different both in content and intent to standard practices should be included. For example, if the intent of the application is to track a client, or group of clients, the content that is needed and available for individual clients should be different from the manner in which present applications collect and report it. Development of applications need to meet the specific needs of the human service manager.

RECOMMENDATIONS FOR FUTURE RESEARCH

Policy Research

Educational and agency accrediting bodies need to establish standards for IT use. Basic questions concerning the content and measurement of knowledge in the area of IT use need to be answered and established as policy before impact

studies determining the effect of IT use can be undertaken. Since standards do not presently exist, the chance to evaluate their impact on managerial and client outcomes should present an enticing opportunity for policy research. Additionally, important variables suggested as having relevance to policy research in this area are gender, and major of educational major specifically as they relate to hiring practices.

Practice Research

Human service managers' consider currently available IT as not particularly useful or easy to use. Research is needed to explore the specific IT needs of human service managers. A list of required applications and the types of needs they must address should form the basis of any applied practice research.

Research is also needed to explore the area of IT use in relation to different professions and disciplines. It was assumed that human services generally, and human service managers specifically, do not use IT as much as other sectors, and their managers. These assumptions need testing. Specific questions that need to be answered include: Is IT use different in human services compared to other kinds of services, and if so, how?; and, Do human service managers differ in the extent of IT use compared to managers of other types of services?

Considering the gender disparities in academic faculty and human service managers, research into how gender impacts on human service delivery is imperative. Research on effective gender-sensitive IT training at both academic and

agency level is also required.

The feasibility and effectiveness of training IT use to individuals with a human service philosophy and belief system needs research. This stems from the argument that only human service professionals would appreciate the nuances of what is needed regarding IT needs in the human services. However, a counter-argument would suggest that only individuals specializing in IT can appreciate the nuances of what IT can do.

Replication Research

The manner in which IT use is measured is important. For example, this study used three different measures: 'frequency', 'magnitude', and 'duration' to measure human service managers' IT use. Other research has attempted equivalent comparison by using different measures. Future research should identify the most appropriate form of measurement, and use it consistently. This thesis findings suggest that 'magnitude' of use might be the best measure of predicting IT use with human service managers. Also, it is suggested that 'frequency', 'magnitude', and 'duration' of use be used to measure IT use for any group.

Future research should also attempt to clarify the general trends in IT use as well as changes in specific use of IT applications. Answers might suggest applications that the human services actually do find most useful, and, thus, offer suggestions in regards to areas for further development.

SUMMARY

Four main findings resulted from this study. The first two pertain to this study's first research question 'How and to what extent do human service managers use IT in their practice?' The third and fourth relate to the study's second research question 'What are the predictors of human service managers IT use?' First, in comparison to human service professionals, human service managers use similar IT applications and as frequently. Where differences do exist human service managers use IT applications less than other human service professionals. Second, human service managers consider IT more useful than easy to use. Third, the two attitudes of 'perceived usefulness' and 'perceived ease of use' do not significantly predict human service managers' IT use. Finally, 'age' and 'proximal availability' do significantly predict human service managers' IT use.

The primary goal of human service organizations is to address personal and societal problems and how they affect their clients/patients. It is possible that increased emphasis on understanding human service managers' use of IT will improve the efficiency and effectiveness in accomplishing this goal. Instead of presupposing IT as non-beneficial, what should be considered is how best to join IT use and the goal of human service delivery.

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APPENDIX A

LETTER OF INTRODUCTION AND CONSENT

Brian Hoffart
Faculty of Social Work
University of Calgary
2500 University Drive N.W.
Calgary, Alberta
T2N 1N4

Dear Colleague,

Work in the human services has never been as challenging as it is today. Budget cutbacks, issues of accountability, and the modern pace of work have made even the best professionals apprehensive. One of the more recent challenges is the use of computers.

The computer will remain a permanent fixture in the workplace. Yet little is understood about the reasons why some people use computers while others do not. However, we do know that attitudes about computers do affect their use.

I am a Master's student asking for your, or your designates', participation in a study concerning the use of computers. The purpose of the study is to better understand attitudes toward computer use. A questionnaire has been sent to professionals who work in various human services within the Calgary area. Please help me complete my study and ensure that your views are included. The questionnaire will take about **5 minutes** to complete.

Your responses will be confidential, as the data will be collected and reported in aggregate form. Your participation is voluntary. The returned form constitutes your permission to use the data. The identification number on the form is for sampling purposes only.

Finally, I thank you in anticipation of a completed questionnaire. Please return it in the enclosed postage-paid self-addressed envelope.

Thank you very much,

Yours sincerely,

Brian Hoffart
MSW Student
University of Calgary

APPENDIX B

**HOW HUMAN SERVICE MANAGERS
USE INFORMATION TECHNOLOGY IN THEIR PRACTICE**

Here is a list of some of the things computers can be used for. For each item please circle the number, or write a number in the space provided, that best matches the frequency of your **weekly** use.

Of Times Used Each Week

Word processing	0	1	2	3	4	5
Spreadsheet	0	1	2	3	4	5
Data base management	0	1	2	3	4	5
Statistical	0	1	2	3	4	5
Desktop publishing	0	1	2	3	4	5
Accounting	0	1	2	3	4	5
Budgeting	0	1	2	3	4	5
Fund raising	0	1	2	3	4	5
Payroll	0	1	2	3	4	5
Personnel	0	1	2	3	4	5
Scheduling	0	1	2	3	4	5
Inventory	0	1	2	3	4	5
Mailing lists	0	1	2	3	4	5
Membership	0	1	2	3	4	5
Internal reports	0	1	2	3	4	5
External reports	0	1	2	3	4	5
Research	0	1	2	3	4	5
Client/patient intake	0	1	2	3	4	5
Interviewing clients/patients	0	1	2	3	4	5
Assessment	0	1	2	3	4	5
Diagnostic	0	1	2	3	4	5
Client/patient records	0	1	2	3	4	5
Treatment planning	0	1	2	3	4	5
Case management	0	1	2	3	4	5
Client/patient tracking	0	1	2	3	4	5
Client/patient outcome	0	1	2	3	4	5
Clinical decision-making	0	1	2	3	4	5
Intra-agency networking	0	1	2	3	4	5
Inter-agency networking	0	1	2	3	4	5
Simulations	0	1	2	3	4	5
Training	0	1	2	3	4	5
Literature search	0	1	2	3	4	5

APPENDIX C

ATTITUDES TOWARDS THE USE OF COMPUTERS

Here are some statements concerning the use of computers. Please circle the number that best matches your attitude towards each statement.

	Strongly Agree		Neutral		Strongly Disagree	
1) Computers are cumbersome to use.	1	2	3	4	5	6 7
2) Learning to operate computers is easy.	1	2	3	4	5	6 7
3) Interacting with computers is frustrating.	1	2	3	4	5	6 7
4) Getting computers to do what one wants is easy.	1	2	3	4	5	6 7
5) Computers are rigid and inflexible.	1	2	3	4	5	6 7
6) Recalling how to perform tasks on computers is easy.	1	2	3	4	5	6 7
7) Interacting with computers requires considerable effort.	1	2	3	4	5	6 7
8) Interacting with computers is clear and understandable.	1	2	3	4	5	6 7
9) Skilled use of computers requires considerable effort.	1	2	3	4	5	6 7
10) Overall, computers are easy to use.	1	2	3	4	5	6 7
11) Using computers improves the quality of work.	1	2	3	4	5	6 7
12) Using computers gives less control over my work.	1	2	3	4	5	6 7
13) Computers enable most tasks to be completed quickly.	1	2	3	4	5	6 7
14) Computers support critical aspects of my job.	1	2	3	4	5	6 7
15) Using computers decreases productivity.	1	2	3	4	5	6 7
16) Using computers decreases job performance.	1	2	3	4	5	6 7
17) Using computers allows more work to be finished.	1	2	3	4	5	6 7
18) Using computers decreases effectiveness.	1	2	3	4	5	6 7
19) Using computers makes work more difficult.	1	2	3	4	5	6 7
20) Overall, the computer is useful.	1	2	3	4	5	6 7

APPENDIX D

DEMOGRAPHIC AND DEPENDENT VARIABLES

- 21) My gender is__ (Female),__ (Male).
- 22) Year of birth 19.
- 23) *Highest* level of education, year of graduation and major:
- | | | | | |
|---------------------|-----|-----------|--------|--------------|
| High school diploma | __, | <u>19</u> | (Year) | |
| College diploma | __, | <u>19</u> | (Year) | _____(Major) |
| Bachelor's | __, | <u>19</u> | (Year) | _____(Major) |
| Master's | __, | <u>19</u> | (Year) | _____(Major) |
| Doctorate | __, | <u>19</u> | (Year) | _____(Major) |
- 24) Position Title: _____
- 25) To what extent are computers currently available for your personal use?
(check most appropriate answer)
- ___ Not at all ___ Within office, but not at my desk ___ At my desk
- 26) On average how often per week do you personally use computers?
- ___ Times per week ___ Not at all
- 27) Normally you spend about _____ hours each week personally using computers.
- 28) How long have you been using computers?
- ___ Years ___ Not at all

COMMENTS:

THANK YOU!

Your contribution to this study is greatly appreciated! Please insert the questionnaire into the postage-paid self-addressed envelope.

If you would like a copy of the results, please print your name and address on the back of the return envelope (not the questionnaire).

APPENDIX E

CORRELATION MATRIX

	V1	V2	V3	V4	V5	V6	V7	V8	V9
V1	1.000								
V2	.193	1.000							
V3	.273	-.202	1.000						
V4	.000	-.069	.028	1.000					
V5	-.240	-.066	-.264	.075	1.000				
V6	-.187	.068	-.039	.037	.388	1.000			
V7	.317	-.015	.759	-.039	-.263	-.098	1.000		
V8	.033	-.054	-.071	-.037	.128	-.062	-.064	1.000	
V9	-.288	-.182	-.335	.481	.286	.088	-.424	-.095	1.000

LEGEND:

V1	=	Gender
V2	=	Educational Level
V3	=	Graduating Year
V4	=	Proximal Availability
V5	=	Perceived Ease of Use
V6	=	Perceived Usefulness
V7	=	Age
V8	=	Educational Major
V9	=	Magnitude of Human Service Managers Use of Information Technology