Policy makers and researchers have identified a divide in computer ownership between the economically disadvantaged and the general population in the United States. Minorities, the elderly, and individuals with low educational achievement also appear to be left out of the new digital economy. In an attempt to test whether this identified divide in computer ownership exists, data concerning people in receipt of Temporary Assistance for Needy Families (TANF) [i.e., welfare] were examined for economic, racial, age, educational, and regional differences in rates of computer ownership. The data were then compared to research studies that examined rates of computer ownership and access in the general population. The findings support policy makers’ and researchers’ concerns about the growing divide in
computer access and ownership between the economically advantaged and disadvantaged.

KEYWORDS. Computers, digital divide, TANF, Georgia

Promoting Modern Technology and Internet Access for Under-Represented Older Populations
Carol Irizarry
Andrew Downing
Deborah West

Bridging the Gap, a South Australian research based program, was designed to introduce the concepts of modern technology and some Internet skills to people over 55. Target populations included people in rural areas, those with a first language other than English and people who were frail or had a disability. Informal, interactive, hands-on sessions were developed which demonstrated the concepts underpinning modern computer-based devices and their applications in society. Major findings indicated that most participants identified feeling less anxious and more confident about using modern technology after the program and that they were using a new range of computer-based skills.

KEYWORDS. Older adults, Internet, new technology, bridging technology gap

Factors Affecting the Acceptance of a Report Writer Software Application Within Two Social Service Agencies
Patrick Panos
Richard A. Weaver

Within the research literature, there has been a well documented difference in the level of acceptance in the adoption of technology within social services agencies by mental health practitioners. This article describes a collaborative process of design, implementation and evaluation of a report writer application for clinicians in hospital settings. Two inpatient hospitals that implemented the report writer software were evaluated. In particular, factors which aided and hindered the acceptance of the application in the two facilities are discussed. A complete description is provided of the application, which allows clinicians to quickly generate a report by choosing and editing commonly used text.

KEYWORDS. Computers, report writing, computer applications, software

Acquiring and Implementing Videoconferencing Technology to Enhance the Field Work Experience
Terry A. Wolfer
Michelle Carney
Jim Ward

To facilitate connections between the curriculum and field, faculty members at one university have explored and experimented with the use of videoconferencing tech-
nology for increased faculty communication with students and field instructors. This paper describes the planning and equipment acquisition process, from beginning conceptualization to current implementation. Further, it provides practical information about videoconferencing systems and suggests ways to maximize their use.

KEYWORDS. Videoconference, televisit, field instruction (or education), faculty field liaison

Building a Model to Predict Caseworker and Supervisor Turnover Using a Neural Network and Logistic Regression
Andrew Quinn
Joan R. Rycraft
Dick Schoech

Human service professionals are increasingly pressured to use sophisticated data analysis tools to support service decisions. However, the application of these tools often involves assumptions and nuances that are difficult for the practitioner to evaluate without specialized information. This article helps the practitioner evaluate two different quantitative methods, a logistic regression and a neural network. Both were used on the same data set to develop a model for predicting employee turnover in a regional child protective services agency. The different steps of building and enhancing the model were discussed. Ultimately, the neural network was able to predict turnover more accurately than a logistic regression by only 1%. The article provides advice to practitioners on comparing, evaluating, and interpreting logistic and neural network tools.

KEYWORDS. Child welfare worker turnover, neural network, logistic regression

SOFTWARE REVIEW

Ontrack’s System Suite 3 Including Power Desk 4
Reviewed by Del Thomas

BOOK REVIEWS

Human Rights and the Internet, by Steven Hick, Edwin F. Halpin, and Eric Hoskins
Reviewed by Janet Olson

The Social Worker’s Guide to the Internet, by R. C. Martinez and C. L. Clark
Reviewed by Art Biagianti
WEBSITE REVIEWS

Introduction 105
Robert Vernon
Darlene Lynch

Websites and the Digital Divide 107
Reviewed by Susan Sarnoff

Website Development Does Not Have to Mean Denying Accessibility 111
Reviewed by Janet Wright

Translation Websites 115
Reviewed by Stephen M. Marson and Barbara M. Marson
For more information or to order the *Journal of Technology in Human Services*, visit http://www.haworthpressinc.com/store/product.asp?sku=J017

- or call (800) 342-9678 (in US and Canada) or (607) 722-5857 (outside US and Canada)

- or fax (800) 895-0582 (in US and Canada) or (607) 771-0012 (outside US and Canada)

For a list of related links, visit http://www.haworthpressinc.com/store/product.asp?sku=J017

Urge your library to subscribe today!
With your library's print subscription, the electronic edition of the journal can be made available campus-wide to all of the library's user!
This section provides you with a list of major indexing & abstracting services. That is to say, each service began covering this periodical during the year noted in the right column. Most Websites which are listed below have indicated that they will either post, disseminate, compile, archive, cite or alert their own Website users with research-based content from this work. (This list is as current as the copyright date of this publication.)

<table>
<thead>
<tr>
<th>Abstracting, Website/Indexing Coverage</th>
<th>Year When Coverage Began</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACM Guide to Computer Literature</td>
<td>1985</td>
</tr>
<tr>
<td>Behavioral Medicine Abstracts</td>
<td>1996</td>
</tr>
<tr>
<td>BUBL Information Service, an Internet-based Information Service for the UK higher education community <a href="">URL:http://bubl.ac.uk</a></td>
<td>1995</td>
</tr>
<tr>
<td>caredata CD: the social and community care database &lt;www.scie.org.uk&gt;</td>
<td>1994</td>
</tr>
<tr>
<td>Computer Abstracts</td>
<td>1995</td>
</tr>
<tr>
<td>Computer Literature Index</td>
<td>1993</td>
</tr>
</tbody>
</table>

(continued)
• Computing Reviews ........................................ 1992

• Education Process Improvement Ctr, Inc (EPICENTER)  
  <http://www.epicent.com> .................................. 2000

• Engineering Information (PAGE ONE) .................. 1994

• FINDEX <www.publist.com> .................................. 2000

• IBZ International Bibliography of Periodical Literature  
  <www.saur.de> .................................................. 1996

• Index Guide to College Journals (core list compiled by integrating  
  48 indexes frequently used to support undergraduate programs in  
  small to medium sized libraries) ......................... 1999

• INSPEC—the leading English-language bibliographic information  
  service, providing access to the world’s scientific & technical literature  
  in physics, electrical engineering, electronics, communications,  
  control engineering, computers & computing, and information  

• Internet & Personal Computing Abstracts  

• Library & Information Science Abstracts (LISA) <www.csa.com> ... 1993

• Periodica Islamica ............................................. 1994

• Psychological Abstracts (PsycINFO) <www.apa.org> ........... 1988

• Referativnyi Zhurnal (Abstracts Journal of the  
  All-Russian Institute of Scientific and  
  Technical Information—in Russian) ....................... 1985

• Sage Public Administration Abstracts (SPAA) .............. 1991

• Social Services Abstracts <www.csa.com> .................. 1985

• Social Work Abstracts <www.silverplatter.com/catalog/swab.htm> ... 1989

• Sociological Abstracts (SA) <www.csa.com> ............... 1992

• SwetsNet <www.swetsnet.com> ............................ 2001

(continued)
Special Bibliographic Notes related to special journal issues (separates) and indexing/abstracting:

- Indexing/abstracting services in this list will also cover material in any "separate" that is co-published simultaneously with Haworth’s special thematic journal issue or DocuSerial. Indexing/abstracting usually covers material at the article/chapter level.
- Monographic co-editions are intended for either non-subscribers or libraries which intend to purchase a second copy for their circulating collections.
- Monographic co-editions are reported to all jobbers/wholesalers/approval plans. The source journal is listed as the “series” to assist the prevention of duplicate purchasing in the same manner utilized for books-in-series.
- To facilitate user/access services all indexing/abstracting services are encouraged to utilize the co-indexing entry note indicated at the bottom of the first page of each article/chapter/contribution.
- This is intended to assist a library user of any reference tool (whether print, electronic, online, or CD-ROM) to locate the monographic version if the library has purchased this version but not a subscription to the source journal.
- Individual articles/chapters in any Haworth publication are also available through the Haworth Document Delivery Service (HDDS).
Journal Ordering, Copyright, and Document Delivery Information

1) JOURNAL OF TECHNOLOGY IN HUMAN SERVICES™ (ISSN: 1522-8835; Electronic ISSN: 1522-8991) is published quarterly at The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580 USA. Volume 16 started in Spring 1999. Subscribers should note that Volume 1-Volume 15 were published under the title of Computers in Human Services.

2) BUSINESS OFFICE: Except for overseas sales representatives, all subscriptions and advertising inquiries should be directed to The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580 USA. Telephone (607) 722-5857.

3) SUBSCRIPTION CYCLE:  □ Academic year basis (first issue in each volume begins in September or Fall season)
   ☒ Calendar year basis (first issue in each volume begins in January or Spring season)
   □ Irregular (first issue in each new volume will be published on a to-be-announced date after publication of the final issue of the preceding volume)

4) FREQUENCY:  ☒ Quarterly (4 issues per volume)
   □ Triannual (3 issues per volume)
   □ Biannual (2 issues per volume)

   Additional volumes in any subscription year may be issued; these will be noted on renewal notices. This journal frequently publishes two volumes a year.

5) SUBSCRIPTION INFORMATION: Subscriptions are on a per volume basis only. The following prices are for the current volume only for the USA. Subscriptions must be prepaid.
   - US$: 75.00 individuals (paid by personal check);
   - US$: 185.00 institutions (examples: corporations, departments, institutes, social & health service agencies/hospitals);
   - US$: 360.00 libraries and subscription agencies (e.g., whenever purchased either directly or through a subscription agency).

6) CANADIAN ORDERS: Price of journal is 35% above domestic USA rate; Canadian G&S Tax of 7% must then be added (GST# R129786984), plus an additional 8% province tax in these four Canadian provinces: Newfoundland, Nova Scotia, New Brunswick, and Labrador.

7) PAYMENT: U.S. and Canadian funds accepted; please add in current exchange rate if paying by Canadian check or money order.

8) OUTSIDE USA AND CANADA: Price of journal is 45% above domestic USA rate.

9) POSTAGE & HANDLING: 10% postage & handling charge is included in journal subscription rates. Journals are mailed via consolidated air mail outside the USA and Canada.

10) BACK VOLUMES: 40% above the current subscription rate.

11) SUBSCRIPTIONS THROUGH AGENCIES: Subscriptions through any subscription agency subject to publisher’s credit check of subscription agency and payment record history of subscription agency. Renewals through agents must be prepaid 60 days prior to renewal cycle of journal, which is: November 1 for calendar-year journals and July 1 for academic-year journals. Library subscribers will be notified if subscription agent does not remit renewal payments on this schedule. All cancellations requiring refunds are subject to a 25% processing fee.

12) CHANGE OF ADDRESS: Please notify the Subscription Department, The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580 USA of address changes. Please allow six weeks for processing; include old and new addresses, as well as both zip codes.

13) COPYRIGHT 2002 by The Haworth Press, Inc. All rights reserved. No part of this work may be reproduced beyond limits set by fair use, or utilized in any form or by any means, electronic or mechanical, including photocopying, microfilm and recording, or by any information storage and retrieval system, without permission in writing from the publisher. See also paragraphs 14 and 15 for obtaining photocopies. Printed in the United States of America.

14) LOCAL PHOTOCOPYING, DOCUMENT DELIVERY, FAIR USE, ANTHOLOGY PUBLISHING:
   a) LOCAL PHOTOCOPYING may be done at no charge for classroom/educational/interlibrary-loan use within the limits allowed by fair use statutes.
b) DOCUMENT DELIVERY is provided by the Haworth Document Delivery Service, 10 Alice St., Binghamton, NY 13904-1580. Telephone orders and all major credit cards accepted. The Haworth Press, Inc. has not licensed any document delivery service, firm, library, or organization for the preparation of photocopies for the purpose of document delivery. Sole exception is the Original Article Tear-sheet Service of the Institute for Scientific Information (ISI). ISI’s right to prepare photocopies cannot be sold or licensed to a third party.

c) BEYOND FAIR USE photocopying requires a rights & permissions fee of $2.50 per copy, per article or portion thereof with a minimum of $25.00 rights & permissions fee on each request for services, payable directly to the Publisher.

d) ANTHOLOGY PUBLISHING fees may be obtained from RuthAnn Heath, Rights & Permissions, The Haworth Press, Inc. 10 Alice Street, Binghamton, NY 13904-1580.

15) SUB-LICENSEING: The Haworth Press, Inc. can provide all photocopies of its materials through its own Haworth Document Delivery Service. Official Sub-Licensee for Article Photocopies: Institute for Scientific Information (ISI)/Research Alert, 3501 Market Street, Philadelphia, PA 19104-3302 (USA) and all allied ISI services.

16) CLAIMING: Claims must be sent within 6 months of the mail date of the issue mailed, with proof of payment. Upon receipt a gratis replacement copy will then be sent.

17) GRACING: Journal issues are not “graced”; i.e., the first issue of a new volume is not mailed until payment is received.

18) DISCLAIMER: The development, preparation, and publication of this work has been undertaken with great care. However, the publisher, employees, editors, and agents of The Haworth Press and all imprints of The Haworth Press, Inc., including The Haworth Medical Press® and Pharmaceutical Products Press®, are not responsible for any errors contained herein or for consequences that may ensue from use of materials or information contained in this work. Opinions expressed by the author(s) are not necessarily those of The Haworth Press, Inc. Offers by Advertisers in Haworth Press journals are made by the Organization named therein and not by The Haworth Press, Inc. The Haworth Press, Inc. disclaims any responsibility on its part for the fulfillment or performance of any such offer. All inquiries with respect to such offer should be made directly to the Advertiser.

19) LIBRARY PHOTOCOPYING: ATTENTION LIBRARIANS: If your library subscribes to this journal, Haworth® waives all photocopying fees or any royalty payments for multiple internal library use. By “internal library use” we mean:
- photocopying multiple copies of any article for your reserve room or reference area
- photocopying of articles for routing to either students or faculty members
- multiple photocopying by students for coursework
- multiple photocopying by faculty members for passing out to students at no charge or for their own files
- other traditional internal library multiple use of journal articles
Welfare Recipients and the Digital Divide: Left Out of the New Economy?

Christopher R. Larrison
Larry Nackerud
Ed Risler
Michael Sullivan

ABSTRACT. Policy makers and researchers have identified a divide in computer ownership between the economically disadvantaged and the general population in the United States. Minorities, the elderly, and individuals with low educational achievement also appear to be left out of the new digital economy. In an attempt to test whether this identified divide in computer ownership exists, data concerning people in receipt of Temporary Assistance for Needy Families (TANF) [i.e., welfare] were examined for economic, racial, age, educational, and regional differences in rates of computer ownership. The data were then compared to research studies that examined rates of computer ownership and access.
in the general population. The findings support policy makers’ and researchers’ concerns about the growing divide in computer access and ownership between the economically advantaged and disadvantaged.

Few would argue that computers have had a significant and far-reaching impact upon western society. The prevalence of computers in the work environment, schools, and home has made them seem commonplace and an integral part of life. Despite this deep penetration into the everyday lives of western culture, Kominski and Newburger (1999), as well as numerous other researchers have concluded that access to personal computing opportunities are “highly variable across specific population subgroups” (p. 2).

An analysis of Census data tracking computer ownership and access between 1984 and 1997 revealed that serious gaps exist across minority populations, age cohorts, economic groups, and educational levels (Newburger, 1999). Three years after the 1997 Census data, a telephone survey of 1,506 people by National Public Radio (NPR), The Kaiser Family Foundation (Kaiser), and the Harvard Kennedy School of Government (Harvard) identified the continued existence of a digital divide in these areas. In particular, their findings indicated that families earning less than $30,000 per year, people who are undereducated, and individuals older than age 60 were being left out of the new digital economy (NPR, Kaiser, & Harvard, 2000).

The term digital divide is a hegemony that encompasses a number of specific technology related issues. In particular, the term is often connected to the access, ownership, knowledge, and skills individuals have concerning computers. For example, a central issue in defining the digital divide is how ownership versus access impacts upon individuals’ knowledge of microprocessing and Internet applications. For a variety of reasons, this research was limited to examining the issue of computer ownership with no attempt to collect data about individual computer usage, knowledge or access beyond ownership.

The purpose of the research conducted for this paper was to examine whether there existed variability, in regards to computer ownership, within the population of people that receive Temporary Assistance for Needy Families (TANF) [i.e., welfare]. Differences between the general population and welfare recipients were also examined. To accomplish this purpose, data from a stratified random sample of the July 1999 TANF caseload in the state of Georgia were analyzed for income, educational, ethnic, age, and regional differ-
ences in rates of home computer ownership. Based on the findings, possible policy implications for welfare recipients are drawn.

LITERATURE REVIEW

NPR, Kaiser, and Harvard (2000) found that 60 percent of all adults over the age of 18 living in the United States (U.S.) have access to a home computer. A lower rate was reported by U.S. Department of Commerce (USDC) in an October 2000 report examining Americans’ access to technology. The USDC found that 51 percent of households own a home computer. This figure was up nearly 8 percent from rate of home computer ownership the USDC (2000) found in 1998 and represents significant growth from the 36.6 percent cited in the Current Population Survey (CPS) study authored by Newburger (1999), which was based upon 1997 Census data. In contrast, Georgia’s welfare recipients rate of computer ownership, 15 percent, is the same as the rate of computer ownership among the general population in 1989, over ten years ago (Larrison, Nackerud, Risler, & Rdesinski, 2000; Kominski & Newburger, 1999). This ten-year lag between welfare recipients and the general population does not seem improbable when the demographics of the welfare population are examined. With a median monthly income of $1052.00, an average educational level of 10.6 years, and a high presence of minority populations, welfare recipients in the state of Georgia represent a group of people who are likely to be left out of the new computer age.

For several reasons, low income translates into low rates of computer ownership and access. The most apparent reason is the expense associated with owning a computer (Kominski & Newburger, 1999; LaRose & Mettler, 1989; USDC, 1995). Although sophisticated home computers can be purchased for less than $1,000.00 today, this amount still represents an almost insurmountable sum of money to spend on one household item for families living at or below the federal poverty line.

Less apparent is the interaction between economic status, minority ethnicity, and educational level, all of which are factors that appear to impact on computer ownership (Newburger, 1999; USDC, 1995; LaRose & Mettler, 1989). For example, the CEO Forum on Education and Technology, a group of prominent corporate executive officers, recently issued a report stating that schools with high levels of minority children in poor school districts have significantly less access to the latest computer technology (CEO Forum, 2000). This lack of access to computers at school means minority children living in poverty are likely to have few opportunities to access the latest computers in any environment; therefore, it is doubtful these children will have the skills
necessary for employment at jobs requiring computer knowledge (CEO Forum, 2000). With the number of jobs in the U.S. demanding some computer skills rising, this situation means more than simply not having access to a computer (USDC, 1995; USDC, 2000; Kominski & Newburger, 1999).

Level of education has been shown by a number of researchers (USDC, 1995; USDC, 2000; Kominski & Newburger, 1999; White et al., 1999; NPR et al., 2000) to impact on the level of usage and ownership of computers. For example, Newburger (1999) reported that 15.2 percent of people with less than a high school diploma had access to a home computer compared to 80 percent of people with a bachelor degree. This difference of nearly 65 percent is high and seems to indicate that educational level possibly overshadows other demographic factors in determining rates of computer ownership. The USDC (2000) found recently that computer ownership is growing among all educational levels, but those individuals with higher educational attainment continue to have significantly higher rates of computer ownership and usage. LaRose and Mettler (1989) cite slightly different findings that show education has an indirect impact on computer ownership and does not overshadow other demographic factors. Although LaRose and Mettler’s findings are different, they do not discount the importance of education. Furthermore, the consistency of findings across a number of populations suggests that at least some relationship exists between educational attainment and computer usage.

Despite the optimistic report by NPR, Kaiser, and Harvard (2000) on differences in computer ownership between African-Americans and whites, their findings did show a 22 percent gap in rates of computer ownership. Other researchers (Newburger, 1999; Kominski & Newburger, 1999) using Census data cite differences between African-Americans and whites similar (21.5 percent) to those reported by NPR, Kaiser, and Harvard. As well, the USDC (2000) found that although minority populations were making impressive gains in access to technology, their rates of ownership continued to be significantly less than whites and that socio-economic factors could not explain this difference entirely.

The difference between African-Americans and whites in computer access decreases to 11 percent at the work place, hinting at the prevalence of computers in the labor market and the divide in computer access at home. Research has shown that familiarity with computers coupled with access can affect the level of competence and sophistication in a person’s computer abilities (CEO Forum, 2000; White et al., 1999; Doelker & Lynette, 1988; Brunet & Proulx, 1989). The lack of computer access at home may mean that minority employees are less sophisticated and comfortable with their office computers than their fellow employees who have access to a home computer.
Typically people over the age of 60 have lagged behind the general population in computer ownership (White et al., 1999, NPR et al., 2000; USCD, 1995). Unlike the other demographic differences in the digital divide, people over 60 are more likely to have the resources to own a computer. The removal of economic barriers leaves only issues of knowledge and comfort. Research suggests that exposure, training, and access to computers helps seniors overcome these barriers (White et al., 1999).

Differences between urban and rural areas have been the focus of a number of researchers interested in the dispersion of technology (LaRose & Mettler, 1989; USDC, 1995; Newburger, 1999; USDC, 2000). Often rural areas are perceived as less innovative and less likely to have access to the latest technology. LaRose and Mettler (1989) examined if rural areas in the U.S. lag behind nonrural areas in the use of computers and communication technology. In a survey of people living in urban and rural regions, LaRose and Mettler (1989) found that there were no significant differences in technology usage or access. In fact, pockets of extreme poverty in inner cities tend to have the least amount of usage and access to technology. The U.S. Department of Commerce (1995) findings from a study of rural-urban differences in access to technology are similar. They found that central urban areas and rural decline areas have the lowest rates of computer access as well as the lowest rates of telephone access.

METHODS

Sample

To better understand the types of families receiving welfare, a profile was developed based on a randomly drawn sample from the July 1999 caseload of TANF recipients in the state of Georgia (N = 56,260). Based on recipients’ counties of residence, the total population was stratified according to one of four economic/geographic designations (urban, suburban, rural growth, rural decline) developed by the University of Georgia demographer Doug Bachtel (Boatright & Bachtel, 1998).

The target number of recipients needed in each of the four economic/geographic designations was calculated to achieve a confidence interval of 92.5 percent. In order to attain this level of confidence in the data, 201 recipients needed to be interviewed. The targeted number of interviews for each strata were as follows, urban (N = 77), suburban (N = 45), rural growth (N = 53), and rural decline (N = 26). To ensure accurate representation, a sample of 262 recipients was randomly selected as potential participants in the research project. When 201 interviews were completed, data collection was discontinued,
meaning 76.6 percent of the initial sample participated in the research project. From the initial sample of 262, 6 people refused to participate, 47 could not be located, and 8 were not needed.

Instruments and Data Collection

The selected welfare recipients (N = 201) responded to a questionnaire consisting of 185 quantitative and qualitative questions formatted in eight comprehensive sections (family relationships and living arrangements, physical and emotional health, child well-being, educational and vocational training, employment and work history, income and family resources, and the welfare experience). One of the questions included in the questionnaire inquired about owning a working computer. Recipients also completed seven standardized rapid assessment instruments. Together these two sections represented the interview guide used to collect data in the field (Larrison, Nackerud, & Risler, in press).

The 185 questions contained in the interview guide were developed after a thorough review of the scholarly literature and semi-structured interviews with over 200 Department of Family and Children Services county directors and employees working for organizations affiliated with DFCS (Nackerud, Risler, & Brooks, 1998). The seven standardized rapid assessment instruments measured happiness, self-esteem, perceived control, depression, optimism, life satisfaction, and self-efficacy.

The interview guide was initially pilot tested with 60 TANF recipients from four counties in Georgia (Bibb, Dekalb, Habersham, & Seminole). These counties were chosen because they reflect the four different economic/geographic strata within the state of Georgia that were used to stratify the sample. The data collection process, which took place in the recipients homes, occurred between September and November of 1999. Recipients were interviewed by researchers for approximately an hour using the interview guide and were compensated $25.00 for their participation in the research project.

The lack of complexity in defining the digital divide as either owning or not owning a home computer represents a serious weakness in this research. Data concerning rates of Internet access and types of computer usage would have offered insight into the possible effectiveness of computer related interventions with TANF recipients seeking employment. By limiting the definition of the digital divide to the issue of ownership, the conclusions drawn about the relationship between computer knowledge, usage and access, and economic stability in the new marketplace are only preliminary and hypothetical.
ANALYSIS AND FINDINGS

When the sample of welfare recipients in Georgia was examined, as would be expected, only a small percentage (15.8 percent) had a working computer in their home. The concept of working could have meant that the computer was or was not connected to the Internet. Instances of brand new Pentium chip computers hooked-up to the Internet and older machines used primarily for word processing were both observed. The two groups of welfare recipients, people with a working computer and people without one, were distinctive with significant economic, ethnic, age, and educational differences. However, independent-samples t tests were conducted to evaluate if differences existed between computer owners and non-owners in happiness, self-esteem, perceived control, depression, optimism, life satisfaction, and self-efficacy. The findings showed there were no significant differences between the two groups’ mean scores on the standardized instruments (see Table 1). White et al. (1999) similarly found that among older adults, computer access and use had no significant effect on psychological well-being as measured by a similar set of standardized instruments.

Economics

The group of welfare recipients that owned computers tended to be better off economically than most other recipients. For example, the median income of welfare recipients that owned computers was $1,534.00 per month (mean = $1,716.76, standard deviation = $1,076.94, min./max. = $362 – $4,155.00) compared to the median monthly income of recipients without computers, $796.00 (mean = $936.76, standard deviation = $530.60, min./max. = $168.00 – $2839.00). This difference was confirmed significant using an independent-samples t test, t (182) = 5.965, p < .0001. Other indicators that welfare recipients who owned computers tended to be better off than recipients without computers included the rate of car ownership, 67.7 percent compared to 31.7 percent, and the rate of home ownership, 45.2 percent compared to 20 percent.

Education

TANF recipients who completed high school were more than twice as likely to own a home computer than individuals that had not completed high school (22.1 percent compared to 8.7 percent). An independent-samples t test was conducted to evaluate any differences in the average years of school completed between recipients who owned a computer and those who did not. The test was not significant, t (190) = 1.795, p = .074, which is contrary to the hypothesis.
that computer owners tended to be significantly better educated than non-computer owners. On the average, TANF recipients who owned a computer completed 11.42 years (SD = 2.03) compared to 10.76 years (SD = 1.85) completed by recipients who did not own a home computer.

**Race, Region, and Age**

The racial divide identified by other researchers held true with rates of computer ownership among white TANF recipients more than double of that experienced by African-American recipients (27.9 percent and 11.6 percent, respectively). Compared to national rates of 51 percent for African-Americans and 73 percent for whites, these numbers also confirmed the economic divide.

The data, when examined, revealed that African-American welfare recipients living in Georgia’s urban centers and white welfare recipients from rural decline areas were the least likely of recipients to have access to a working home computer. Interestingly, the rate of computer ownership among African-Americans living in the rural decline areas of Georgia was nearly 20 percent higher than that of whites. This is the opposite situation found by other researchers. There is no information contained in the data collected that provides an explanation for this significant reversal of white and minority rates of computer ownership in a rural area. Table 2 shows the complete distribution of computer ownership across the geographic/economic strata broken out by race.

The average age of TANF recipients included in the sample was 35.67 (M = 33, SD = 13.25) with a range of 18 to 76. TANF recipients over 50 years old,
who represented 17.9 percent of the sample (N = 36), had higher rates of home computer ownership than younger recipients (25.6 percent compared to 15.4 percent). This held true for both African-American and white recipients, although the difference in the rate of ownership, 14.3 percent compared to 55.6 percent respectively, again highlighted the divide between African-Americans and whites. An independent-samples t test was conducted to evaluate if any significant differences in average age existed between TANF recipients that owned a computer and those that did not. The test was not significant, \( t(194) = 1.346, p = .180 \). On the average, TANF recipients that owned a computer (\( M = 38.71, SD = 11.88 \)) were 3.49 years older than recipients that did not own a home computer (\( M = 35.22, SD = 13.48 \)).

**DISCUSSION**

In general, the data confirm much of the research findings from various studies conducted over the last ten years concerning the dispersion of computer technology among the U.S. population. The Georgia data show that the very poor (as represented by welfare recipients) have significantly lower rates of computer ownership than the general public. The data also show that economic differences, education levels, and ethnicity stratify the welfare population the same way they do the general population in terms of computer ownership.

The Georgia data further indicate that young single mothers are the least likely of welfare recipients to have access to a working home computer. Over 22 percent of Georgia’s TANF recipients are under the age of 25. Ninety-one percent of single African-American women under the age of 25 and 80 percent of white women under the age of 25 report that they do not have access to a home computer. This is contrary to trends nationally which indicate that young

**TABLE 2. Percentage of TANF recipients that own a home computer broken out by race and geographic area.**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>African-American</th>
<th>N</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>69</td>
<td>7.5 %</td>
<td>5</td>
<td>40.0 %</td>
</tr>
<tr>
<td>Suburban</td>
<td>26</td>
<td>20.0 %</td>
<td>17</td>
<td>31.3 %</td>
</tr>
<tr>
<td>Rural Growth</td>
<td>35</td>
<td>8.8 %</td>
<td>17</td>
<td>29.4 %</td>
</tr>
<tr>
<td>Rural Decline</td>
<td>21</td>
<td>19.0 %</td>
<td>5</td>
<td>0.0 %</td>
</tr>
</tbody>
</table>
adults with children are a group of people that typically have high rates of computer ownership (NPR, Kaiser, & Harvard, 2000; USDC, 2000).

However, caution should be taken when interpreting the importance of computers on psychological well-being. This research along with White et al. (1999) show that computer use and ownership have nonsignificant impacts upon such intangibles as happiness, loneliness, self-esteem, and depression. Computers seem to be more related to economic and educational differences, with groups of people who traditionally lag behind in these areas also having lower rates of computer ownership.

One bright spot in the data was the rate of computer ownership among welfare recipients 50 years and older (Larrison et al., in press). This group is primarily taking care of children that are a generation removed from them. Anecdotal evidence suggests that the reason older welfare recipients have purchased a home computer is to help the child in their care. From the perspective of assets, recipients over 50 years old tend to have highest levels of income, home ownership, and car ownership among TANF recipients (Larrison et al., in press). This is congruent with overall national trends indicating the influence of financial resources as a dominant factor in determining rates of computer ownership.

Why is computer access and ownership important for welfare recipients? The focus of welfare reform, which emanated from the passage of the Personal Responsibility and Work Reconciliation Act (PRWORA) in 1996, has been and continues to be, moving able-bodied adults from the welfare rolls to work. Once in the workforce, policy makers want people to maintain stable employment that provides enough income to support their families. Evidence suggest that the stagnation in the wages of the low-skilled is related to the rapid technological change in society, “which has increased the demand for skilled workers and has made life harder for those without skills” (Out of sight, 2000, p. 28). The easy of access and comfort associated with home usage of computers allows individuals to develop skills at a pace and method that they dictate. This is particularly important to TANF recipients who often have a history of low educational achievement in traditionally structured educational environments.

Furthermore, recent findings from the USDC (2000) suggest that low-income users access computers and the Internet for the purpose of job searches. Because home ownership is low, these individuals will have to access public computers. Although public access will facilitate this type of usage, it is unlikely to effectively help TANF recipients obtain the general computing skills (e.g., word processing, basic Web design, desktop publishing skills) they need for the marketplace. The findings from this research therefore indicate that TANF recipients, who are traditionally low-skilled workers, will continue to lack the skills necessary to take advantage of work that requires a basic under-
standing and comfort with computers. As the nation moves towards an increasingly technology driven workforce and economy, this situation undermines the current success of welfare reform.

In a preliminary survey conducted during the summer of 2000 of Georgia’s county level Department of Family and Children Service directors concerning innovative programs that help welfare recipients return to work, approximately ten percent cited the use of computer training (Larrison, Nackerud, Lane-Crea, Risler, Robinson-Dooley, & Sullivan, 2000). This represents an opportunity lost, especially since researchers have found that exposure, training, and access to computers have a positive impact on the level of knowledge and comfort people have with computers (White et al., 1999; Brunet & Proulx, 1989; Doelker & Lynette, 1988). Although computer access is not a panacea to welfare recipients’ skill deficits, it can offer a chance for some individuals to obtain stable employment with living wages.

CONCLUSIONS

The divide between people who have access to computers and people who do not has been identified by a wide range of policy makers as a growing problem that may contribute to further economic isolation for certain segments of society. The digital divide is also a symptom of the widening divide between the economically advantaged and disadvantaged worldwide.

Welfare recipients represent a group of people who have traditionally experienced low economic success. The findings from this research indicate that this pattern of low economic success will continue as society moves towards an era when computers are commonplace in a wide range of work environments. In response to this identified gap in computer access, agencies involved in preparing welfare recipients for work should include some basic computer training as part of any job readiness program. The CEO Forum (2000) summed up this call for closing the digital divide best by stating: “As the nation moves forward in digital learning environments, it is imperative that technology be used to remove existing barriers and avoid creating new ones” (p. 29).

REFERENCES


RECEIVED: 12/15/00
REVISED: 07/01/01
ACCEPTED: 07/15/01
Promoting Modern Technology and Internet Access for Under-Represented Older Populations

Carol Irizarry
Andrew Downing
Deborah West

ABSTRACT. Bridging the Gap, a South Australian research based program, was designed to introduce the concepts of modern technology and some Internet skills to people over 55. Target populations included people in rural areas, those with a first language other than English and people who were frail or had a disability. Informal, interactive, hands-on
sessions were developed which demonstrated the concepts underpinning modern computer-based devices and their applications in society. Major findings indicated that most participants identified feeling less anxious and more confident about using modern technology after the program and that they were using a new range of computer-based skills. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <getinfo@haworthpressinc.com> Website: <http://www.HaworthPress.com> © 2002 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Older adults, Internet, new technology, bridging technology gap

BACKGROUND

Australians have traditionally been high consumers of electronic and telecommunication products. A rapid increase has been experienced over the last decade in the acquisition of computers and the use of the Internet by the general public (Australian Bureau of Statistics, 1996, 2000a, 2000b, 2000c). Contrary to the popular stereotype of older people as resistant to innovation, many older people are interested in, and have positive attitudes towards, new technologies (Dyck & Smither, 1994; Irizarry & Downing, 1997; Odlin, 1997; Philbeck, 1997; Shapiro, 1995). They also have a strong desire to feel that they are part of the modern world and to not feel alienated from children and grandchildren for whom technology is an integral part of life (Philbeck, 1997). When presented with the opportunity, older people have been found to be enthusiastic learners and users of computer programming (Eilers, 1989), telecommunication (Furlong, 1989), Internet (Bow, Williamson, & Wale, 1995; Odlin, 1997), on-line information and support (Brennan, Moore, & Smyth, 1995), personal response systems (Dibner, 1990) and word-processing (Irizarry & Downing, 1997).

Because the need for assistive devices increases with age (Sonn & Grimby, 1994), it seems important that older people become familiar with, and confident in their ability to use technology before they confront it as a necessity. If older people are unfamiliar with new technologies they may find them daunting and be reluctant to incorporate health, safety, monitoring and communications technologies into their lives. With the emphasis upon maintaining older people in the community, it is of paramount importance that older people have the knowledge, competence and confidence to take advantage of technologies
that will contribute to their health, independence, safety and well-being, as well as their level of participation in daily living, educational, social and recreational activities.

The Australian Department of Social Security identified that women, people living in rural areas, unemployed people, older people, people with a disability and people from non-English speaking backgrounds, are among those “at greatest risk of being excluded from IT use” (Scott, Diamond, & Smith, 1997, p. 16). This was further borne out by the Australian Bureau of Statistics survey of Household Use of Information Technology conducted in 1996. It showed that while 24% of the population in Australia aged five years and over use a computer at home, the figure for those aged 55 plus was only 7% (Australian Bureau of Statistics, 1996, p. 6). In the state of South Australia the figure for the same group dropped to 6.1%. An American survey conducted at a similar time (Adler, 1996) reported that, while 30% of people aged 55 to 75 years own a personal computer, differences were still found in relation to employment and gender.

The most recent figures (May 2000) show the rate of computer ownership has increased to 50% of all Australian households yet only 20% of people over 55 reported using a computer at home (Australian Bureau of Statistics, 2000a). Internet access too remains lower with only 9% of people over 55 accessing the Internet from home compared with the national figure of 24% (Australian Bureau of Statistics, 2000c). The current figures do not yet show the more detailed demographics of older computer users that were described in 1996. Recent (October 2000) U.S. figures show household computer ownership is now 51% and 41.5% of households now have Internet access (National Telecommunications and Information Administration, 2000). Yet people over 50 remain much further behind with 29.6% in this age group accessing the Internet from any site (National Telecommunications and Information Administration, 2000).

While all older people face potential exclusion from information technology, a double exclusion may be experienced by many older people who face additional barriers such as having a first language other than English, having a disability, living in a rural area or being female (Scott et al., 1997). These factors may make mediating their age-related exclusion much more difficult.

With respect to computer technology, there is evidence to suggest that older people have largely been excluded from the associated benefits of computers due to having left the educational system and the workforce before computer literacy was essential (Australian Bureau of Statistics, 1996, 2000b; Furlong, 1989; National Telecommunications and Information Administration, 2000). Of the total adult computer users in Australia, 80% indicated that they had
taken some training; however, only 6% indicated that this was through an adult community education course. The majority received training through the workplace and traditional educational facilities (Australian Bureau of Statistics, 1996). This supports the notion that most younger people learn to use computers in the workplace or at school and those who do not have such opportunities such as older people are less likely to receive training. Adler (Adler, 1996) also reported that non-computer owners are less likely to be familiar with computers as age increases. The idea that employment is a key factor in the use of the Internet is supported by the most recent U.S. figures which show that within the 50+ age group a dramatic difference is seen between the employed (46.4%) and those who are not in employment (16.6%) (National Telecommunications and Information Administration, 2000).

National figures indicate that there is a small gender imbalance in the use of computers with 67% of men in all age groups compared to 64% of women (Australian Bureau of Statistics, 2000a). The current figures do not provide a gender breakdown for individual age groups (Australian Bureau of Statistics, 2000a). However, previous figures have, and in the over-55 age group in Australia only 4.4% of women reported using a computer at home while the figure for men was 10% (Australian Bureau of Statistics, 1996). In the United States, men and women are now equally represented in terms of Internet use; however, in the over 50 age group there is a gender imbalance when employment is accounted for (National Telecommunications and Information Administration, 2000). Men (46.0%) and women (46.8%) in this age group are fairly evenly matched in terms of Internet access if they are employed, yet if they are not in employment a slight gender imbalance appears with men (18.1%) being more likely to access the Internet than women (15.6%) (National Telecommunications and Information Administration, 2000).

The Australian Bureau of Statistics (Australian Bureau of Statistics, 1996) reported that home computer use increases with education level in the Australian population as a whole from 14% of those with a high school certificate up to 44% of people who held a Bachelors degree. This difference also held true in the U.S. where household Internet access was found to increase significantly with education levels from 11.7% of people with less than a high school education up to 64% of those who had graduated from college (National Telecommunications and Information Administration, 2000).

Combined with the specific challenges faced by an individual in any of these circumstances, older people face some common challenges in coming to grips with computers such as limited income for equipment and classes and limited opportunities to learn. Mainstream classes are often geared to younger learners in terms of attitude, pace, intensity and level of explanations that may
not suit an older person’s style of learning. However, when offered the opportunity in an environment appropriate to their needs, older people learn successfully and enjoy the experience (Filipaczak, 1998; Groves & Slack, 1994; Irizarry & Downing, 1997; Morris, 1994; Temple & Gavillet, 1990). It is also reported that older people experience benefits beyond those directly associated with the acquisition of computer literacy. Improvements in memory, self-confidence, sense of achievement and inter-generational interactions have been reported (Eilers, 1989; Farris, Bates, Resnick, & Stabler, 1994; Groves & Slack, 1994; Irizarry, Downing, & Elford, 1997; James, Gibson, McAuley, & McAuley, 1995; Kautzmann, 1990; McGuire, 1990; Temple & Gavillet, 1990).

Funding for 3 years from the Australian federal government in 1993 was made possible to School of Social Work and the School of Engineering at the Flinders University of South Australia to develop collaborative research into how technology could improve the lives of older people. Several projects were developed and have been reported elsewhere (Irizarry & Downing, 1997; Irizarry, Downing, & Elford, 1997). Findings from these studies indicated that people over 65 who were surveyed held positive attitudes towards modern technology, but lacked opportunities for continued learning about such items as computers. These past projects designed a research-based computer literacy program called Seniors-On-Line for people over 55 years of age. Participants reported high motivation to learn word processing and the importance of environmental factors as helpful to their learning. However, they also consistently reported a gap in their knowledge in relation to modern technology in general. The large number of seniors who became active in this program placed the researchers in an advantageous position to investigate more encompassing ways in which the technological gap could be bridged for older people.

**RESEARCH QUESTION**

Bridging the Gap: Technology Classes for Older People was a project designed to create innovative educational opportunities for selected target populations within the over 55 age group to learn the principles of modern technology and to gain skills in electronic communication. It was hypothesized that by reducing anxiety related to new technologies and by increasing people’s comfort and skills, they would broaden both their understanding and utilization of a wide range of technological devices that are available for daily living, recreational, social, educational and health purposes.
The Bridging the Gap project was carried out in a collaborative effort by the Schools of Social Work and Engineering. The Engineering staff (1/2 time equivalent) were responsible for developing and adapting the curriculum for the project and the different target groups as well as selecting and devising appropriate demonstrations of equipment. They needed an in-depth knowledge of modern technology and the ability to explain their principles clearly and simply. Based on the development of their material, two separate content areas were offered in classes for General Technology and Using the Internet.

The Social Workers (1 full-time equivalent) identified the target populations and liaised with community agencies such as the Council on the Aging, Community Health Centers, Senior Citizen Centers and aged care residential facilities, to identify groups of people that they encouraged to attend the program. They took responsibility for coordination and administration of the General Technology and Using the Internet sessions, which included introducing and explaining the research to participants, then collecting and entering the data.

Target Populations

The four target populations selected for this study were older people from rural areas, older people with a first language other than English, older people who are frail or have a disability and older people from the general community.

Geographic isolation experienced by older people from rural areas poses challenges such as the lack of availability of classes or long distances to travel to classes, and individuals may be isolated from others who share their interests. The disadvantage posed by geographic isolation may be reflected in the fact that while 54% of households in metropolitan areas own computers, the figure drops to 42% for those outside of that area (Australian Bureau of Statistics, 2000a). Internet access at home is also lower outside of metropolitan areas at 19% compared to 33% within (Australian Bureau of Statistics, 2000a).

Older people with a language barrier face the added challenge of understanding instruction in English as well as learning a new computer language and may experience discomfort attending mainstream classes. Experience in the research program Seniors-On-Line (Irizarry, Downing, & Elford, 1997) has indicated that when people with first languages other than English are placed together for their instruction (which is given in English), the class sessions are well attended and reported to be highly effective. Feedback from these English as a Second Language participants consistently highlights the increased comfort and ease of learning they experience which can be attributed to giving clear explanations, teaching at a slower pace and offering individual help.
Older people who are frail or have a disability face potential barriers to inclusion in mainstream classes including limited site access, reduced mobility or fine motor skills, and reduced vision or hearing. They require a teaching method that is more flexible and better suited to the individual’s needs than is offered in mainstream classes. Appropriate training of people with disabilities and their caregivers was found to be of significance in increasing their use of computers and available on-line facilities (Irizarry, Downing, Gilbertson, Lillecrapp, & Wallace, 1997).

Older people from the general community were also included as one of the target populations to encourage access to this research project by the group of seniors who had initially identified the need for a program to bridge the gap in their knowledge of technology.

The Program: General Technology Classes; Using the Internet Classes

The General Technology classes presented principles behind modern technology and gave participants the opportunity to explore a range of technological devices in a relaxed and supported environment. The classes were presented in four one-hour modules each covering a different topic. Each module covered a different aspect or principle of technology focusing on an explanation of the principles behind a range of technological items. This allowed for the application of the principle to be demonstrated and seen in practice through a variety of useful and everyday devices. An effort was made to include health devices as examples in each module. Classes were small and interactive, allowing time for people to look at and experiment with a range of equipment used in the classes.

The four modules covered information on modern technology that can be found in the home and is used in everyday life. The topics included the distinction between digital and analogue things, telecommunications technology, safety and security devices, the principles behind audio and visual technology, the benefits of using such devices and the future of information technology in everyday life. A complete curriculum was developed for these modules including handouts, reference notes, an equipment inventory and video of class sessions.

The aim of the Using the Internet classes was to introduce people to the use of the Internet as well as the possibilities and the opportunities it provides for information gathering, communication, leisure activities and commerce. By utilising a hands-on approach with peer level teaching, small groups and encouragement to collaborate and ask questions, class participants were able to learn quickly, effectively and successfully.
Classes consisted of three 2-hour sessions held over a three-week period. The classes built progressively from a general introduction with some background history on the Internet to a more detailed look at how to use the Internet for searching and exploring the World Wide Web and the use of E-mail and Internet banking facilities. An Internet manual geared to older learners was written during the developmental stage and distributed to class members.

Data Collection

The questionnaires used were adapted from those which had been used with the computer education program, Seniors-On-Line. They had been revised over four years through the utilisation of feedback. Data collected from all willing participants included an initial demographic questionnaire with a range of questions used to determine the participants’ motivation for taking the course, their planned use for the skills and knowledge gained. Included in this questionnaire was a pre- and post-class attitude rating on respondents’ level of anxiety, frustration and satisfaction toward modern technology. A feedback questionnaire on the classes evaluated what was most useful to their learning, whilst a two-month follow-up questionnaire asked whether the participants used the skills and knowledge as they had planned, whether the classes had been a value to their lives, and if they felt more relaxed about technological matters. The questionnaires were coded and no names were kept in connection with the study.

FINDINGS

Characteristics of Participants

A total of 359 people had taken part in the Bridging the Gap program as of March 2000. The data presented below is based on information received from those who completed the research questionnaire. The number of people who undertook the General Technology classes was 219. Of those, 201 (92%) completed the initial demographic questionnaire. In the Internet classes, 140 people participated and of those, 136 (97%) completed the demographic questionnaire.

Although there was a wide distribution among the age groups, the highest proportion of participants, 26%, was in the 65 to 69 age group. The next highest proportions were 20% of the General Technology classes and 23% of the Internet classes being 70 to 74 years of age. This meant that just under 50% of those attending were between 65 to 74. Figure 1 shows the age groupings in
both the General Technology class and the Internet class. More women than men were present in the General Technology classes, 56% female, 39% male (5% did not respond) but the Internet classes were equally represented by men and women 50%-50%.

Educational background varied amongst the participants. In the General Technology classes, 34% had less than high school, 15% completed high school, 21% had trade or business qualifications and 21% had tertiary education (9% did not respond). In the Internet classes, 27% had less than high school, 21% completed high school, 21% had trade or business qualifications and 27% of the participants had tertiary education (4% did not respond). Most interesting in relation to educational level is that the fact that attendance did not appear to be dependent on high educational levels.

Since modern technology may be particularly important for people living alone, it was rewarding to see that this population was attracted to attend both the General Technology classes (29%) and the Internet classes (23%).

Motivation for Attending Classes

Participants were asked to give their reasons for wanting to learn about General Technology and the Internet. Figure 2 shows these responses for both aspects of the program.

Characteristics of Target Groups

Rural Participants

Through surveys from the Seniors-On-Line project, a significant lack of opportunity for older people was identified in rural areas. It was discovered that these older adults wanted to explore avenues to obtain farming information, modernise their businesses and to stay connected with their adult children liv-
Classes were established in one rural geographic section of South Australia, the Riverland, where 20% of the people were over 60 years of age (Riverland Development Corporation, 1996).

A total of 91 people participated in the program in the Riverland; 59 attended General Technology classes and 32 attended Internet classes. Of the 89 reporting participants in the Bridging the Gap rural program, 62% were male and 36% female (2% did not respond). Twenty-four percent were in the 55-64 age group, 54% were 65-74 and 17% were over 75 (5% did not answer). These figures reflect a high older male attendance at the programs in the rural area.

Participants with a First Language Other Than English

Eighteen percent of the General Technology classes and 7% of the Internet Classes identified themselves as having English as a second language. Recruitment for this population was undertaken by working in cooperation with local community centers and agencies offering multicultural services.

During the course of the project, feedback was received about the lack of accessibility to technological information by people who do not speak English. To experiment with reaching out to such a population and to learn about the specifics of conveying the material in a language other than English, the project team decided to offer one set of classes in another language. The questionnaires, class notes and teaching aids were translated into Italian by a language consultant who also acted as an interpreter for the lectures.
The questionnaires proved to be difficult for people, despite the forms being translated, and assistance was necessary for many to complete them. Some participants clearly indicated that they were suspicious of “official” questionnaires and did not want to fill them out. This resulted in only 25 of the 35 participants completing the questionnaires with much of the data missing.

Of this number, 76% were female, 8% male and 16% did not answer. Twenty-four percent of the participants were aged between 55 and 64 years, 48% were 65-74, 4% were 80 or over and data was missing from 24%.

Participants Who Were Frail or Who Had a Disability

People who were frail or who had a disability were reached through cooperation from Aged Care organizations in South Australia and the Alzheimer’s Association. The types of reported disabilities varied greatly and included those that restricted mobility and those that did not.

Twenty-five percent of the total number of people who attended classes identified themselves as having a disability. Eighty-six people fell into this target group with 49% being male and 51% being female. One General Technology class included nursing home residents, each accompanied by a staff person who was able to act as a helper in the class.

Participants’ Evaluation of Classes

At the end of the classes, participants completed the feedback questionnaires. The feedback questionnaires were designed to look at factors that may have influenced teaching and to provide the teachers with information regarding their presentation.

At the end of the General Technology class, 177 participants out of the 201 who completed the original demographic questionnaire completed the feedback questionnaires. The Internet class attendance was 140, and of the 136 people who completed the demographic questionnaire, 125 participants subsequently completed the feedback questionnaires.

The findings regarding the presentation of classes were similar in both the Internet classes and the General Technology classes, as can be seen in Figure 3. Overwhelmingly, participants responded positively to the classes and found the pace and length of the class, the number of examples provided, the class instruction and the teacher’s presentation to be well suited to their learning. It is most significant to this project that in all classes, it was consistently identified that class size, the informal atmosphere, the freedom to ask questions, the skill of the teacher and having helpers available were the most important factors in helping their learning.
Follow-Up Questionnaires

Of the 201 participants who completed the initial questionnaires in the General Technology classes, 157 or 78% agreed to be sent the two-month follow-up questionnaire. From the 157 respondents, 92 people or 59% returned the completed questionnaire.

The pre- and post-class attitude ratings on the respondents’ levels of anxiety, frustration and satisfaction towards new technology were determined. The results showed that there was a relationship between pre-post attitude variables at the 0.01 or 0.02 and 0.05 level respectively that show a significant change in each variable. As a result of the General Technology classes, respondents generally felt less anxious and therefore more comfortable about trying new technology as well as less frustrated and more satisfied when using new technology.

The follow-up questionnaire also sought to find out what uses people had made of their new skills. Of the 136 participants in the Internet classes who completed the demographic questionnaire, 94 agreed to be sent the two-month follow-up questionnaire. From these 94 participants, 69 people or 73% returned the completed questionnaire.
Uses of Skills Gained During General Technology Classes and Internet Classes

Two months after completing their classes, participants were asked about the actual uses to which they had put the skills learned in the classes. Figure 4 shows firstly the planned uses of skills indicated during the General Technology classes, and secondly the actual uses to which they had put the skills learned in the classes. Figure 5 illustrates the planned uses of skills indicated during the Internet classes, and secondly the actual uses.

Graphs for both the General Technology class and the Internet class indicate that the participants had formulated realistic plans, and that they had generally used their skills in the ways intended. Participants were able to bridge the technology gap and increase their access to all forms of information and strengthen communication with family and friends. This is supported by comments from participants such as, “Technology can be a huge problem for ‘oldies’ creating further gaps between us and the rest of society and creating lack of confidence in coping with life. All the more reason why we need this type of education.”

Ways in Which Program Affected Participants’ Lives

Participants were also asked if participation in the program had affected their lives in one or more of the following ways. The responses are shown in Figure 6.

As can be seen, this resulted in improved quality of life for the participants and possibly a contribution toward the prevention of problems that could require organized social services. This is further supported by participant comments such as the classes “have given me confidence in conversations allied to computers. I am slowly but surely creating a new interest or ‘lease on life’ and consequently relieving loneliness and bouts of depression.”

DISCUSSION

This project involved a small number of older people living in Adelaide, South Australia, and one surrounding rural area and was not a representative sample of older people. But the older people who participated in the learning opportunities offered through the Bridging the Gap project were, for the most part, delighted with the experience and identified feeling less anxious about modern technology after the experience. Most importantly, they liked and understood the “principles” presented in the General Technology classes and in-
FIGURE 4. Percentage of respondents’ planned uses of skills learned during General Technology classes, and their actual uses of skills 2 months after the classes.

FIGURE 5. Percentage of respondents’ planned uses of skills learned during Internet classes, and their actual uses of skills 2 months after the classes.
dicated that their self-esteem was higher after their participation. They reported satisfaction with a content aimed at general explanations of principles rather than specific tasks.

By contrast, the Internet classes provided skills which participants reported gave them the thrill of being part of the new Information Age. As one class member stated, “I know I’m still behind my grand-children but I’m closing the gap. It’s the greatest thing since sliced bread!” Many such enthusiastic responses were received usually written on the back of one of the feedback forms.

In reflecting on the 12 months of the project, there were aspects which could have been improved or changed. Class size for the technological classes was expanded beyond the ideal number of 20 people as participants often appeared with significant others or unregistered guests. This made the hands-on demonstrations more difficult.

It had been intended that several language groups would be included in the program but only one was organized (in Italian). This was due in part to under-
estimating the amount of time required to reach the diversity of the target populations such as the frail or disabled, rural and non-English speaking older people. In the 12 months of the project it was possible to include only a selection from each of the target populations.

The goal of the Bridging the Gap project was to reduce anxiety related to new technologies and to increase people’s comfort, understanding and utilization of a wide range of technological devices that are available for daily living, recreational, social and health purposes. It was felt that in general the project reached its goal and achieved the following important conclusions:

- The participants in the program exhibited a strong interest in gaining information and knowledge about the modern technological age.
- They expressed positive attitudes towards technologies that are in everyday use.
- Age was not a barrier to learning to use and appreciate the Internet as a source of communication and information for those people who attended the classes.
- The learning environment is crucial and its support structures are critical to successful teaching of older people. Basic ingredients include straightforward, non-technical language, a moderate pace of delivery, interactive activities, individual help available to participants, and an atmosphere of fun and informality.
- Certain populations of older people with disadvantages in addition to age need special outreach strategies to successfully engage them in learning about modern telecommunications and technologies.
- When local expertise and infrastructure are available in rural communities or with language specific populations, prospects for the establishment and conduct of technologically oriented classes and activities for seniors are very high.
- The participants of the study exhibited the ability to come to grips with new technology, and to make effective long-term use of the broad range skills they have gained.
- There was evidence to suggest that older people were successful in using their newly acquired skills as planned after completing the classes.

RECOMMENDATIONS

With the emphasis upon maintaining older people in the community, it is of paramount importance that older people have the knowledge, competence and confidence to take advantage of technologies which will contribute to their
health, independence, safety and well-being, as well as their level of participation in daily living, educational, social and recreational activities. The Bridging the Gap: Technology Classes for Older People project has contributed towards our understanding of how older people can be empowered to participate in the technological era and overcome barriers due to age, disability, frailty, language or geographic isolation. It is recommended that opportunities for the development of specific skills for the use of modern technology in a supportive environment be acknowledged as essential and that research continue with efforts to identify how such programs can be effective. It is also recommended that attention be directed toward presenting more abstract concepts or principles relating to modern technology to older people who have limited access to obtaining such knowledge. Further research is needed about the confidence and self-esteem which appears to be a benefit to older people in learning to understand concepts relating to modern technology.

REFERENCES


Factors Affecting the Acceptance of a Report Writer Software Application Within Two Social Service Agencies

Patrick Panos
Richard A. Weaver

ABSTRACT. Within the research literature, there has been a well documented difference in the level of acceptance in the adoption of technology within social services agencies by mental health practitioners. This article describes a collaborative process of design, implementation and evaluation of a report writer application for clinicians in hospital settings. Two inpatient hospitals that implemented the report writer software were evaluated. In particular, factors which aided and hindered the acceptance of the application in the two facilities are discussed. A complete description is provided of the application, which allows clinicians to quickly generate a report by choosing and editing commonly used text. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <getinfo@haworthpressinc.com> Website: <http://www.HaworthPress.com> © 2002 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Computers, report writing, computer applications, software

Patrick Panos, MSW, PhD, was a pediatric neuropsychologist and Director of Social Work at the Utah State Hospital, Provo, Utah, and is Assistant Professor of Social Work at Brigham Young University, School of Social Work, 220 KMB, P.O. Box 24472, Provo, UT 84602-4472 (E-mail: patrickpanos@byu.edu).

Richard A. Weaver, PhD, is a clinical psychologist at the Department of Veterans Affairs, SLC Health Care System, Salt Lake City, UT (E-mail: Richard.Weaver@va.med.gov).

Journal of Technology in Human Services, Vol. 19(4) 2002 © 2002 by The Haworth Press, Inc. All rights reserved.
INTRODUCTION

For two decades, it has been well recognized that advances in information technology are dramatically affecting the delivery of social services and mental health treatment (Greist & Klein, 1981; Lieff, 1987; Schwartz, 1984; Sidowski, Johnson, & Williams, 1980). A myriad of computer applications are continuing to be developed for all aspects of service delivery. Social service agencies have generally focused on using information technology to assist in managing administrative data, including quality assurance, service utilization, client demographics, as well as maintaining fiscal accounts (Pardeck, Collier-Umfress, & Murphy, 1990). Unfortunately, front-line social service and mental health treatment providers have reportedly been slow to take advantage of the potential power afforded by computers in their clinical work (Diamond, 1996; Farrell, 1989; Hammer & Hile, 1986; Phillips & Bergman, 1995; Rosen & Weil, 1996). Several reasons for the slow adoption of information technology into the social service and mental health fields have been suggested by several researchers. For instance, Gerstman (1996) asserts that the attitudes of agency directors can greatly impact the level of computer use by employees, while Mutschler and Hoefer (1990) found inadequate training and limited access to agency databases as limiting factors to the utilization of information technology. Alternatively, Patterson (2000) maintains that the slowness of practitioners to adopt the use computers is a result of the fact that most computer application focus on administrative and fiscal information needs, and provide little practice-relevant information. Kolodner (1992) suggests that both of these positions are true, stating that failures of implementation are due to both systems and software factors.

Since there has been a well documented difference in the level of acceptance in the adoption of technology within social services agencies by front-line workers (Hammer & Hile, 1986; Hedlund, 1987; Sarris & Sawyer, 1990), it becomes important to examine the factors that assist in the adoption of computer applications. This article will examine two such situations in which a computer assisted report writer was implemented within two separate agencies, the Department of Veteran’s Affairs, Salt Lake City Health Care System (previously known as the VA Medical Center) and the Utah State Hospital. In particular, factors which aided and hindered the acceptance of the application in the two facilities will be discussed.

Background and Needs Assessment for the Development of the Software

The first step to effective software development within a mental health agency is to complete a thorough needs assessment (Patterson, 2000; Phillips &
Berman, 1995; Schoech, 1999). Cooper (1995, 1999) has noted that software is successful to the degree that it achieves the users’ goals. Within the clinical setting, Sarris, Sawyer, and Quigley (1993) have found that mental health professionals had more positive attitudes regarding the use of computers if they were perceived as “facilitating their work” (p. 221).

Mental health practitioners generally do not enjoy the paperwork that is an increasingly important part of their daily routines (Hammer & Hile, 1986; Taintor, 1987). Discipline-specific assessments (e.g., social histories, psychiatric evaluations, etc.) are particularly troublesome because they are so labor intensive. Conducting a thorough assessment of the psychiatric patient requires an enormous investment of time. While a problem-focused examination (e.g., for a broken arm) may take a physician five minutes to conduct and require a paragraph to summarize the findings, a psychiatric history legitimately considers everything about the patient, past and present, and may require a mental health clinician several hours of interviewing and many pages to summarize the findings. With the pressures of managed care, clinicians have a competitive edge to the extent that they adopt the most efficient methods for history taking and report writing. Previous researchers have developed and reported attempts to computerize report writing (Chang, 1987; Ferriter, 1995; Gifford & Maberry, 1979; Kolodner, 1992; Mezzich, Dow, Ganguli, Munetz, & Zettler-Segal, 1986; Zawacky, Levit, Khan, & Bhattacharyya, 1992); however, these endeavors became either expensive and complex database management software packages, or more simple word processing templates or checklists.

The programmer who developed the Report Writer was himself a clinician who saw a need within these hospitals for this type of program. It was developed to fit for the needs of the clinicians in these agencies and not to be used as a commercial product. Both authors were involved in the implementation of the application and evaluation process.

Based on the needs assessment of the two agencies, the V.A. and Utah State Hospital, the following software development goals were determined by the clinicians and middle managers: (1) to develop a software application with a primary purpose of assisting practitioners to generate high quality draft narrative clinical reports and histories; (2) to make the application sufficiently intuitive and “user-friendly” so that little or no training was required to use it effectively; (3) to make the application satisfactorily flexible so that both discipline-specific and practitioner-specific report templates could be rapidly created by individual users; and (4) to facilitate the work of practitioners in the clinical setting, as evidenced by their willingness to use the application. The following is a brief description of the software application, written in Visual Basic 6 with information stored in an Access 2000 database, designed to meet these goals, and which became known as “Report Writer.”
Report Templates

There are common denominators in the content of reports that clinicians from each of the mental health disciplines produce. Mental status, family history, substance abuse history and suicidal inclinations, for example, are frequent headings in many patient histories. Much of the material included under these headings is fairly standard and is repeated, with patient-specific modifications, from report to report.

The “Report Writer” approach translates these common denominator materials into report templates that can capture up to 75-80% of the material clinicians typically include in their reports. A computer program processes these templates, showing the report headings as “buttons” at the top of the screen and presenting the content for a particular heading on the screen in the form of a list. The task of the clinician is to select material from the list that applies to the patient being interviewed, modify the material to fit the patient and add new material when appropriate. An example of a computer screen displaying the list content of a mental status section is presented in Figure 1.

In order to develop the templates, a multi-disciplinary committee was formed. Each committee member consulted with colleagues, formally and informally, and the result was a set of four discipline-oriented templates covering psychology, psychiatry, social work and nursing. Later, core templates for such subject matter areas as neuropsychology, suicide potential and substance abuse were developed.

Writing a Report

The clinician begins writing a report by selecting the template she or he wishes to use from a list of templates on the computer screen. The list includes the core templates and any others that individual clinicians have defined. The computer then displays the section headings from this template as “buttons” at the top of the screen (see Figure 1). When the clinician selects a button, the computer displays the content for that section. The clinician peruses the content and, using the keyboard or a mouse, selects the applicable sentences, phrases, and words that fit the patient. Any item can be edited, in whole or in part, while writing the report. If the clinician selects an item with an embedded asterisk, a blank edit window pops up requesting material to replace the asterisk. For example, when the statement “This is the * SLC VAMC admission” is selected, the edit window opens to allow the writer to enter the admission number, to be inserted where the asterisk is appearing in the sentence. Button titles
change to lower case when items have been selected from that section so that clinicians can scan the rows of buttons and know which sections have been completed.

After moving through all of the sections and selecting and editing (when necessary) the pre-written sentences, phrases and words to produce 80% of the report, the clinician then completes the final 20% by freestyle writing in two sections common to all reports: Problem and Formulation. When these two sections are complete, the computer puts the entire report together on a preview screen and allows the clinician to continue the refinement process. The report is printed from the preview screen after the clinician has had a chance to read and edit as much or as little as he or she wishes. The report is saved to the database at the end of this process.

In essence, the Report Writer allows the clinician to collect data using the rapid selection process. The basis of the report is compiled and formatted automatically by the Report Writer. Next the clinician writes the summary statements (i.e., Problem and Formulation) that require clinical judgment. If an
appropriate rapport is established with the patient, the report writer can be used during the interview in a collaborative process with the patient. Additional summary statements are then added. Once the assessment interview is over the report is quickly finished, printed and placed in the chart. This is a streamlined process which is more efficient than interviewing the patient, scribbling notes, and, when time permits writing the report, often even after the patient has been discharged and the information has lost its immediate value.

FACTORS ASSOCIATED WITH AGENCY’S ACCEPTANCE OF APPLICATION

Report Writer was originally introduced to and quickly accepted by the staff at the Department of Veteran’s Affairs Salt Lake City Health Care System (V.A.). The sixty clinicians in the V.A. psychiatric program serve over 100 in-patients as well as a large outpatient population in the mountain states area around Utah. This experience was subsequently repeated at the Utah State Hospital, located in Provo, Utah. This hospital has 389 inpatient beds and over 100 clinicians on staff. It should be noted that both facilities have computers available to all clinicians, and have a basic electronic chart system in place. In both facilities, the electronic charts lack report writing capabilities; however, the Report Writer, using Windows clipboard can be easily transferred into the electronic chart. Since the clinician who developed this program did so in his off-duty time, there was no cost incurred by the facilities.

This pattern of general acceptance of the software application within a facility is not typically reported in the research literature (Monnickendam, 1999; Schoech, 1982). Several factors were consistently identified within focus groups conducted during the development and evaluation of Report Writer as important components to the acceptance of the application within each agency. The observations, notes, evaluations and findings from the focus groups in the two agencies were similar. The following were the reported factors.

Followed Normal Report Writing Processes and Goals

The majority of staff in both agencies reported that Report Writer followed the normal report writing procedures, while meeting the specific goals of each type of report. As mentioned previously, the ability to create and refine templates allowed individual clinicians and treatment team members to customize reports to reflect their own needs. As a result, templates reflected the specific report writing demands of the agency, discipline and clinician. Several interviewees spontaneously reported that they had tried other report writing appli-
cations; however, the narratives which they generated typically were too
generic, and failed to meet their unique requirements. Report Writer, therefore,
was more readily accepted because it provided an important balance between
standardization and flexibility.

Clean Interface

Staff at both agencies reported a preference for the clean interface of the Re-
port Writer, which has clearly labeled buttons and few pop-up messages (which
often can confuse users with cryptic choices). As Cooper (1995, 1999) has
noted, many computer applications are written for “power-users,” who prefer
choices, instead of for the general population, who have a wide variety of experi-
ence with computers. Report Writer still allowed for more computer accom-
plished staff to customize the interface, and “drill down” to choices, while
keeping the interface simple for the general user. Additionally, older staff mem-
ers stated that they appreciated that buttons were large, with easy to read fonts.

Ease of Use

The authors noted that one of the indicators of how well people liked com-
puters was correlated with their facility with a keyboard. It was not unusual
to find that more experienced clinicians were more comfortable with dicta-
tion, and were resistive to “typing their own reports.” The Report Writer re-
duces the need for extensive typing by providing much of the content of a
report in the pre-written templates. As a result, this application was more
readily adopted by staff who were resistive to computers due to lack of key-
board abilities.

Time Savings

The time saved in writing reports is another prime inducement to using the
application. For instance, the typical amount of time needed to produce an ini-
tial inpatient psychiatric report, with client collaboration, is 30-45 minutes, in-
cluding an interpretation of psychological test data. This represents a 50-60%
savings in time, which is consistent with the findings of other researchers
(Ferriter, 1995). Greater percentage of time savings were reported with length-
tier reports.

Greater Client Satisfaction and Collaboration

Some of the users reported actively collaborating with patients when writ-
ing reports. Several clinicians stated that they allowed the patient to view the
computer screen over the corner of a desk so that they could select content items together. Additionally, clients reported being more comfortable with this collaborative approach, and more willing to respond to questions. This finding is consistent with results reported by other researchers (Ferriter, 1993; Richman, Kiesler, Weisb, & Drasgow, 1999) in which clients were found to be more candid, and more accurate in their responses.

Provided Commonly Needed Information

As Report Writer became more commonly accepted in both agencies, many staff discovered that they were able to access the reports of other staff which normally would have been unavailable. Reports were immediately accessible to clinicians at their desks, as opposed to hard copies which had to be typed by secretaries and then placed into charts before they could be reviewed. Thus, staff reported they were able to read assessments from other disciplines as they prepared their reports. The ability to access reports was additionally enhanced by links within the application.

Integrating the application even further, the authors used the standard Windows help facility to prepare materials useful to a wide variety of clinicians and make these materials seamlessly available during the report writing process. The authors began with interpretation aids for general assessment instruments. If a clinician has administered the Beck Depression Inventory, for example, and is summarizing the results in the formulation section, the clinician can use the capabilities of the Windows help system to review interpretive hypotheses and descriptors and paste those that apply into the formulation section. Other links are easily added and are currently being developed. For example, information on medications, their side effects, and their indications and contra-indications can be examined while writing the report. Names, addresses and descriptions of referral options can be maintained, allowing social workers to copy such materials into their reports. DSM-IV diagnostic criteria can be reviewed while making diagnostic formulation.

Staff also reported that templates were a good teaching tool for students and interns learning how to take histories and write reports. For example, some students reported a sense of reassurance to see on the computer screen the content areas that should be addressed when assessing mental status or depression (Figure 2).

FACTORS ASSOCIATED WITH AGENCY’S LEVEL OF ACCEPTANCE OF APPLICATION

Despite acceptance by front-line workers for who this software was designed, top level administration in both hospitals were reluctant to allow full
access to the application. Although in both cases the application was installed to the network, there was a lack of acceptance by upper management to its adoption. The following are the two main concerns cited.

Did Not Meet Administrative Needs

Although descriptive statistics concerning predetermined categories can be generated using Report Writer, the main purpose of the program is to assist clinicians in generating reports. Several upper level administrators therefore questioned the need for such an application, stating they were seeking programs which could generate more focused reports, such as for the state legislature. Administrators at both hospitals concluded that introduction of the program would be permitted, although it was unclear to them that there was a need for such a program at the clinical level. It should be noted that since this software was being designed for clinicians, and had middle managers’ support, the need for upper level administration support was somewhat reduced. It seems obvious in retrospect that it is important for administrators to under-
stand the design and implementation of any software in their agency, even when it is primarily for the front-line clinicians’ use.

Concerns About Providing Information Technology Department (IT) Support

A barrier to introducing the application came from the Information Technology Department (IT) services. The legitimate question was raised regarding “who would support the application.” In other words, computer services desired to have formal contact with a vendor whom they could contact in case of difficulty. Even when the developer agreed to provide support, additional concerns, also legitimate, were raised regarding training staff in the use of the program. Arrangements were made to train the staff and the IT professionals to use the software. The application was placed onto the system conditionally, with the understanding that any major difficulties with stability would lead to its removal.

The concerns of the upper administration as well as the IT services were eventually resolved, as the program demonstrated stability and became a reliable, useful tool within the agencies. The application is still in use in both facilities. In hindsight, the acceptance by these two very important departments in the organization could have been assisted by better awareness of the potential barriers, plus more communication and inclusion in the implementation process.

CONCLUSION

Within the research literature, there has been a well documented difference in the level of acceptance in the adoption of technology within social services agencies by mental health practitioners. However, there is a paucity of research that examines the successful implementation of new software for clinicians. In an evaluation of the software implementation at two separate inpatient hospital sites, the following factors were noted as aiding in the acceptance of the software: (1) followed normal report writing processes and goals; (2) clean interface; (3) ease of use; (4) time savings; (5) greater client satisfaction and collaboration; (6) provided commonly needed information. The factors that hindered acceptance were: (1) did not meet administrative needs; and (2) concerns about providing information technology department support. A thorough understanding of what the clinician needs is the basis for a successful software design. Clinicians will use the technology available to them if the software is flexible, and adaptable to their work.
REFERENCES


Cooper, A. (1999). The inmates are running the asylum: Why high-tech products drive us crazy and how to restore the sanity. Indianapolis, IN: SAMS.


RECEIVED: 01/15/01
REVISED: 06/28/01
ACCEPTED: 07/18/01
Acquiring and Implementing Videoconferencing Technology to Enhance the Field Work Experience

Terry A. Wolfer
Michelle Carney
Jim Ward

ABSTRACT. To facilitate connections between the curriculum and field, faculty members at one university have explored and experimented with the use of videoconferencing technology for increased faculty communication with students and field instructors. This paper describes the planning and equipment acquisition process, from beginning conceptualization to current implementation. Further, it provides practical information about videoconferencing systems and suggests ways to maximize their use. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <getinfo@haworthpressinc.com> Website: <http://www.HaworthPress.com> © 2002 by The Haworth Press, Inc. All rights reserved.]
KEYWORDS. Videoconference, televisit, field instruction (or education), faculty field liaison

INTRODUCTION

The Council on Social Work Education stipulates that field placements be “educationally directed, coordinated, and monitored experiences for all students” (1994, p. 142). For a variety of reasons, however, faculty members serving as field liaisons have increasing difficulty maintaining sufficient involvement with field settings to provide educational direction. These reasons include increasing numbers of students and practicum sites, competing pressures on faculty time, few rewards for the liaison role, and lack of clarity concerning the field liaison role (e.g., Council on Social Work Education, 1988, 1998; Fortune, 1994; Hartman, 1990). Nevertheless, it remains incumbent upon the faculty field liaison to help students and field instructors make the necessary connections between the curriculum and practice. Indeed, these and other pressures may create the need for alternate models of educational supervision in field education (Reisch & Jarman-Rohde, 2000).

As one response to these problems, faculty members at one university have explored and experimented with the use of videoconferencing technology for increased faculty communication with students and field instructors. Essentially, the strategy increases opportunities for educational direction through briefer, more frequent contacts by faculty liaisons with students and field instructors. This paper describes the planning and equipment acquisition process, from beginning conceptualization to current implementation. More specifically, the paper: (1) describes our rationale for using videoconferencing technology to support field liaison activities; (2) introduces criteria for a viable videoconferencing system, (3) describes the process of establishing a workable system and obstacles encountered, and (4) speculates about further applications of the technology. In sum, it provides conceptual and practical assistance for those interested in using videoconferencing technology for conducting field liaison visits and other communication.

Basic Definitions

Before providing our rationale for using videoconferencing, we will define several terms. Videoconferencing refers to simultaneous, two-way communication between distant sites involving combined “video and audio contact that may also include graphics and data exchange” (Hyman, 1999a). Basically, it adds a visual dimension to conventional telephone communication. At mini-
mum, videoconferencing requires “audio-visual equipment (monitor [or screen], camera, microphone, and speaker) as well as a means of transmitting information between sites” (Hyman, 1999a). Recent advances in computer and telecommunications technologies have made possible compression of large volumes of digital data. With data compression comes the ability to “transmit information via today’s Internet or telephone network, greatly reducing the cost of videoconferencing [compared with satellite connections]” (Hyman, 1999a).

Videoconferencing offers several advantages. Basically, it simulates in-person meetings by supplementing audio communication (i.e., telephone) with face-to-face video communication. Because it operates in real time, the resulting communication is fully interactive. Once established, videoconferencing can provide this enhanced level of communication for less cost and less time than required for traveling between distant sites.

Videoconferencing technology has been available for more than three decades (Olgren & Parker, 1983; Svenning & Ruchinskas, 1984), but only widely used in the past decade. In 1997, 39% of U.S. businesses used videoconferencing technology, and 40% reported plans for first-time purchases or upgrades of videoconferencing equipment in 1998 and 1999 (Kay, 1998). Technological advances have made videoconferencing available on a smaller, less expensive scale. These advances have included improvements in both computer and communications technologies. But, unfortunately, videoconferencing “systems have become increasingly complex as they have moved toward the desktop, because they represent a fusion of a number of previously separate hardware and software technologies. Understanding them thus becomes difficult” (Agius & Angelides, 1997, p. 291).

Desktop videoconferencing refers specifically to “videoconferencing on a personal computer. [It is] most appropriate for small groups or individuals” (Hyman, 1999b). These systems rely on personal computers with additional hardware and software to code and decode signals for transmission. Because desktop systems often include a document sharing feature that allows participants to see and edit a computer document as they see and hear each other (Hyman, 1999a), videoconferencing creates a virtual desktop where distant colleagues can work face-to-face in real time on an electronic file. Relatively low cost desktop systems with document sharing make an ideal tool for communication, collaboration, and learning (Hyman, 1999a). In contrast to the early room-size videoconferencing systems, desktop videoconferencing is characterized by: one (or few) to one (or few) interaction, mutual participation, more relaxed control, and less formal communication among participants (Hyman, 1999a).
Videoconferencing bridges developments in computers and communications networks. This interstitial position requires a meshing of new components from systems with little history of linkage. In addition, the technological demands for processing and transmitting video data far exceed those of audio alone, as in the conventional telephone.

OUR RATIONALE FOR USING VIDEOCONFERENCING

Traditionally, our College has maintained a major commitment to the field component of social work education. All regular faculty members, as a standard part of their standard teaching responsibilities in the College, provide field liaison services to 12-14 students each year. College policy requires that field liaisons make a minimum of three face-to-face visits with each student and his or her field instructor at the field site per year. Typically, the first visit occurs at the beginning of fall semester, with the other two visits coming at the end of fall and spring semesters. During academic year 2000-2001, the College has 344 students in concurrent field placements. These placements are located across a three-state area: 56.7% within the metro area, 36% elsewhere in the state (with most in population centers 1.5-3 hours away), and 7.3% in two adjoining states (1.5-5 hours away). In addition, a large majority of summer block placements are located outside the metro area.

At the outset, the authors were assigned by the dean to explore the use of videoconferencing for field liaison visits. As demonstrated by growing medical, business and administrative uses on our campus, videoconferencing appeared to be “the way to go.” Initially, we anticipated that by reducing travel costs videoconferencing could soon recoup equipment costs and subsequently conserve resources. We envisioned videoconferencing as simply a way to more efficiently fulfill liaison responsibilities, thus conserving faculty time and college resources.

Beginning with a minimum of three on-site, face-to-face visits per student per academic year, our faculty members spend a substantial amount of time for field liaison responsibilities. However, a large portion of faculty time allotted for field visits is spent traveling to and from field agencies. Of course, when there are problems with field placements, additional time may be required for further student/field instructor interaction. We conservatively estimated that out-of-town travel alone requires a total of more than 420 hours of “windshield time” per year, or the equivalent of 10.5 weeks of full-time activity for one faculty member. This estimate does not include time required by overnight stays for out-of-state field visits nor travel time within the metropolitan area for non-reimbursed mileage (nearly as much as for out-of-town travel). Initially, we
also anticipated that videoconferencing could be used to increase productivity and ultimately be cost-effective by freeing up faculty time for other academic obligations.

Eventually, however, we realized that these efficiencies created the potential for addressing emerging problems in the field program. Rather than expend fewer resources to maintain minimal levels of faculty contact with students and field instructors (the status quo), we saw an opportunity to increase contact without increasing the overall cost or time required. In short, information technology created a means to improve field instruction.

Each year, students express a desire for greater contact with their field liaisons, and many indicate that field liaison visits are too infrequent and too widely spaced to allow for development of a meaningful educational relationship between faculty members and students. It became apparent to us that videoconferencing technology offered substantial unintended benefits. For this reason, we began paying more attention to our own and others’ concerns about field instruction and exploring ways to enhance it. We concluded this new technology could be used to increase and enhance faculty involvement with field students.

More specifically, some students and field instructors express concern about inadequate linkages between their field settings and the college. In end-of-year field evaluations, some students question the relevance of the curriculum to the practice environment. Informally, students occasionally articulate their difficulty trying to understand their own practice in theoretically sophisticated ways but more often simply exhibit confusion and frustration in doing so, both inside and outside the classroom. At annual field instructor meetings and training sessions, field instructors routinely express concern about their limited understanding of the curriculum (despite a field manual and field instructor meetings that provide overviews of the curriculum). Likewise, social work educators sometimes express concern about the limited relevance of the curriculum for professional practice (e.g., Reisch & Jarman-Rohde, 2000; Rhodes et al., 1999; Vayda & Bogo, 1991). Again, we began to anticipate that this technology could be used to increase and enhance faculty involvement with students, field instructors, and agencies.

Obviously, we could employ alternate means for increasing faculty contact with students (e.g., integrative seminars, chatrooms, e-mail) and field instructors (e.g., workshops, e-mail). But videoconferencing offers the benefits of face-to-face, real-time contact with students and field instructors in their agency settings. We believe such contact increases the likelihood that participants will communicate more extensively, especially those who work farther away from the college and those who dislike less natural, more technologically mediated forms of communication. These considerations seem particularly
important for the kind of problem-solving, learning-oriented dialogue we envisioned.

**GENERAL CHARACTERISTICS OF A VIABLE VIDEO CONFERENCING SYSTEM**

Throughout our exploration and implementation of a solution to these problems and needs, we repeatedly considered four criteria. To be satisfactory, we initially sought a videoconferencing system that would be simple, inexpensive, highly compatible, and feasible. We sought simplicity because we knew that each year a new group of students and some new field instructors would have to be introduced to the system. We also knew that to gain wide acceptance and continued use, a system would require a mild learning curve. Because we operated in a public university setting and sought to reduce overall field-related costs, we wished to avoid an inordinately expensive system. Further, because technology in this area continues to evolve so rapidly, we sought a “good enough” system rather than the most recent technology at much higher prices. We sought a highly flexible and widely compatible system because our students are placed throughout a three-state region in field agencies ranging from large to small, urban to rural, public to private, and profit to nonprofit. Because some of these agencies were already beginning to use videoconferencing technology, we wanted a system that would be compatible with their ISDN-based systems (e.g., PictureTel, VTel, Tandberg). But because many field agencies currently make limited use of information technologies, we also sought a system to which new agencies could eventually connect with minimal investment. Given these and other constraints, we wanted a system that, ultimately, would be highly “feasible.”

**OUR ACQUISITION PROCESS**

The following sections summarize our rather torturous process of acquiring videoconferencing equipment. Interspersed throughout the account, separate paragraphs describe what we learned about the technology. We intend to include basic definitions and descriptions here that will assist others unfamiliar with videoconferencing technology. While particular details of our experience may be unimportant to others, this account provides a way for introducing increasingly sophisticated information incrementally.

At the outset, we simply wanted to have combined audio and video contacts with field instructors and students. We briefly considered several inexpensive
alternatives because we knew that many field agencies do not have the resources to purchase higher end equipment. For example, we considered using the AT&T video telephone but the picture size and quality seemed so limited that we quickly abandoned this alternative. Our initial exploration introduced us to the world of videoconferencing.

Basic Videoconferencing Equipment

Videoconferencing requires several hardware and software components. In desktop computer applications, the video camera and microphone may be the most visible of these components. However, a coder-decoder (or codec, for short) is essential. Like a modem, this hardware component may be installed internal or external to the computer. It “codes the outgoing video and audio signals and decodes the incoming signals. Prior to transmission, the codec converts analog signals to digital signals and compresses the digital signals. Incoming audio and video must be decompressed and converted from digital back to analog” (Hyman, 1999b). Converting information to digital signals and compressing it allows larger volumes of data to be carried more economically than otherwise possible.

A codec converts and compresses video and audio data using an algorithm, “a step-by-step problem-solving procedure. Transmission of compressed video over a communications network requires sophisticated compression algorithms. Some videoconferencing systems offer both proprietary and standard compression algorithms” (Hyman, 1999b). These compression algorithms resemble those used by computers for compressing data to save disk space. A proprietary compression algorithm is a “vendor-specific algorithm for compression of a video signal. A videoconferencing system using a proprietary algorithm can only communicate with a remote site using the same algorithm. Many vendors also adhere to standard compression algorithms to facilitate communication across platforms” (Hyman, 1999b). A standard compression algorithm refers to an “algorithm convention for compression of a video signal. Adherence to standards allows communication among a wide variety of videoconferencing systems, though not with the same clarity as two similar systems using a proprietary algorithm. H.320 is the most widely accepted standard in use today” (Hyman, 1999b). In short, it permits “a wide variety of videoconferencing systems to communicate” (Hyman, 1999b).

While a codec’s capacity for processing data may create a bottleneck, it is more likely that video quality will be compromised by the capacity of the transmission lines. This capacity is referred to as bandwidth. “In casual use, [bandwidth is] the amount of information that can be transmitted in an infor-
...... High bandwidth video conferencing means that the picture and sound will be clear” (Hyman, 1999b).

To minimize costs for field agencies, we considered buying a laptop computer equipped with the necessary video conferencing hardware and software. Using a scheduling and checkout system, we planned to lend this equipment to students who would take it along to their field agency for periodic televisits with field liaisons who remained on campus. In 1998, this plan was stymied by laptop computer capabilities that limited what we could attach to a portable unit. Further concerns about the risks of having multiple users transport a laptop (e.g., having equipment broken, lost, stolen) and the difficulty of scheduling more than one user per week (for students who travel to campus once per week) finally led us to abandon this alternative.

We also considered some of the widely available, low-cost desk-top video conferencing systems designed for use over the Internet (e.g., Kodak, Intel, IBM, Logitech). These systems require Internet access at each site and are limited by the dial-up bandwidth of the slowest telephone connection on a videoconference call. They typically use NetMeeting video conferencing software that is available for free with Microsoft Windows operating software. Because these systems did not yet provide the consistent video and audio quality we required, we sought another alternative. To produce the quality conferencing we needed, it became apparent that the most viable solution was to use desktop video conferencing hardware and software in combination with ISDN lines. So we set out to explore such systems.

Basic Videoconferencing Features

In the past few years, video conferencing technology has improved dramatically and costs have declined substantially. These developments posed bewildering choices of differing capabilities, and their particular costs and benefits made it difficult to determine how our needs could best be met. Furthermore, the number of companies manufacturing this technology added to our confusion. In addition to the basic system processes identified above, we learned about basic capabilities of video conferencing systems that determine the quality of results. Even for experienced computer users, much of the language used for video conferencing may be unfamiliar, coming as it does from the field of telecommunications. But this language will be important for understanding basic features of video conferencing systems. For that reason, we offer several additional definitions.

Early video conferencing systems provided only half duplex audio: “2-way audio transmitted and received in turn (rather than simultaneously) so only one site can speak at a time” (Hyman, 1999b). Full duplex audio is now standard in
videoconferencing systems: “2-way audio simultaneously transmitted and received without any interference or ‘clipping’” (Hyman, 1999b). Because this is the audio quality we are accustomed to having with the telephone system, anything less is distracting and annoying.

Likewise, early videoconferencing systems provided relatively low frame rates. Frame rate refers to the “frequency in which [successive] video frames are displayed on a monitor, typically described in frames-per-second (fps)” (Hyman, 1999b). The frame rate can be limited by the capacity of either the codec or transmission lines. At low frame rates, video appears jerky and unnatural. For sake of comparison, broadcast television provides video with a frame rate of 30 fps. At 30 fps, video movement is smooth and continuous, and referred to as full-motion (Hyman, 1999b). However,

In the videoconferencing world, the term ‘full-motion video’ is often used, and often misunderstood. Videoconferencing systems cannot provide 30 fps for all resolutions at all times nor is that rate always needed for a high-quality, satisfying video image. Picture quality must sometimes be sacrificed to achieve interactive visual communication across the telephone network economically. Videoconferencing vendors often use ‘full-motion video’ to refer to any system that isn’t still-frame. Most videoconferencing systems today run 10-15 fps at 112 Kbps. (Fourcher, 2000)

Because we are accustomed to full-motion video with television and camcorders, anything less can be unacceptable.

In sum, as we grew more familiar with various alternatives, we became increasingly convinced of the need for selecting a videoconferencing system that could provide high quality audio and video. For example, it seemed especially important to provide a videoconferencing system that would convey both verbal and nonverbal communication to promote use among faculty colleagues concerned about having fewer on-site, face-to-face contacts with students and field instructors. Other, more experienced videoconferencing users on campus encouraged us in this direction as well.

Additional Videoconferencing Features

By definition, videoconferencing includes audio (or sound) information from a microphone and video (or visual) information from a camera. Some systems, however, provide additional forms of visual information. Document sharing refers to “a feature supported by many desktop videoconferencing systems that allows participants at both ends of a videoconference to view and edit the same computer document” (Hyman, 1999b). The particular document and
associated software program need only exist on one participant’s computer. This feature allows a field liaison and student, for example, to review and revise the student’s learning contract.

All videoconferencing systems are capable of point-to-point videoconferencing, simply a videoconference between two sites. This is analogous to a standard telephone call. More advanced systems are also capable of multipoint videoconferencing, a videoconference involving people at three or more sites simultaneously, like a telephone conference call. For multipoint videoconferencing, the sites must connect via a computerized switching system known as a video bridge (Hyman, 1999b). Some high-end videoconferencing systems integrate the codec and video bridge, while others provide these as separate components. This feature allows a liaison to connect simultaneously with students and field instructors at multiple sites, thus facilitating broader collaboration and consultation regarding particular problems or innovations.

Videoconferencing systems vary in the extent to which they provide users control of audio and video equipment. Like televisions or computers, videoconferencing systems provide ways for users to control the speakers (e.g., volume) and screen (e.g., darkness, contrast). While users can control their local camera and microphone at least manually, some videoconferencing systems also permit users to manipulate the remote microphone (e.g., volume) and camera (e.g., focusing, panning, zooming) electronically. These additional controls allow users to optimize audio and video transmissions. For example, during videoconferences participants often become engrossed in the discussion and forget how they appear on the remote screen. Remote control enables a viewer to follow a speaker who moves or to zoom in and shift between multiple speakers.

As we began to clarify our own needs, we encountered difficulty in obtaining clear, consistent, and coherent information from various sources. As we soon realized, much of the information we obtained was proprietary, that is, provided by people wishing to sell us equipment or transmission services. Beyond dealing with the possible inherent bias, however, we struggled to integrate fragmented, often incomplete information. Time after time, the technical information we obtained turned out to be piecemeal. Much to our surprise, people we expected to understand videoconferencing technology did not. For example, one apparently knowledgeable person from the local telephone company encouraged us to purchase a tiny video phone. Only later did we realize that such equipment required the transmission service her company provided. Often, vendors seemed to minimally understand their own equipment and have little knowledge of how it fit with other components. For example, after choosing one videoconferencing system, the vendor informed us that it required an additional piece of computer hardware. Initially, the computer manufacturer
indicated that the piece could only be installed at the factory, and then informed us that it could not be installed at all. Only then did the videoconferencing vendor provide a list of computer manufacturers who could install the necessary hardware in their computers. No doubt, many of the difficulties we encountered will likely persist for others as well, given the rapid rate of innovation and relative lack of standardization in this area.

With incomplete information and often conflicting advice, we struggled to sort through the various equipment options. At the time, we were not yet certain of which technology options would satisfactorily meet our identified needs. For us, the data gathering and decision-making process extended several months.

Eventually, we selected the PictureTel 200 (http://www.picturetel.com/). It included all necessary hardware and software for desktop videoconferencing (except, of course, for the computer and transmission line). Among other features, this basic system offered: H.320-compliance for broad compatibility with many other systems (and software upgrade ability), 128 Kbps transmission rate (with a 384 Kbps option for higher video quality), local and far end video windows, and control of the remote camera.

After selecting a particular videoconferencing system, we decided to “go slow” on procurement. Among our reasons for purchasing this single, relatively low-end system was a desire to experiment and gain further understanding through first-hand experience with a desktop videoconferencing system. We assumed that a year of experience would help us clarify both the type and extent of our technology needs, and also help us decide whether this equipment adequately met those needs. Then, depending on our satisfaction with this system, we could invest in additional equipment with similar or greater capacity, from this or another vendor. Anticipating continued developments in videoconferencing technology and further cost reductions, and given our limited but developing understanding of videoconferencing technology, we also wished to keep our options open another year. Any videoconferencing system, however, forced us to also select a transmission service.

Transmission Networks

Increasingly sophisticated videoconferencing technology requires data transmission rates that exceed what is possible with computer modems and standard telephone lines. The next better alternative is the Integrated Services Digital Network (ISDN). “ISDN is essentially a digital network that will provide seamless communications of voice, video, and text between individual desktop videoconferencing systems and/or group videoconferencing systems” (Hyman, 1999b). Because of its higher capacity, ISDN is expected to eventually replace current telephone lines.
More precisely, ISDN involves a “set of protocol and interface standards that effectively constitute an integrated (voice, video, and data) telephone ‘network.’ These standards promote global availability and compatibility of ISDN products and services” (Fourcher, 2000). There are essentially two types of ISDN service: Basic Rate Interface (BRI) and Primary Rate Interface (PRI). The two types are distinguished by the number of information carrying channels provided.

ISDN BRI provides two 64Kbps B (“bearer”) channels to carry information content, the voice, video, and data substance of a transmission. A separate 16Kbps D (“data”) channel is used for call setup and signaling. ISDN BRI is often called “2B + D” ISDN, for its combination of two B and one D channel. ... ISDN PRI [or T1] ... provides 23B + D (in North America) or 30B + D (in Europe) running at 1.544Mbps and 2.048Mps, respectively. Each channel (time slot) is 64Kbps. One channel is reserved as the D channel; the other 23, as bearer channels (23 + D). (Fourcher, 2000)

In short, ISDN BRI is roughly equivalent to two conventional telephone lines bound together, while ISDN PRI is equivalent to 24 telephone lines bound together. Obviously, ISDN PRI offers far greater transmission capacity. However, ISDN BRI lines can be bundled to provide greater capacity, with bundles of two, three, or four lines being most common (resulting in 256, 384, and 512 kbps capacity, respectively). Similarly, ISDN PRI lines can be subdivided to simultaneously transmit information from multiple videoconferences. In fact, because most current videoconferencing systems do not require the capacity of an entire ISDN PRI line, they use only a portion of the available channels. In general, the greater the bandwidth, the sharper and smoother the video, the clearer the audio, and the better synchronized the two will be.

ISDN represents a separate communications network that operates parallel to the conventional telephone network. Much like conventional telephone lines, ISDN lines are identified by unique numbers and must be installed by a company providing ISDN service. At this point, ISDN networks are accessible in cities and most towns but not consistently in rural areas.

Transmission Services

Just as myriad carriers provide long distance telephone service, numerous companies offer ISDN services, each with their own rate schedule and service package. For example, in our area, BellSouth charges a $700 installation fee and offers relatively expensive long distance rates but provides free calls in the local calling area. In contrast, AT&T charges no installation fee and offers very low long distance rates, but provides no free local calls. Like standard telephone ser-
vice, these rate patterns include both monthly transport or service charges that vary by type of line (e.g., BRI or PRI) and charges based on amount of use. But unlike telephone service, charges based on amount of use differ by the type of service on both ends of a call (e.g., depending on the type of service at the point of origination, calling a PRI site may cost more or less than calling a BRI site). In addition, because AT&T subcontracts installation work to BellSouth, they are dependent upon BellSouth scheduling: BellSouth installs its own lines within several days but typically requires up to 45 days to install lines for AT&T or other carriers, an upper limit set by the Federal Communications Commission (S. Harris, personal communication, August 18, 2000).

Eventually, we contracted with BellSouth, our local telephone company, to install one ISDN-BRI line. We connected it to a dedicated desktop computer equipped with a video camera, microphone, speakers, and codec. But even this decision was complicated by competition between service providers. We learned, for example, that some 26 local telephone companies serve various parts of our state, each with its own network and varying capabilities. Via a telephone, communicating between or across provider areas is transparent and seamless but via ISDN, it may be problematic. This fragmentation increases costs and complicates billing (for transmission across service areas), and results in uneven transmission quality and capacity. We had to concern ourselves with these issues because our field agencies are located throughout the state, as well as in two adjacent states.

In our situation, transmission service is further complicated by the university’s own communications network and its contracts with multiple providers. Portions of the university’s aging communications network, installed before fax machines or desktop computers existed, are currently pressed to full capacity and overdue for replacement. In addition, the university’s various departments currently contract with five long distance providers, with multiple contracts for telephone and ISDN service. In varying ways, contracts negotiated by university and state government personnel apply to our College. Independently negotiated, such contracts often provide financial savings but inevitably complicate and confuse subsequent contracting efforts.

Problems in Use

During the first year of use, we encountered several major problems. At certain times, for example, limitations of the university communications system sometimes meant that we could not dial out of the university but field agencies could still dial in. At other times, apparently due to heavy network traffic, we would lose one channel, usually the video channel, while a videoconference was in progress. Losing the video channel resulted in a blank screen with au-
dio, essentially reducing our system to an inconvenient speaker phone. In one
situation, troubleshooting one such transmission problem required multiple calls
to the university communications department, a local line provider, BellSouth,
and AT&T. We also encountered unexpected obstacles with videoconferencing
systems operated by other organizations. For example, the local Veterans Admin-
istration hospital has an older videoconferencing system that operates at 384
kbps but lacks the capability, now standard, to “step down” and communicate
with systems such as ours that operate at 128 kbps.

Not surprisingly, these technical difficulties undermined the interest and
willingness of field instructors and students to use videoconferencing. Despite
the problems, however, the initial group of field instructors remained involved
throughout the year and agreed to continue with the videoconferencing project
into the upcoming, second year. In most cases, they had important administra-
tive support for collaborating with us. But to their credit, the problems became
a source of humor and camaraderie among participants who came to view
themselves as pioneers.

During its first year, the videoconferencing project involved three faculty
members and only a portion of their field liaison load. We plan to maintain
limited faculty involvement until the system works well on a consistent basis.
Faculty colleagues have expressed concern about the loss of on-site, real-time
contact with students and field instructors. Because of this resistance, it ap-
pears that a high quality system will be required to attract widespread use. For
the same reason, it seems clear that the technical difficulties must be fully re-
solved before we expand the group of participants. Accustomed as we are to
no-delay telephone conversations, television-quality video, and well-synchro-
nized audio and video, it should not be surprising that anything less elicits frus-
tration from many users and discourages their participation.

We took comfort in learning that implementation problems were not unique
to us. Our state’s mental health department has been a national leader in use of
videoconferencing (Grinfeld, 1998), and provided early encouragement for
our efforts. Their staff suggested that videoconferencing might well lead to
new types of and more efficient service provision as it had for their agency
(e.g., delivering psychiatric services for deaf clients statewide, training mental
health practitioners to work with deaf clients). The department distributed
videoconferencing equipment to their 17 community mental health centers,
several large residential facilities, and administrative offices. Because our col-
lege places approximately 90 students, about 25% of the total, in department
settings, we were optimistic about the use of videoconferencing for field visits
in these sites. However, we have since learned that some facilities have not yet
installed the equipment, while others make little or no use of it because the
only person initially trained has left the organization. At this point, the depart-
ment lacks the infrastructure to deal with equipment malfunction and ongoing training needs. In addition, we have observed that the sporadic and limited use of videoconferencing undermines staff members’ attitudes toward and comfort with the technology.

Next Steps

As a result of these continuing problems, we decided to consult further with colleagues from the medical school. The medical school employs a supervisor and several staff members to maintain their large videoconferencing system. These staff members have experience with a variety of videoconferencing systems, and they have negotiated purchase contracts for equipment and transmission services. We have an existing link with the medical school because of ongoing collaboration for training medical and social work students in rural settings. At our request, support staff at the medical school demonstrated their videoconferencing system and consulted with us regarding our needs and probable uses for a system. Upon their recommendation, we decided to upgrade to a mid-level, ISDN-based videoconferencing system by Polycom (http://www.polycom.com/) and to a much larger capacity ISDN-PRI (or T1) transmission line. Although monthly line charges nearly tripled for this increased capacity, per minute charges decreased.

Most importantly for us, the new equipment and transmission line provide more dependable access, allow multiple connection speeds, offer more bandwidth for smoother video, and include a larger television screen for improved picture quality. In addition, the new system provides multipoint conferencing capability, a hand-held remote control affording greater ease of use, and increased control of equipment at a remote sight. Because we have only recently acquired the new equipment and transmission line, time will tell how well this system meets our needs.

During the past two years, our conceptualization of the field liaison role has changed. Based on feedback from students and field instructors regarding their perceived lack of interaction and connection with college faculty and on field instructor concerns about their lack of understanding of curriculum issues, we recognized the need for greater faculty involvement with field settings. Traditionally, social work educators assume a liaison helps field instructors with curriculum issues. But in reality, liaisons cannot deliver much help in three visits per year. Increasingly, we realized we could use videoconferencing to generate interactions that could better address these needs. Further, we envisioned that faculty field liaisons could assume an increasing role in providing educational direction for field settings, promoting theory/practice integration
and educational support where these have diminished due to systemic pressures and changes. Over time, our thinking resulted in development of a new faculty field liaison model, something we elaborate elsewhere (Carney, Wolfer, & Ward, 2000). We are currently collecting data from students and field instructors to evaluate the learning benefits of this more intensive model and whether these justify the additional effort (Carney, Wolfer, & Ward, in progress).

LESSONS LEARNED

As a result of our experience, we offer several suggestions for acquiring and using a videoconferencing system.

First, choose a quality system in the very beginning. Communications research has long suggested that mainstream users find videoconferencing systems most satisfying when readily accessible and easy to use, video is near television quality, and audio and video are well synchronized (e.g., Agius & Angelides, 1997; Campbell, 1998; Svenning & Ruchinskas, 1984). With a year’s experience, we better appreciate the importance of transmission capacity and dependability as well. Low quality creates apprehension and frustration, deterring use of the technology.

Second, look for internal expertise for help with decision-making. In many organizations there may be individuals already involved in videoconferencing. In a large university, these individuals may reside in other colleges (e.g., business, medicine, nursing, education, public health) or at the administrative level. They can acquaint you with what is possible or already available. If available, such individuals can substantially simplify and hasten the acquisition process.

Third, partner with other organizations to maximize the use of videoconferencing technology while minimizing the financial investment. As we began to explore videoconferencing, we learned that other university departments already had systems in use. Because systems are expensive but seldom have heavy use, shared use may be an attractive alternative. At minimum, you can experiment with others’ systems to clarify your own needs. In addition, you can ask questions and learn from others’ mistakes and experiences.

Fourth, think creatively about possible reasons for acquiring videoconferencing technology. Vendors often market videoconferencing technology by touting annual savings in travel expenses, suggesting this as a primary reason for the investment. However, other goals may include employees meeting more often, sharing knowledge, or meeting even when travel is not possible. These reasons all involve soft-values, but suggest alternative uses and
begin the process of thinking creatively about unique ways to maximize the technology (Myhrman & Eriksson, 2000). Myhrman and Eriksson (2000) maintain that people do not know when to use the technology, often because they view physical meetings differently than videoconferencing. They suggest that once people learn when and how to use the technology they may change the way they meet with others. It may no longer matter how the meeting took place, as long as knowledge was shared and there was an increase in “created value” (Myhrman & Eriksson, 2000).

Fifth, clarify how you intend to use the equipment and make your purchase accordingly. Like other forms of information technology, videoconferencing varies greatly in cost and is changing rapidly. It is unlikely that you will need the most expensive equipment to accomplish your goals. But it is also important to think creatively, to look beyond single uses for a videoconferencing system. Diverse and more frequent uses may help to justify purchase of a higher quality system. And higher quality systems may enable and encourage successful adoption and usage.

Sixth, identify a person in the organization who can be formally dedicated to the project (e.g., regular time commitment with salary). Late in the process, we acquired a graduate student to assist with the project. This person substantially moved the project forward because he could immerse himself in the effort. To fill such a position, consider a university grant for funding. It is important, however, to identify the “right” person (e.g., a persistent “networker” with some technical sophistication).

Finally, remember that dissatisfaction with videoconferencing often results from uncertainty about when and how to use the technology. For example, among businesses using videoconferencing, little more than half were satisfied with their use of videoconferencing and others had not yet discovered when and how to use it (Myhrman & Eriksson, 2000). Factors related to successful adoption of videoconferencing included:

(a) that companies where the CEO and the top executives use the system have succeeded better than others, (b) that unexpected events can force a dramatic change in attitude towards the technology (e.g., during the Gulf War, one company wouldn’t let their employees fly, so there was a drastic increase in the use of videoconferencing, and the employees continued using it after the ban was lifted), (c) that one key person can motivate an entire corporation to use the system, (d) that more people use the system if the surroundings are similar to those of physical meetings, and (e) that the users themselves have to find out when and how to use the system. (Myhrman & Eriksson, 2000)
Therefore, to assure better use of a videoconferencing system, it is important that those who will use the system understand why, when, and how to do so. Myhrman and Eriksson (2000) suggest twenty-nine different steps to facilitate this process. We include three that seemed particularly applicable in our situation: (a) introduce the meeting rule, (b) educate employees, and (c) evaluate constantly.

Introduce the meeting rule. If a meeting requires more than one hour of travel, it must be preceded by a videoconference meeting (Myhrman & Eriksson, 2000). Holding a videoconference meeting will provide three kinds of information. Participants may learn that the physical meeting: (a) could be canceled because they had completed meeting objectives or (b) was still necessary but had better results because participants were better prepared. Participants may also learn there was no difference in the outcome of the videoconference meeting compared with a physical meeting. In the process, participants become more aware of when and how videoconferencing can be used (Myhrman & Eriksson, 2000).

Educate employees. Potential users of videoconferencing benefit from information about how to use the technology, including technical demonstrations and examples of successful applications (Myhrman & Eriksson, 2000). In addition, as some field instructors and students explained, understanding the rationale for our project helped them to tolerate the frequent problems. In our case, our faculty field liaison innovation promoted buy-in regarding use of the technology.

Evaluate constantly. Gather evaluative information constantly and formally, in ways easy for users to complete, and use this information to create a genuine feedback loop. “As with all new technology, bad word-of-mouth can be devastating and corporations should not stick their heads in the sand when people said [sic] they hate videoconferencing” (Myhrman & Eriksson, 2000). Videoconferencing makes immediate, face-to-face communication possible and expected; use it to resolve problems with the system itself.

FUTURE APPLICATIONS

It is our contention that, if accompanied by increased contacts with students and instructors, videoconferencing can facilitate an improved field component in social work education by increasing college/field interaction without a net gain in financial cost or time. It may provide more opportunities to discuss connections between the curriculum and field activities. Using this new technology for field visits may also provide opportunities for field-based research and renewed or increased university connections with field settings. This is
most apparent in several of our field settings where, whether through state-level or grassroots initiative, social workers have embarked on innovative service projects that benefit from university collaboration.

Acquiring videoconferencing technology for field visits creates additional potential applications for social work education more generally. Beyond the field experience, videoconferencing can be used to: provide integrative online seminars (for field students or other courses), consult with students on course assignments (especially when these involve visual aids such as charts or budgets), and supplement distance education classes. Once in place, the videoconferencing system may also be used by students to communicate with students or professionals in other field placement settings. A side benefit includes increasing students' comfort with information technology.

In addition, the faculty may use the system for: case research and writing, consulting about field research, supervising ongoing field research, consulting about agency program development, consulting on clinical cases, providing specialized continuing education for small groups, delivering hearing impaired and multi-language services of various kinds, and supervising clinical practitioners who seek professional licensure. Some advanced videoconferencing systems would allow for large group and/or multi-site continuing education opportunities.

In addition, as administrators and faculty members become familiar with a videoconferencing system, we can imagine several non-educational uses for it. In other departments of our university, for example, administrators already use videoconferencing for face-to-face meetings with their counterparts across campus and at regional campuses around the state. The videoconferencing system may prove useful for interviews with prospective doctoral students and preliminary interviews with faculty candidates. It could allow current students and faculty members to interact with prospective students. Because some doctoral students must leave campus before completing their dissertations, videoconferencing may be used by faculty members for consulting with these off-campus doctoral candidates regarding their dissertations, and possibly for dissertation defenses when a faculty member or doctoral student is not readily available (for example, in the summer or during a sabbatical).

CONCLUSION

In retrospect, it was essential that we approached this project with a can-do attitude. Acquiring and implementing videoconferencing technology has required commitment and persistence. Along the way, conflicting information,
confusing technical jargon, and slow faculty buy-in threatened to halt our process. Initially naive, we became increasingly skeptical of information and learned to seek second and third opinions. Each step took longer than we anticipated, and costs rose higher than expected. But our efforts have generated solid benefits and exciting possibilities.

Using videoconferencing for field liaison visits is a new concept for us, one with potential to strengthen connections between the university and field settings. The ease of contacting sites allows for more frequent communication with students and instructors, possibly averting problems that might otherwise require crisis intervention. At the same time, as faculty field liaisons we appreciate the reduced “windshield time” required for these responsibilities.

As this account makes clear, videoconferencing systems currently pose rather complex and interlocking demands, involving both material resources (e.g., hardware, software, transmission services) and human resources (e.g., planning, purchasing, training). But as it also suggests, videoconferencing offers multiple uses and benefits that may well legitimize these costs and reward persistence.

NOTES

1. As one response, college faculty implemented a capstone course to help students better integrate theory and practice. The course has served to heighten faculty and student awareness of students’ difficulties in this area.

2. Technically, telephone lines have two channels, one 64Kbps B or “Bearer” channel to carry information content (the voices) and a separate 16Kbps D or “data” channel for call setup and signaling.

REFERENCES


RECEIVED: 09/07/00
REVISED: 02/15/01
ACCEPTED: 03/30/01
ABSTRACT. Human service professionals are increasingly pressured to use sophisticated data analysis tools to support service decisions. However, the application of these tools often involves assumptions and nuances that are difficult for the practitioner to evaluate without specialized information. This article helps the practitioner evaluate two different quantitative methods, a logistic regression and a neural network. Both were used on the same data set to develop a model for predicting employee turnover in a regional child protective services agency. The different steps of building and enhancing the model were discussed. Ultimately, the neural network was able to predict turnover more accu-
Employee turnover in human services agencies is both costly and problematic. In fact, human services agencies, such as Child Protective services, are often exposed to turnover due to their high work demands and low wages. Studies have consistently identified several factors influencing employee turnover: job satisfaction, organizational commitment, job assignment match, and employee demographics (Cone, 1998; DeSantis & Durst, 1998; Liou, 1998; Lee, 1996; and Packard, 1989). Some of the employee demographics include length of tenure with the agency and in specific job assignments, number of job assignments, and types of job assignments, among others. Given the availability of data in agency information systems, managers often develop models that predict whether a current or potential employee will quit or stay with the agency. One commonly used prediction tool in the human service literature is logistic regression. However, a newer prediction tool that is making its way into human service literature is a neural network. While neural networks have existed since the 1950s, in recent years they have become increasingly popular in the human services due to their increased ability to predict complex phenomena more accurately than traditional statistical techniques (Garson, 1998). To successfully build prediction models with these tools, human service professionals must understand their capabilities, their differences, and how to use them. This paper will present the concepts of neural networks and logistic regression and illustrate how both procedures can be used to develop models that predict employee turnover. It will also address the many considerations required by practitioners when using, interpreting, and evaluating these two tools to support human service decision-making.

MODELS AND MODEL BUILDING

To assist the human service manager in predicting an employee’s retention, a model of turnover must be developed. A model is a conceptual schema, often
in the form of research questions or data queries, that suggest how variables interact as the question or query is answered. Generating models helps avoid explanatory gaps or “black box” approaches where users are not provided with the logic or rationale to explain how variables interact in a solution (Schoech, Quinn, & Rycraft, 2000). Variables selected for inclusion in the model are based on specific characteristics of the employment paths of caseworkers and supervisors. Models are validated and revised based on the analysis of data. Both qualitative and quantitative data can be used.

The model in this article was initiated when managers at a regional child welfare agency asked a university researcher for help in explaining and predicting turnover so the agency could implement preventive and retention policies and practices. In discussion with agency administrators and human resources personnel, variables that were identified as characteristics of employment paths were selected for the study. Agency administrators were especially interested in the geographic, unit, and task assignments of staff that terminated and retained employment. These variables can be considered a preliminary model of agency turnover and are listed in Table 1. At this point in model building, the researcher had the option of a qualitative or quantitative approach to refining the model. A qualitative approach might involve setting up focus groups to explore the meaning of each variable and the relationship between the variables in Table 1. Focus group transcripts could be analyzed and explored using any of the many qualitative software packages on the market. However, an agency information system was available that contained data on these variables, so a more quantitative approach was possible. As a result, the researcher identified a sample of workers who stayed and who had left the agency and collected data on each variable in Table 1 for workers in the sample. With this data set, quantitative analysis could be conducted using logistic regression or neural network analysis. Each of these quantitative procedures will be discussed.

EXPLANATION OF LOGISTIC REGRESSION

Logistic regression is a multivariate statistical technique that, given a set of independent variables, predicts group membership in a dichotomous dependent variable. Logistic regression has advantages over other statistical techniques. For example, multiple linear regression assumes normal distribution of the dependent variable and linearity between the independent and the dependent variable. These assumptions are not made when developing a model using logistic regression. This makes logistic regression an excellent tool for our situation where the data were not normally distributed and where the dependent variable is dichotomous.
To allow the researcher to examine the impact of each variable on the model, logistic regression produces a statistic called an odds ratio, also referred to as log odds. The odds ratio is defined as the ratio of the odds that the independent variable is present in the logistic regression model to the odds that the independent variable is absent in the logistic regression model (Hosmer & Lemeshow, 1989). The odds ratio indicates the increase in odds that the model will predict correctly given the presence of the independent variable. Knowing the log odds can aid in understanding how much of an influence a variable has on the dependent variable. Log odds that fall around 1.0 indicate that the independent variable has no effect on the dependent variable. Independent variables with log odds with the greater and lesser values than 1.0 are the better predictors of outcomes. For example, when examining turnover, if the log odds for gender were 1.68, then knowing a worker’s gender will increase the odds that the logistic regression model will predict the correct employment path (stay or leave) by 1.68 when all other variables in the model are held constant.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leave or stay (Dependent variable)</td>
<td>Whether employee left agency or was currently employed</td>
</tr>
<tr>
<td>Age (Missing cases = 12)</td>
<td>Age of employee</td>
</tr>
<tr>
<td>Degree (Missing cases = 20)</td>
<td>Whether employee holds a social work or non social work degree</td>
</tr>
<tr>
<td>Ethnicity&lt;sup&gt;a&lt;/sup&gt; (Missing cases = 12)</td>
<td>Whether employee classified as White, African-American, Hispanic</td>
</tr>
<tr>
<td>Gender</td>
<td>Sex of employee</td>
</tr>
<tr>
<td>Current classification</td>
<td>Whether employee was a worker or supervisor</td>
</tr>
<tr>
<td>Experience wkr/sup years</td>
<td>Years employed with the agency</td>
</tr>
<tr>
<td>Current county (Missing cases = 1)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>In which of the counties employee worked</td>
</tr>
<tr>
<td>Total assignments</td>
<td>Number of job assignments post training academy</td>
</tr>
<tr>
<td>Education</td>
<td>Whether someone had a graduate degree or not</td>
</tr>
<tr>
<td>Assignment 1: County&lt;sup&gt;a&lt;/sup&gt;</td>
<td>In which of the counties employee was first assigned</td>
</tr>
<tr>
<td>Assignment 2: County&lt;sup&gt;a&lt;/sup&gt;</td>
<td>In which of the counties employee worked their second assignment</td>
</tr>
<tr>
<td>Assignment 1: Job type</td>
<td>Type of unit during first assignment</td>
</tr>
<tr>
<td>Assignment 2: Job type</td>
<td>Type of unit during second assignment</td>
</tr>
<tr>
<td>Assignment 1: Length of tenure (Missing cases = 5)</td>
<td>Months employee worked in first assignment</td>
</tr>
<tr>
<td>Assignment 2: Length of tenure (Missing cases = 64)</td>
<td>Months employee worked in second assignment</td>
</tr>
</tbody>
</table>

<sup>a</sup> = 1-of-N coding applied

TABLE 1. Variable Names and Definitions
A non-traditional, but increasingly popular quantitative analysis tool is a neural network. Neural networks are software-based mathematical tools that use a process similar to the human brain to predict, classify, and find patterns in data (Steyaert, 1994). Neural networks are constructed in layers of nodes. Nodes are components of a network that aid in the passage of information between layers (Garson, 1998). The nodes of the first layer, the input layer, represent independent variables that are collected to predict a particular phenomenon (the output layer). In between the input and output layers generally exists a hidden layer of nodes. This hidden layer serves as an error correction mechanism, helping the neural network to find the best predictive model. Neural networks exist that have more than one hidden layer. The decision on the number of hidden layers needed is guided by the complexity and type of problem being solved. Figure 1 is a schematic of a three layered neural network model. The three circles on the left indicate the input nodes, the two circles in the middle represent the hidden layer, and the circle on the far right represents the output node.

The overall purpose of a neural network analysis is to capture the important variances among the input variables and then map them to the output variables (Somers, 1999). Data is entered into the network through input nodes. Input nodes pass data through the hidden layer of nodes and then on to a set of output variables. The success of a neural network is its ability to use mathematical formulas to map the complex relationships that generally exist between input and output nodes, i.e., independent and dependent variables.

To develop a neural network model, the network must be trained on existing cases where the output node is known. Training consists of passing a certain percentage of the cases through the network in order to “teach” the network to recognize the patterns present in the data.

Neural networks provide a way to validate a network’s performance. During validation, cases that have been set aside from the training data set are fed into the trained network model. The purpose of validating the network model is to measure if the network was trained successfully on the data. This is accomplished by examining the difference between network error during training and validation. If the error between the network models developed during the two phases is similar, the training network model is assumed to have successfully learned the predictive patterns that exist in the data. However, there is no statistic or standard that exists to indicate how much error is considered reasonable. Often times, this error is minimal with the “acceptable” difference between the training and validation models being about .01 (Statsoft Support, personal communication, September, 18, 2000).
Neural networks usually require that a small portion of the data set be set aside for testing the model developed from the training data. Testing is performed by feeding novel cases into the network model. If the accuracy of the training model is similar to the accuracy on test data, the model can be considered generalizable. In cases where a limited amount of data is present, it might be difficult to provide enough cases to test the network model. Many users of neural networks do not use a test data set (Statsoft, 1999). Instead, they use the amount of error between in training and validation data sets as a measure of generalizability. For end users, neural networks have a method to obtain a prediction by applying the developed model to individual cases where the outcome is not known. In other words, data not seen by the network is fed into the trained model, allowing predictions about the dependent variable to be made.

Neural networks do not have the same stringent assumptions about data that exists in other multivariate techniques (e.g., multiple linear regression, discriminant analysis). First, they work well with nonlinear data. Second, a normal distribution of the independent variables and the dependent variables is not assumed. Finally, independent variables can be nominal, ordinal, interval, and/or ratio. However, if they are nominal or ordinal, 1-of-N coding must be applied manually by the user or automatically by the software.

Neural network software can provide several methods to allow for a deeper understanding of an input variable’s influence on the model. One method uses three-dimensional graphs to show visually how two independent variables influence the dependent variable (SPSS, 1997). Another method, called a sensitivity analysis, tests how the network would cope if each of the inputs were unavailable.
able (Statsoft, 1999). In a sensitivity analysis, data is submitted repeatedly with each variable treated as missing. A ratio between the network’s baseline error (the error in the network generated when the variable in question is present in the network) and the error that occurs when the variable is omitted from the model is generated. The variables are ranked based on their ratios. The rank order can help the user gain a better understanding of the data model being developed. In the situation presented earlier, for example, sensitivity analysis could give the manager the ability to identify variables that are key predictors and variables that can be ignored when predicting retention or turnover in employees (Statsoft, 1999). The results produced by a sensitivity analysis of a network model are of a similar concept to log odds produced by a logistic regression model. Both reflect the importance of an independent variable in relation to the overall model.

Another decision that must be made concerns the use of hidden nodes. While there appears to be very few conventions for choosing the number of hidden nodes to use in the hidden layer, Garson (1998) recommends that the number of hidden nodes be one-half the combined number of input and output nodes. Increasing the number of hidden nodes might improve the neural network model’s ability to predict. However, if too many hidden nodes are used, the neural network might learn the training data so well that it loses its ability to generalize to novel data (SPSS, 1997). Thus, after changing the number of hidden nodes during training, it is important for the researcher to insure that validation error is minimal and that test data predictions are similar to training data predictions.

Several different types of neural network architectures exist. Two common neural network architectures that appear in the human service literature are the Multi-Layered Perceptron and the Bayesian or probabilistic neural network. An extensive list of the different types of neural network architectures is beyond the scope of this paper. For a more involved discussion on other types of networks, refer to Garson (1998). Since neural networks are relatively new in the human services, it is useful to examine studies where they have been used.

**NETWORKS APPLICATIONS IN THE HUMAN SERVICES**

Studies have appeared in human service literature where neural networks have predicted juvenile recidivism patterns (Brodzinski et al., 1994), diagnosed autism (Cohen et al., 1994), predicted rehospitalization in severely mentally ill outpatients (Patterson & Cloud, 1998), and predicted employee turnover (Somers, 1999). These studies will be briefly described to illustrate how neural networks can aid in human service decision-making.

Before the review, it must be noted that there appears to be some ambiguity in existing research surrounding the terms validation and testing as it relates to
neural networks (Ripley, 1996). The terms, as they are used in the human service literature, seem interchangeable. At times when articles mention a validation set, they are really referring to running novel data through a network. For example, Brodzinski et al. (1994) used a neural network with eight inputs to differentiate between recidivating and non-recidivating juvenile delinquents. Instead of reporting the training data, Brodzinski et al., reported on the 388 cases used to test the network. However, the authors referred to this data as a validation set. In a totally new data set, the network model was able to successfully discriminate cases of recidivists from non-recidivists 99.48% of the time. The neural network results proved superior to a discriminate analysis, which predicted recidivists with only 64.36% accuracy.

Cohen et al. (1994) used a three-layered network model with 12 inputs consisting of variables identified in assessing autistic behavior. The output variable discriminated between mental retardation and an autistic state. 128 cases were used to train the network, half of which were classified autistic and the other half classified as mental retardation. During training, the network model predicted 95% of the autistic cases and 84% of the mental retardation cases correctly. When passing the data through a discriminate analysis model, 89% of the autistic sample and 78% of the mental retardation sample were correctly predicted. Cohen et al. (1994) used 10 cases to test their network model. The test model was able to identify 98% of the people with autism and 89% of the people with mental retardation. Cohen’s study points out the usefulness of having equal number of cases in the predicted category states, i.e., autistic vs. mental retardation. If the preponderance of cases fell into one state, then the neural network could generate a model that had overlearned the state with a high number of cases at the expense of learning how to predict the state with a small number of cases.

Patterson and Cloud (1998) used a three-layer Bayesian Neural Network to develop a model to predict rehospitalization in the mentally ill. Patterson and Cloud trained and tested two Bayesian neural networks consisting of six input nodes, a hidden layer of four nodes, and a single output node. The first network was constructed to examine rehospitalization or no rehospitalization. A Bayesian model, which was developed during training from 138 cases, predicted rehospitalization correctly 93% of the time. The second neural network classified patients by whether they were not rehospitalized, rehospitalized 1 to 2 times, or rehospitalized three or more times. The model was developed using the same 138 cases. This model was able to predict 80% of the cases accurately. It is unclear whether Patterson and Cloud used training or test data to report their results.

Somers (1999) used another type of ANN, a Multi-Layered Perceptron, to classify hospital workers on the output variable of turnover. Using four predictor variables to make up the input nodes, he trained the network on 462 cases. His network had four inputs, one hidden layer with three hidden nodes, and a
dichotomous output of workers who stayed and workers who left. He then tested the trained model on 115 novel cases. On the test data, the network was able to offer accurate results 88% of the time. Somers compared the results of the Multi-Layered Perceptron to those of a logistic regression. The logistic regression was able to offer accurate results only 76% of the time. Both procedures were able to predict workers who were likely to stay with 99% accuracy. When examining those who were likely to leave, the MLP was able to predict 44% while the logistic model was only able to predict a mere 1%. Somers used the neural network graphic technique described previously to explore the interrelationship between the variables. Using graphs, he was able to visually show that the relationship between turnover and the predictor variables are non-linear in nature. In fact, by plotting job satisfaction and job withdrawal intention against the dependent variable of turnover, he demonstrated that small changes in an independent variable might have a large influence on turnover.

AN ILLUSTRATIVE EXAMPLE

This section uses a neural network and a logistic regression to build a model to help practitioners address the problem of caseworker and supervisor turnover in the public child welfare agency mentioned previously. It is our intent to compare the neural network and logistic regression using the exact same data and data patterns (e.g., missing data, number of cases). Table 1 presents the variables in the initial model the researcher developed to predict whether an employee was likely to remain employed or leave the agency. The quantitative approach to refining the model consisted of collecting the data, preparing the data, applying the data to the prediction tool, selecting appropriate software, and running the data to generate the model. The advantages and disadvantages of the ANN and logistic model will be discussed in the illustration along with the issues raised by the model building process. For the purposes of this illustration, the model in Table 1, the steps in the process, and the results were often simplified. A more complete model description, analysis, and results are beyond the focus of this paper and will be reported elsewhere.

Collecting the Data

A research data set can be built using pre-existing agency data or through the collection of new data selected to examine a specific problem. In our illustration, agency employment histories of caseworkers and supervisors from a regional child welfare agency were collected using a cross sectional review of personnel files. The data set consisted of 536 cases.
Preparing the Data

Once the data were collected, they required preparation for analysis. Preparation of the data can take up to 60% of the time it takes to eventually develop and analyze a model for decision making (SPSS, 1997). For example, when examining turnover in this study, a great amount of time was given to the handling of missing data and coding of independent variables. The following data preparation steps were vital to refining our prediction model.

Handling Missing Data. An important decision in building a predictive model is to decide how to handle missing data. In data collection, missing data can occur because of human error or because the information was not present at the time of data collection. A variable is considered usable for statistical inquiry if it is present in 70% of the cases (SPSS, 1997). The general rule for a variable in less than 70% of the cases is to drop it from the data set. Problems can occur if a variable is dropped due to missing data. The variable might be capturing important information that would be lost. In addition, removing the variable might eliminate important relationships between variables. It is important to note that at this stage of model refinement, the consideration about missing data concerns itself with determining if a variable has enough data to be useful in the model. The original data set consisted of well over a hundred variables. A large portion of the variables documented the specific assignments of each employee. Many of these were dropped because they did not have at least 70% of their data. For example, if a caseworker had been employed for only three years, that case would include only a few assignments whereas a caseworker with several years of employment would have several more assignments. Variables such as the third or more assignment were dropped. Further consideration of missing data in our illustration is addressed later in the article. Variables selected for the model and their amount of missing data are noted in Table 1.

Variable Coding. Another task in preparing a data set for analysis is to ensure the data is in the format required by the tool to be used. One typical task is called 1-of-N coding (SPSS, 1997) or dummy coding. 1-of-N coding transforms categorical variables into continuous variables. For example, one of the variables in the CPS data set that required 1-of-N coding was ethnicity. If this variable was analyzed in its natural state of White, African-American, and Hispanic, it would create an unjustified linear relationship by assuming that White, African-American, and Hispanic were on a continuum with the distance between White and African-American being the same as the distance between African American and Hispanic. By applying 1-of-N coding, each state of the ethnicity variable is recoded into a continuous two-state variable, with one state representing the presence of the variable and the other state repre-
senting the absence of the variable. Therefore, ethnicity was recoded into White or not White, African-American or not African-American, and Hispanic or not Hispanic. The variables that required 1-of-N coding in the CPS data were ethnicity, current county, assignment 1: county, assignment 2: county. The major disadvantage to 1-of-N coding is that it increases the number of inputs to the network, increasing the size of the network and the amount of time it takes to train (SPSS, 1997).

Logistic Regression also requires 1-of-N coding. However, a procedural difference exists between neural networks and logistic regression in their handling of 1-of-N coding during the analysis. When 1-of-N coding is applied to a categorical variable, one of the categories is left out of the model during logistic regression analysis. The category that is left out is referred to the reference group. When a logistic regression model is run, the remaining categories that were entered in the model are compared to the reference group. Reference groups are chosen based on their importance to the variable in reference to the phenomenon being studied. That is, when using 1-of-N coding in logistic regression, “the only statement you can make about the effects of a particular category is in comparison to some other category” (SPSS, 1999, p. 48). When White is used as the reference group of the ethnicity variable, all the remaining groups will be compared to Whites. The choice of a reference group is arbitrary. In fact, to obtain the log odds for all 1-of-N coded variables, several logistic regressions were run with a different reference group left out each time. This allowed each category in a 1-of-N coded variable to generate log odds.

Applying the Predictive Tool to the Data

Two major differences exist between the neural network and logistic analyses in this phase of model building. First, a neural network model is trained on a percentage of the data set, whereas the logistic model has no training mechanism and produces a model based on the complete data set. Second, several different types of neural networks can be used to build the model, whereas only one logistic regression procedure is available to build the model. Therefore, two additional steps are needed in the building of a neural network model. These two additional steps are the selection of an appropriate neural network and development of training, validation, and test data sets.

When using a neural network, a protocol for choosing the amount of data to set aside for training must be developed. Generally, 80% of the data is set aside as training data. However, if data is limited, SPSS (1997) suggest the minimum size for a training data set is $10(N + M)$ cases, where $N$ is the number of choices in the dependent variable and $M$ is the number of independent variables being entered into the network. Once the training data is set aside, the re-
The remaining data is divided into a validation set and a testing set. For our analysis, 80% of the CPS data (N = 429) was set aside to train the network. The remaining 20% was divided into validation (N = 54) and testing (N = 53) data sets.

One of the most popular neural networks is a multi-layered perceptron (MLP) (SPSS, 1997). In our example, a Multi-Layered Perceptron neural network was chosen because of its prior success to predict turnover (Somers, 1999).

Software Selection and Running the Procedures

The neural network model was generated and analyzed using Statsoft’s Neural Network Version 4.0B (1999). The logistic regression was run using SPSS 9.0 (1998). Both procedures were run on a Pentium III 450 MHZ with 128 Megabytes of RAM.

Statsoft’s Neural Network was chosen because it allows the user to control nearly every aspect of neural network analysis. Statsoft’s Neural Network can also read a variety of different spreadsheet formats and offers a user interface, called an intelligent problem solver, which leads the user “step-by-step through the process of building a neural network” (Statsoft, 1999, p. 10). The problem solver allows users to either choose the software defaults or choose their own settings for developing the neural network model for the data set. The CPS data were run through the intelligence problem solver during which the researchers determined the inputs, outputs, and the allocation of data to the training and validation of the network.

Using Statsoft’s Intelligent Problem Solver, several networks were generated that fit the data. The model presented here had the least amount of error between the training and validation models. The best network model consisted of 23 input nodes, 1 hidden layer of 12 nodes, and a single output node (leave or stay).

The logistic regression model was generated using SPSS 9.0. One-of-N coding was applied to the variables ethnicity, current county, assignment 1: county, assignment 2: county and by default, the reference group was the last state of these categorical variables. The variables that required 1-of-N coding are annotated in Table 1.

RESULTS

In order to compare the predictive power of both procedures, the same data set was used to generate the logistic regression model and to train the MLP. To accomplish this, the cases were randomized using Microsoft Excel (Patterson, 2000). The randomized data were saved as an Excel file and imported into both SPSS 9.0 and Statsoft’s Neural Network package. For the logistic regression,
the first 429 cases were analyzed to develop the model. For the MLP, the first 429 were used to train the network. The remaining cases \((N = 107)\) were set aside for validation and testing the MLP. It should be noted that using the exact same data set for both procedures increases the likelihood that the results would be very similar for both procedures. That is, typically neural networks gain their predictive power over logistic regression due to their capacity for handling of missing data, nonlinear relationships, multicollinearity, and a large number of weak predictor variables. For a comparison of a neural network and logistic regression where the predictive models were optimized for both procedures, see Schoech, Quinn, and Rycraft (2000).

To handle missing data in the model variables, logistic regression and neural networks use a method called listwise deletion. In listwise deletion, cases with missing data are deleted. The drawback to listwise deletion is that case elimination can cause the data set to shrink in size. In some situations, a small data set might not provide enough information to construct a valid prediction model (Garson, n.d.). Out of the first 429 cases, 86 were dropped by both procedures due to missing data. Ultimately, this left 343 cases that consisted of 246 stayers and 97 leavers. Using standard neural network guidelines, the minimal number of cases for training to be set aside for the CPS data is 250 \([10(25)]\) (SPSS, 1999). The 343 used proved a sufficient size for training the MLP and developing the logistic regression model. Even though several cases had to be dropped due to missing data, each model variable retained at least 70% of its data, making them usable in both models.

**Prediction Accuracy of the Model**

The neural network model was able to accurately predict 80\% \((N = 273)\) of the cases in the training data set where an employee stayed or left the public child welfare agency. The model was able to predict 197 stayers out of 246 stayers \(80\%)\) and 76 leavers out of 97 leavers \(78\%)\).

To validate the network model’s performance, 54 of the cases set aside in the validation data set were fed into the network model developed from the training data set. Overall, the resulting neural network model was able to predict 35 (73\%) of the cases in the validation data set. Out of 39 stayers, 29 were predicted accurately (74\%) and out of nine leavers, the model predicted six leavers (67\%) correctly.

The logistic regression model was able to predict whether an employee was someone who would stay employed or to quit the agency 79\% of the time. When examining just the employees who were stayers, logistic regression was accurate 92\% of the time and when examining just the leavers, the logistic re-
gression was accurate 47% of the time. Table 2 presents the results of the logistic regression procedure and the Multi-Layered Perceptron.

Testing the Success of the Model

The measure of success for a neural network model is twofold. First, a network is considered successful if the difference between the error generated during the validation phase and the training phase is minimal. Second, a network is also considered successful if it has the ability to generalize its accuracy to a test data set.

The difference (.008) between the amount of error during the validation phase (.364) and the training phase (.372) was minimal according to Statsoft technical support. However, no clear definition exists on what is considered minimal.

Of the portion of the data set (N = 53) that was set aside to test the network, eleven cases were not used due to missing data. Overall, the MLP predicted 42 (60%) of the training cases correctly. When predicting the 32 stayers in the test data set, the MLP was successful 56% (N = 18) of the time and when predicting the 10 leavers, the MLP was successful 70% (N = 7) of the time. For benchmark purposes, a human flipping a coin should be able to successfully predict 50% of the leavers and stayers.

Improving the Model

Logistic regression provides no features to improve a model; however, an MLP can be improved using several techniques. First, the number of hidden nodes in the training model were increased from 12 to 18. Second, an attempt to improve the model was made through a process called case equalization (SPSS, 1997). When a network model is presented with an unequal number of cases in each state of the output nodes, it is possible that the model will learn to predict the state with the larger number of cases. A better model might result if the same numbers of stayers and leavers existed in the data set. In the CPS data set, a larger number of stayers existed in the training, validation, and testing phase. To equalize the amount of stayers vs. leavers, SPSS’s Neural Connection was used. Neural Connection is not as sophisticated in controlling the development of neural networks as Statsoft’s package, therefore it was not chosen to develop the main neural network. However, SPSS’s neural network software package was utilized in this situation because it offers a case equalizing tool that is not present in Statsoft’s Neural Network software. This tool created an even number of stayers and leavers by downsizing from 343 to 194 cases (97 stayers and 97 leavers). Neither attempt, however, made any remarkable improvements to the prediction accuracy of the neural network model.
Table 3 compares the prediction results from the original network model, the model with 18 hidden nodes, and the equalized model.

Additional Analysis

Additional analyses for each analytic procedure were used to obtain a deeper understanding of the models.

Sensitivity Analysis. The sensitivity analysis was generated for the originally run neural network model with the results reported in Table 4. According to the sensitivity analysis, a worker’s length of tenure in CPS seems to have the greatest influence on turnover. Other important factors influencing turnover were being African-American and whether the employee had a social work degree or not. An employee’s designated first assignment proved to have the least influence on the model. Other variables that had little influence included working in the first urban area, the type of job the employee worked, and how many months the employee remained in the first assignment.

Log Odds. The log odds produced by a logistic regression indicate which variables have the greatest influence over the turnover predictions (Table 4). The log odds indicate that ethnicity seemed to have a great influence on predicting turnover. More specifically, knowing someone is Hispanic vs. African-American will increase the logistic regression model’s prediction by 8.2. Similar to the sensitivity analysis, aspects of the second assignment (job type \[\text{log odds} = 1.06\] and months employed at second assignment \[\text{log odds} = 1.009\]) proved to have little influence on the model.

DISCUSSION

The results were not entirely consistent with the literature that suggests neural networks are better predictors than traditional statistics, in that the MLP was able to offer only a 1% better overall prediction rate than the logistic model. However, this comparison restricted some of the strengths of a neural network. Where these strengths were taken into account with the same initial
data set, the neural network was a much better predictor (Schoech, Quinn, & Rycraft, 2000). Somers’s (1999) comparison using the same two procedures to predict turnover in hospital workers proved more successful. For example, his comparison of a neural network to a logistic model produced a 12% difference in favor of the neural network. The two tools were also compared on their ability to predict stayers and leavers. The logistic regression model was able to predict stayers more accurately than the MLP by 11%. This finding also contradicts Somers (1999) in which both models were able to predict stayers with a similar 99% accuracy. When examining leavers, the MLP was able to predict more accurately than the logistic regression by 31%. This finding is consistent with the prediction rates offered for leavers by Somers. In fact, our MLP was able to predict 78% of its leavers, while the logistic model predicted only 47%. Several other methods of comparison exist for examining neural networks and logistic regression. These included more sophisticated tests such as an ROC curve analysis (MedCal, 2000) and visual analysis (Somers, 1999). However, such additional analysis was beyond the scope of this paper.

One benefit that is present in the neural network model that is lacking in a logistic model is the ability to test the model on unseen data. Our model was able to predict novel cases with mixed accuracy. Overall, the MLP was only able to predict novel cases 10% above chance and for stayers, a mere 6% above chance. However, these results differed dramatically from the training results even though the validation error rate was acceptable. In fact, the MLP was able to offer an overall training prediction rate of 80%, and for stayers, it also per-

<table>
<thead>
<tr>
<th></th>
<th>MLP (Original) (N = 536)</th>
<th>MLP (With 18 Hidden Nodes) (N = 536)</th>
<th>MLP (Case Equalization) (N = 232)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>80%</td>
<td>80%</td>
<td>72%</td>
</tr>
<tr>
<td>Stayers</td>
<td>80%</td>
<td>81%</td>
<td>67%</td>
</tr>
<tr>
<td>Leavers</td>
<td>78%</td>
<td>77%</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Validation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>73%</td>
<td>69%</td>
<td>67%</td>
</tr>
<tr>
<td>Stayers</td>
<td>74%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>Leavers</td>
<td>67%</td>
<td>77%</td>
<td>67%</td>
</tr>
<tr>
<td><strong>Testing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>60%</td>
<td>58%</td>
<td>55%</td>
</tr>
<tr>
<td>Stayers</td>
<td>56%</td>
<td>56%</td>
<td>40%</td>
</tr>
<tr>
<td>Leavers</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
</tr>
</tbody>
</table>
### TABLE 4. Results of the Sensitivity Analysis and the Log Odds

<table>
<thead>
<tr>
<th>Regression Variables from Table 1 in Decreasing Impact</th>
<th>Log odds</th>
<th>Neural Network Variables in Decreasing Impact</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity (Hispanic vs. African-American)</td>
<td>8.183</td>
<td>Experience (total months employed at CPS)</td>
<td>1.058</td>
</tr>
<tr>
<td>Ethnicity (Caucasian vs. African-American)</td>
<td>5.780</td>
<td>Ethnicity (African-American)</td>
<td>1.037</td>
</tr>
<tr>
<td>Assignment 2: county (urban 1 vs. urban 2)</td>
<td>3.062</td>
<td>Degree (social work degree vs. non social work degree)</td>
<td>1.037</td>
</tr>
<tr>
<td>Current assignment county (urban 2 vs. rural)</td>
<td>2.806</td>
<td>Assignment 2: job type (intake or investigation vs. other)</td>
<td>1.034</td>
</tr>
<tr>
<td>Gender (female vs. male)</td>
<td>2.493</td>
<td>Assignment 2: county (urban 2)</td>
<td>1.032</td>
</tr>
<tr>
<td>Current assignment county (urban 1 vs. rural)</td>
<td>2.411</td>
<td>Gender (female vs. male)</td>
<td>1.031</td>
</tr>
<tr>
<td>Assignment 2: county (urban 1 vs. rural)</td>
<td>2.258</td>
<td>Current assignment county (urban 1)</td>
<td>1.025</td>
</tr>
<tr>
<td>Assignment 1: county (rural vs. urban 1)</td>
<td>1.991</td>
<td>Assignment 1: county (rural)</td>
<td>1.024</td>
</tr>
<tr>
<td>Degree (social work degree vs. non social work degree)</td>
<td>1.770</td>
<td>Number of job assignments after training</td>
<td>1.024</td>
</tr>
<tr>
<td>Assignment 1: county (rural vs. urban 2)</td>
<td>1.606</td>
<td>Ethnicity (Caucasian)</td>
<td>1.020</td>
</tr>
<tr>
<td>Assignment 1: job type (intake or investigation vs. other)</td>
<td>1.562</td>
<td>Current assignment county (urban 2)</td>
<td>1.020</td>
</tr>
<tr>
<td>Education (MSW or PhD vs. not MSW or PhD)</td>
<td>1.526</td>
<td>Ethnicity (Hispanic)</td>
<td>1.019</td>
</tr>
<tr>
<td>Ethnicity (Hispanic vs. Caucasian)</td>
<td>1.416</td>
<td>Education (MSW or PhD vs. not MSW or PhD)</td>
<td>1.019</td>
</tr>
<tr>
<td>Assignment 2: county (urban 2 vs. rural)</td>
<td>1.355</td>
<td>Assignment 2: months employed in assignment 2</td>
<td>1.018</td>
</tr>
<tr>
<td>Current job type (worker vs. supervisor)</td>
<td>1.344</td>
<td>Current assignment county (rural)</td>
<td>1.017</td>
</tr>
<tr>
<td>Experience (total months employed at CPS)</td>
<td>1.315</td>
<td>Assignment 1: county (urban 2)</td>
<td>1.014</td>
</tr>
<tr>
<td>Number of job assignments after training</td>
<td>1.216</td>
<td>Assignment 2: county (rural)</td>
<td>1.011</td>
</tr>
<tr>
<td>Assignment 1: county (urban 2 vs. urban 1)</td>
<td>1.164</td>
<td>Current job type (worker vs. supervisor)</td>
<td>1.007</td>
</tr>
<tr>
<td>Current assignment county (urban 1 vs. urban 2)</td>
<td>1.164</td>
<td>Age</td>
<td>1.006</td>
</tr>
<tr>
<td>Assignment 2: job type (intake or investigation vs. other)</td>
<td>1.064</td>
<td>Assignment 1: county (urban 1)</td>
<td>1.004</td>
</tr>
<tr>
<td>Assignment 1: months employed in assignment 1</td>
<td>1.025</td>
<td>Assignment 1: job type (intake or investigation vs. other)</td>
<td>1.004</td>
</tr>
<tr>
<td>Assignment 2: months employed in assignment 2</td>
<td>1.009</td>
<td>Assignment 1: months employed in assignment 1</td>
<td>1.003</td>
</tr>
<tr>
<td>Age</td>
<td>1.006</td>
<td>Assignment 2: county (urban 1)</td>
<td>1.001</td>
</tr>
</tbody>
</table>

1 = For variables where the Odds ratio was below 1, the inverse was used in order that the variables could be ranked by prediction strength.
formed adequately by predicting 80%. These results indicate that our neural network model developed during training was not able to generalize to unseen data. We suspected that this result could be related to the fact that there was almost a three to one ratio for the number of stayers (N = 32) to leavers (10). However, when the cases were equalized, this proved not to be the case. In fact, equalizing the neural network data had little effect on the overall prediction results. Out of the 10 stayers in the test data, the equalized network was able to only classify 40% correct. However, the initial MLP testing prediction rate for leavers was 70%.

Another surprise was that increasing the number of hidden nodes did not result in substantial improvement as expected. This contradicts Garson’s belief that increasing the number of hidden nodes increases the model’s ability to predict. Of interest, though, is the fact that despite no mass improvement in prediction accuracy, the error rate between the validation and training data remained minimal. This demonstrates that the decision on the number of hidden nodes is somewhat arbitrary and that the human service practitioner will need to build several models with a varying numbers of hidden nodes.

Our review of previous studies found that two areas of neural network model interpretation often do not appear in other human services literature. These were the examination of the difference between the validation and training error and the results of all three phases of the neural network model. First, it has been that it is very important for the human service practitioner to consider the error rate between the validation and training phases and how the model performs on novel test data. When considering the difference in the error produced by the training and the validation data, the practitioner is able to consider whether the model was built accurately. For example, the error produced by this model appeared minimal (.008). By examining the performance on the test data, the practitioner is able to draw a conclusion about how successful the network model is when trying to predict novel cases. For example, a human service practitioner using the model presented here can examine the accuracy of the test data and see that the model was able to classify 60% of novel cases correctly. Without validation and test results, some of the very positive results reported in the literature should be taken with caution.

Finally, a comparison between log odds and sensitivity analysis was presented. Of interest here is that both procedures offered different results. For example, in the sensitivity analysis, a worker’s experience was ranked as the most influential variable, whereas the same variable ranked 16th in the log odds. However, despite the very different ranks of some variables in the log odds and the sensitivity analysis, the human service practitioner should consider where each variable falls. A variable that ranks high in both models should gain credibility as a predictor of turnover. For example, both the sensitivity analysis
and the log odds ranked ethnicity (African-American or not) as one of the best predictors of turnover from among the 23 variables. Of interest here is that two models can produce different conclusions while examining the same data. This suggests that the practitioner use multiple tools to see how models that are generated on similar data are comparable and different. It also suggests that previous studies be used to help interpret the importance of the variables. Findings that contradict previous studies should be suspect, unless reasons for the contradictions can be explained, for example, as substantial differences in samples.

CONCLUSION

This study used two quantitative tools to develop and explore a model of CPS employee turnover. It illustrated that the development of a model predicting turnover is a multi-step process including the identification of potential influencing variables, several preprocessing steps to ready the data, the generation of the model, and the interpretation of results. It also found that CPS may not be as simple as hospital turnover where novel cases were predicted with approximately 90% accuracy by using only a few variables (Somers, 1999). Our 15 variables were only able to predict novel cases 60-70% of the time.

Also, instead of demonstrating that neural networks are superior in prediction to logistic regression, as would be consistent with the literature cited, this paper demonstrated that quantitative analysis of the same data using different procedures can offer differing results. We must conclude that turnover in the CPS agency studied may be a more complex phenomenon than initially anticipated. The initial model variables in Table 1 were not sufficient to give managers acceptable turnover predictions. Thus, a human service practitioner needs to proceed with caution when developing predictive models using only one quantitative procedure. We expected the results from the sensitivity analysis and the log odds to consistently identify variables that had a strong influence in the turnover prediction model. However, that was not always the case. This deeper analysis did not allow us to make any conclusions about the role of variables in stay/leave predictions. Consequently, the statistical information of both procedures should only be considered as one tool in the human service practitioner’s arsenal. Once models are developed and results are calculated, it might serve the practitioner best if the results are presented to a focus group for a more comprehensive view of the phenomenon being investigated. Finally, we suggest that better reporting of ANN results is essential so that researchers and practitioners can have more confidence that results are valid.
REFERENCES


RECEIVED: 05/01/01
REVISED: 06/30/01
ACCEPTED: 07/16/01
Ontrack’s System Suite 3
Including Power Desk 4

Software Product: Ontrack’s System Suite 3 including Power Desk 4

Keywords: Fix-it utility, data recovery, zip and unzip, file management, Virus scan, Task bar, customizable, uninstaller, data eraser.

Product Summary: System Suite 3, the new version of Ontrack’s prize winning System Suite 2000, includes a collection of utilities, including Virus Scanner, Fix-it Utilities, EasyUninstall, CrashProof, ZipMagic Wizards plus a powerful full fledged file manager, Power Desk 4 Pro. Together, the utilities in the suite provide all of the utility power that most human service practitioners, managers, IT staff, and power users will ever need. System Suite 3 is a comprehensive bundle of utilities that can be adapted to fit the needs, skills and scale of the users situation be they novice or veteran.

Evaluation Summary: System Suite 3 is a collection of utilities that picks up where its prize winning predecessor System Suite 2000 left off. Added to these utilities is Power Desk 4, one of the most powerful file managers available. Both are highly adaptable to meet the needs of a wide range of users. This Suite will perform all of the tasks, from disk defragmenting to relocating applications, that even the most demanding veteran users will require in a package that
is also accessible to occasional and novice users. Site licenses are available, and like the retail product, they can be customized and scaled to match organizational and individual user needs. Happily, this software is also designed to provide a bridge for veteran users from our old faithful turn of the century software to what the millennium will bring. As a product, the System Suite 3 is strengthened by the Ontrack company’s commitment to excellent customer support. Not only is the one year free tech support above and beyond that provided in the rest of the industry, there is a 60 day money back guarantee for users who are not completely satisfied.

There is more. The Ontrack Web site <http://www.Ontrack.com/> is loaded with free, trial and demo versions of Ontrack products, as well as rebates and upgrades you can download. This combination of outstanding support and products make System Suite 3 with Power Desk 4 a highly recommended package for both the individual user and as a tool for the IT staff of large human service organizations.


Product Detail: System Suite 3 can be found on the shelves and end displays of all the usual software retail outlets and has a shelf price of $59.99. The system requires Windows 95/98 ME or NT/2000 system with at least 16 MB of RAM (64 recommended) and from 25 to 60 MB of free disk space depending on the number and type of components installed. There is a 60 day money back guarantee if the user is not completely satisfied. Version 3.0.0.18 is reviewed.

Reviewer Hardware: System Suite 3 was tested on (1) a Toshiba 2595XDVD with Celeron 400, 128MB of RAM and a Sound Blaster sound board using Windows 98 VER2; (2) a PIII 700 laptop with 256MB of RAM; (3) a clone desktop with Celeron 400, 128 MB of RAM and a Sound Blaster Live, using Windows 2000 as well as a similar system using Windows ME. The “college bring home the dirty laundry test” was performed on a Celeron 400, 128MB of RAM and a Toshiba Tecra 500 series with Windows 95.

Reviewer: Del Thomas, PhD, systems builder, software developer, social psychologist, licensed social worker

Director SAW
Box 92
Malvern, PA 19355
cht@ccil.org
After watching a Native sculptor carving a block of wood for a few minutes, a tourist walked up to him and asked, “What are you making from that block of wood?” The sculptor answered, “I’m trying to help what’s in there get out.” “What does this have to do with a review of software?” you ask. This exchange highlights two approaches or strategies that can be used for reviewing software. More often than not, the goal of a review is a tour. Tours can be useful when software is a temporary commodity designed to be here today and obsolete tomorrow. However, a review of System Suite 3 requires more. Not only is this software designed to grow with you, it provides a bridge from our tried, true and familiar turn of the century DOS applications to our software future(s). System Suite 3 also prepares the user to meet the millennial challenge, the transition from the primitive mechanical technologies to the more organic, adaptable and user involved technologies. Finally, there is the excellent customer service concept at the heart of the Ontrack company.

System Suite 3 can be found in the usual retail stores for $59.00 (before various rebate offers) and is the upgrade of the prize winning System Suite 2000. On the shelves you will also find that some System Suite 3 utilities are sold separately as stand alone utilities (shelf price $29.00 to $49.00). The existence of stand alone products based on the Wizards in the Suite raises the question of buying the System Suite 3 or the stand alone utilities separately. I have tested the stand alone products, such as Internet Clean Up, and they all meet Ontrack’s high standards and also have a 60 day return option. However, all things considered, starting with the purchase of the Suite is recommended for the sake of economy as well as productivity. If, after you have used the Suite, you find that you need the extended power of one of the full programs, you can get it. The no risk 60 day money back satisfaction guarantee, which comes with System Suite 3, makes not buying the Suite a waste of time and money.

Before we start thinking outside the box, we need to take a quick look at the question, “Who is the System Suite 3 for?” The strength of System Suite 3 is that it is adaptable for use by agencies, managers, and human service workers looking for the quick and accessible answer to life’s assorted PC troubles as well as those who are eager to spend hours under the hood fine-tuning their utility programs. Many utility purchases are made after trouble strikes or when we are fed up with the stress and downtime from what turn out to be relatively minor PC troubles. System Suite 3 will prevent, protect and solve problems before they strike.

Whether users are individuals or the head of the IT program for a statewide agency, they can use System Suite 3 as a tool for maintaining PCs, preventing PC troubles, as well as avoiding delays and downtime due to computer failure.
or mishaps. Large organizations, such as state systems or departments, can get a site license designed to fit their needs and size. Because System Suite 3 is adaptable, the installer can configure each workstation to match the user’s skills and needs. This includes configuring an “install” to prevent users, who want to push every button they see, from getting into deep trouble. Every office should have at least one person familiar with System Suite 3 so that the IT staff need not be called to fix minor but disabling problems that could be prevented or fixed by a user with a copy of System Suite 3.

The Bridge

Power Desk 4 provides a bridge for veteran users who remember a time when a 20 megabyte hard drive was considered mass storage, and relied on programs like DR DOS, Side Kick, Xtree or Norton’s Commander much longer than they should. We were slowly left high and dry when these old faithful programs were not upgraded to run with the Windows 9x OS, make the leap to long file names, or work with Gigabyte sized hard drives. These veteran users, be they IT staff or single users, will be pleased to find that Power Desk 4 can be configured at the options menu to operate at the command level like Xtree or Commander.

Now its time to get to work on System Suite 3. Your first task is to go out and purchase the System Suite 3 software so that we can do the review together and get what’s in System Suite 3 out of the box together.

But wait!!

You don’t have to go to the store; you can take care of business at the Ontrack Web site http://www.Ontrack.com/. There you can find complete information about all of the Ontrack software and data rescue services, order a copy of System Suite 3, download, demos, trials, get a free copy of PowerDesk 4 or purchase Desk 4 Pro for just $19.

Getting Started

Now that you have the software in hand with any available rebates, it is time to get System Suite 3 and Power Desk 4 out of the box, install them, and help what’s in there get out. During the install you are introduced to Easy Update. Use it! Easy Update logs you onto the Ontrack Web site and checks your hard drive to make sure you have the latest builds of your Ontrack software. This feature is always available and keeps your System Suite 3 and Power Desk 4 up to date. Every time you access Easy Update your virus information is also updated. Since Ontrack makes the latest virus info available every Wednesday, it makes sense to check Easy Update on Wednesdays.
Once installed you will find two Icons on your desktop, one for the System Suite 3 and one for Power Desk 4 Pro. Some users will be satisfied and happy to find that once installed, System Suite 3 and Power Desk 4 Pro are ready, on guard and on the job when needed. Typically, those who purchase utilities are too busy for further exploration, wouldn’t be prudent. Let’s face it, we buy utilities for protection when trouble strikes or for a bridge over troubled waters. Hopefully, you may never need these programs, but it is wise to investigate your options and have a plan ready when and if trouble strikes. You should and can be prepared for the most dreaded of those troubled waters, such as data loss.

The Crisis Center in System Suite 3 is the place for individual users as well as managers to start before trouble strikes. This chapter will help you prepare a crisis plan with a “to do” and “not to do” list for when you are faced with the worse case scenario and those in between. There are times when knowing what not to do and avoiding panic can be crucial to getting the job done. The Crisis Center could provide you with the most important management skill and or resource you pick up this year. The star of the Crisis Center is the improved “do-it-yourself” program called Easy Recovery. If the Easy Recovery program is not enough, and you need an industrial strength recovery program, the Easy Recovery upgrade can be downloaded at the Ontrack Web site for $44. Complete information on the full range of rescue options available, such as remote rescue, and the costs of those services are described at http://www.Ontrack.com/.

Be sure that you make a rescue disk and try it out so that you know what to expect if you or one of your colleagues ever hit those troubled waters and cannot get your system to boot. Even if you have someone to call in for these emergencies, the Crisis Center and the rescue disk can save you hours of unnecessary waiting, downtime and stress.

Once you have the emergency plan in place, the next step is an overall system cleanup with the Fix-It Wizard. This powerful one-step Wizard is the easiest and most effective way to fix and tune up your Windows 95, 98, Me, NT and 2000 systems. It scans for viruses, saves and backs up system files, cleans out old files and the registry as well as defragments all of your disks while you attend to other business.

Warning!!

With power, caution is advised. The first time you run the Fix-It Wizard, make sure that you uncheck the box marked “remove unused files.” On examining the screen you will note that some of the categories have a + next to them indicating that they can be expanded. When you expand the “remove unused files” box you will find the categories of files that will be removed when the
box is checked. Included are .bak files as well as temp files and files in the re-
cycle bin. You may not want to remove some of these “unused files.” The am-
ple size of current hard drives makes the necessity of deleting unused files
minimal. Always delete with care.

The next stop is file management, Power Desk 4. How many times has a
project been delayed by what appears to be a disappeared file. Or you have
been frustrated by one of those “xfile.???” not found” messages, followed by
the suggestion that you call the vendor? But you can’t call the vendor, because
you don’t have the slightest hint which application “xfile.???” belongs to.
Even before the shift from megabytes to gigabytes and hard drives the size of a
Montana zip code, it was location, location, location. That’s why Windows
added a Find program to the OS. The addition of the power of Power Desk 4 to
System Suite 3 makes all the difference. Power Desk 4 not only has the power
of an enhanced Find program called File Finder to give you control over the lo-
cation challenge, it includes a content filter.

Before you start adapting System Suite 3 utilities and Power Desk 4, you
will find that each time you left click on a file or a folder you will find that
power desk and the zip magic wizards are at your beck and call. Once you have
found the file or folder, just click on the file and the System Suite 3 modified
menu is ready to move, copy, convert, zip, decode, or scan for viruses. You can
rename or place the file or the folder wherever you want it and make sure that it
does not get lost again. Add to these features the above mentioned bridge to
Xtree and Commander, so you can use the keyboard commands to your heart’s
delight or point and click. Let’s just say that with Power Desk 4 you have the
best of both the point and click and keyboard commands.

The College Laundry Test

Reviews should have a test. The test I used is the college laundry test. This
test is reminiscent of the days when your kids brought all their dirty laundry
home from college for cleaning. Things have changed. Now they bring home
their dirty hard drives. I was into a laundry cleaning project before I realized it.
I started to upgrade my daughter’s desktop to a Pentium III and ran into a se-
semester’s worth of assorted viruses. This was a test that would rival any diffi-
culties users are likely to encounter. I was careful to uninstall System Suite
2000 and Power Desk 98 before installing System Suite 3. Then I ran the Fix-It
Wizard. During the virus scan I received a screen message advising me that the
virus database was outdated. As a result, I downloaded the upgraded virus pat-
terns. Because I had run the Fix-It Wizard before the Easy Update, some of the
more than 40 viruses located could not be removed. After the Easy Update, the
viruses were removed without difficulty. With the HD cleaned, I used Power
Desk 4 Pro to find and root out other pesky problems my daughter had reported with her screen saver. Once these problems were fixed and the System Suite 3 Jetdefrag was run, we had a clean machine.

The next part of the laundry test came in the form of a plaintive wail, “Dad, my laptop won’t boot.” The laptop is a Pentium running on Win 95 that had been on loan to another student because my daughter decided that it was unfair that she had two computers while other students had none. I used the rescue disk to reinstall Win 95 and the Fix-It Wizard to complete the job, clean out the viruses, and other stuff that had accumulated. The laptop dirty laundry was done and the only complaint was that I had not used the correct background image. Well, System Suite 3 gets the job done, even though you may not be a total hero.

After you get the Mom and Dad or IT work done, it’s time for even the busy to play with System Suite 3. Take a look at the Power Desk 4 and the tool bar the Ontrack folks call the Coolbar. A Coolbar includes at least one or more of the basic tools that come with Power Desk. There is a clock tool, a quick launch tool, a command line tool, a print manager tool, a multi-view tool and a start menu tool. You can design an unlimited number of these Coolbars. Each of them can be activated by keyboard commands when you need them.

The Coolbars are easy to set up and the only limit is your imagination. These Coolbars can help you to streamline the way you work or you can use them to set up a single PC so several people can share it, each having their own set of Coolbars. Or perhaps you can have a Coolbar with Power Desk 4 configured to work like Xtree. You can use Notepad or WordPad to edit files and write batch commands for use at the DOS prompt.

The Ontrack Company

A major strength of the System Suite 3 product is the company. Ontrack’s commitment to customer support is far ahead of the rest of the pack. While most software companies don’t talk “tech” with you until they have a credit card number, Ontrack offers a year of free tech support.

I delayed the obligatory review call to tech support until I found a legitimate reason to call. I was impressed by the patience and knowledgeable responses given by the tech staff that I talked with. They are very user friendly and, as the following tale demonstrates, will go beyond the call.

The tech support team received a call from a user who was angry because the System Suite 3’s Virus Scanner found a virus in an attachment sent by a friend. The caller argued that the Virus Scanner was wrong. The attachment could not have a virus because it had been sent by a friend. The tech support crew listened patiently and pleaded with the caller not to open the attachment. Their warnings went unheeded and the caller opened the attachment. OOOOPS!
The tech support staff listened to the caller’s “play-by-play” report of the virus at work and then helped the caller recover. Two of the tech support staff I talked with told me that even though a year of free support was the company policy, they had never heard of a user being denied tech support because their year of free support had expired. During several calls to tech support, at no time was I asked gatekeeper questions, such as a serial number or any other information regarding how long I had the program.

The Documentation

I’m as guilty as the rest when it comes to plunging in without reading the documentation. System Suite 3 is so adaptable and easy to run that I expect most users will adapt System Suite 3 as they discover it. Because there is so much in there to help get out, spending some time reading the documentation is strongly recommended. Docu-phobes should start with “quick tour.” If you want to dig in, the documentation contains a detailed descriptions of each of the utility wizards. More importantly, this documentation provides ideas for adapting the program.

There Is More

The disk and files wizards include a disk fixer and a data eraser. EasyUninstall makes it safe and simple to free up disk space in just one click, plus when you open the EasyUninstall program you will find some surprisingly handy utilities. Not only does this group of utilities uninstall files, it will move an application and its components to another drive or partition, transport an application to another computer, and archive programs that you don’t use for later restoration. These programs are real time savers for busy managers and those who are frequently working under the hood alike.

A final warning to those of you who didn’t follow directions and get a copy of System Suite 3 and work with us, we know who you are and where you work. We even know who you go to when you have trouble with your PC. But we’re not going to tell. At least not right away. We won’t have to. We’ll just smirk when you come and ask for help and want to borrow our System Suite 3.

Summary

System Suite 3 package with Power Desk 4 contains a group of powerful utility applications from the “must have” to the handy, as well as a few that are likely to be on the veteran user’s wish list. The package is easy to adapt so it can be recommended for a variety of user types, ranging from managers of
large human service organizations installing the Suite on many machines with different needs to the novice user on a single PC. While the file manager Power Desk 4 is recommended for all machines, selective installation of System Suite 3 is warranted. Fortunately System Suite 3’s customized installer makes it possible to install based on the users skills and needs. Every PC can use the one step automated Fix-It Wizard, do-it-yourself data rescue, and virus protection applications. When the many features of the System Suite 3 package are added to the Ontrack company’s excellent customer support, System Suite 3 with Power Desk 4 is a must buy.
SOFTWEWARE REVIEW

Ontrack’s System Suite 3
Including Power Desk 4

<table>
<thead>
<tr>
<th>Software Review Summary</th>
<th>Poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Error Handling</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Documentation</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Value for Money</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Tech Support</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Software Product: Ontrack’s System Suite 3 including Power Desk 4

Keywords: Fix-it utility, data recovery, zip and unzip, file management, Virus scan, Task bar, customizable, uninstaller, data eraser.

Product Summary: System Suite 3, the new version of Ontrack’s prize winning System Suite 2000, includes a collection of utilities, including Virus Scanner, Fix-it Utilities, EasyUninstall, CrashProof, ZipMagic Wizards plus a powerful full fledged file manager, Power Desk 4 Pro. Together, the utilities in the suite provide all of the utility power that most human service practitioners, managers, IT staff, and power users will ever need. System Suite 3 is a comprehensive bundle of utilities that can be adapted to fit the needs, skills and scale of the users situation be they novice or veteran.

Evaluation Summary: System Suite 3 is a collection of utilities that picks up where its prize winning predecessor System Suite 2000 left off. Added to these utilities is Power Desk 4, one of the most powerful file managers available. Both are highly adaptable to meet the needs of a wide range of users. This Suite will perform all of the tasks, from disk defragmenting to relocating applications, that even the most demanding veteran users will require in a package that
is also accessible to occasional and novice users. Site licenses are available, and like the retail product, they can be customized and scaled to match organizational and individual user needs. Happily, this software is also designed to provide a bridge for veteran users from our old faithful turn of the century software to what the millennium will bring. As a product, the System Suite 3 is strengthened by the Ontrack company’s commitment to excellent customer support. Not only is the one year free tech support above and beyond that provided in the rest of the industry, there is a 60 day money back guarantee for users who are not completely satisfied.

There is more. The Ontrack Web site <http://www.Ontrack.com/> is loaded with free, trial and demo versions of Ontrack products, as well as rebates and upgrades you can download. This combination of outstanding support and products make System Suite 3 with Power Desk 4 a highly recommended package for both the individual user and as a tool for the IT staff of large human service organizations.


Product Detail: System Suite 3 can be found on the shelves and end displays of all the usual software retail outlets and has a shelf price of $59.99. The system requires Windows 95/98 ME or NT/2000 system with at least 16 MB of RAM (64 recommended) and from 25 to 60 MB of free disk space depending on the number and type of components installed. There is a 60 day money back guarantee if the user is not completely satisfied. Version 3.0.0.18 is reviewed.

Reviewer Hardware: System Suite 3 was tested on (1) a Toshiba 2595XDVD with Celeron 400, 128MB of RAM and a Sound Blaster sound board using Windows 98 VER2; (2) a PIII 700 laptop with 256MB of RAM; (3) a clone desktop with Celeron 400, 128 MB of RAM and a Sound Blaster Live, using Windows 2000 as well as a similar system using Windows ME. The “college bring home the dirty laundry test” was performed on a Celeron 400, 128MB of RAM and a Toshiba Tecra 500 series with Windows 95.

Reviewer: Del Thomas, PhD, systems builder, software developer, social psychologist, licensed social worker

  Director SAW
  Box 92
  Malvern, PA 19355
  cht@ccil.org
REVIEW OF SYSTEM SUITE 3

After watching a Native sculptor carving a block of wood for a few minutes, a tourist walked up to him and asked, “What are you making from that block of wood?” The sculptor answered, “I’m trying to help what’s in there get out.”

“What does this have to do with a review of software?” you ask. This exchange highlights two approaches or strategies that can be used for reviewing software. More often than not, the goal of a review is a tour. Tours can be useful when software is a temporary commodity designed to be here today and obsolete tomorrow. However, a review of System Suite 3 requires more. Not only is this software designed to grow with you, it provides a bridge from our tried, true and familiar turn of the century DOS applications to our software future(s). System Suite 3 also prepares the user to meet the millennial challenge, the transition from the primitive mechanical technologies to the more organic, adaptable and user involved technologies. Finally, there is the excellent customer service concept at the heart of the Ontrack company.

System Suite 3 can be found in the usual retail stores for $59.00 (before various rebate offers) and is the upgrade of the prize winning System Suite 2000. On the shelves you will also find that some System Suite 3 utilities are sold separately as stand alone utilities (shelf price $29.00 to $49.00). The existence of stand alone products based on the Wizards in the Suite raises the question of buying the System Suite 3 or the stand alone utilities separately. I have tested the stand alone products, such as Internet Clean Up, and they all meet Ontrack’s high standards and also have a 60 day return option. However, all things considered, starting with the purchase of the Suite is recommended for the sake of economy as well as productivity. If, after you have used the Suite, you find that you need the extended power of one of the full programs, you can get it. The no risk 60 day money back satisfaction guarantee, which comes with System Suite 3, makes not buying the Suite a waste of time and money.

Before we start thinking outside the box, we need to take a quick look at the question, “Who is the System Suite 3 for?” The strength of System Suite 3 is that it is adaptable for use by agencies, managers, and human service workers looking for the quick and accessible answer to life’s assorted PC troubles as well as those who are eager to spend hours under the hood fine-tuning their utility programs. Many utility purchases are made after trouble strikes or when we are fed up with the stress and downtime from what turn out to be relatively minor PC troubles. System Suite 3 will prevent, protect and solve problems before they strike.

Whether users are individuals or the head of the IT program for a statewide agency, they can use System Suite 3 as a tool for maintaining PCs, preventing PC troubles, as well as avoiding delays and downtime due to computer failure
or mishaps. Large organizations, such as state systems or departments, can get a site license designed to fit their needs and size. Because System Suite 3 is adaptable, the installer can configure each workstation to match the user’s skills and needs. This includes configuring an “install” to prevent users, who want to push every button they see, from getting into deep trouble. Every office should have at least one person familiar with System Suite 3 so that the IT staff need not be called to fix minor but disabling problems that could be prevented or fixed by a user with a copy of System Suite 3.

The Bridge

Power Desk 4 provides a bridge for veteran users who remember a time when a 20 megabyte hard drive was considered mass storage, and relied on programs like DR DOS, Side Kick, Xtree or Norton’s Commander much longer than they should. We were slowly left high and dry when these old faithful programs were not upgraded to run with the Windows 9x OS, make the leap to long file names, or work with Gigabyte sized hard drives. These veteran users, be they IT staff or single users, will be pleased to find that Power Desk 4 can be configured at the options menu to operate at the command level like Xtree or Commander.

Now its time to get to work on System Suite 3. Your first task is to go out and purchase the System Suite 3 software so that we can do the review together and get what’s in System Suite 3 out of the box together.

But wait!!

You don’t have to go to the store; you can take care of business at the Ontrack Web site http://www.Ontrack.com/. There you can find complete information about all of the Ontrack software and data rescue services, order a copy of System Suite 3, download demos, trials, get a free copy of PowerDesk 4 or purchase Desk 4 Pro for just $19.

Getting Started

Now that you have the software in hand with any available rebates, it is time to get System Suite 3 and Power Desk 4 out of the box, install them, and help what’s in there get out. During the install you are introduced to Easy Update. Use it! Easy Update logs you onto the Ontrack Web site and checks your hard drive to make sure you have the latest builds of your Ontrack software. This feature is always available and keeps your System Suite 3 and Power Desk 4 up to date. Every time you access Easy Update your virus information is also updated. Since Ontrack makes the latest virus info available every Wednesday, it makes sense to check Easy Update on Wednesdays.
Once installed you will find two Icons on your desktop, one for the System Suite 3 and one for Power Desk 4 Pro. Some users will be satisfied and happy to find that once installed, System Suite 3 and Power Desk 4 Pro are ready, on guard and on the job when needed. Typically, those who purchase utilities are too busy for further exploration, wouldn’t be prudent. Let’s face it, we buy utilities for protection when trouble strikes or for a bridge over troubled waters. Hopefully, you may never need these programs, but it is wise to investigate your options and have a plan ready when and if trouble strikes. You should and can be prepared for the most dreaded of those troubled waters, such as data loss.

The Crisis Center in System Suite 3 is the place for individual users as well as managers to start before trouble strikes. This chapter will help you prepare a crisis plan with a “to do” and “not to do” list for when you are faced with the worse case scenario and those in between. There are times when knowing what not to do and avoiding panic can be crucial to getting the job done. The Crisis Center could provide you with the most important management skill and or resource you pick up this year. The star of the Crisis Center is the improved “do-it-yourself” program called Easy Recovery. If the Easy Recovery program is not enough, and you need an industrial strength recovery program, the Easy Recovery upgrade can be downloaded at the Ontrack Web site for $44. Complete information on the full range of rescue options available, such as remote rescue, and the costs of those services are described at http://www.Ontrack.com/.

Be sure that you make a rescue disk and try it out so that you know what to expect if you or one of your colleagues ever hit those troubled waters and cannot get your system to boot. Even if you have someone to call in for these emergencies, the Crisis Center and the rescue disk can save you hours of unnecessary waiting, downtime and stress.

Once you have the emergency plan in place, the next step is an overall system cleanup with the Fix-It Wizard. This powerful one-step Wizard is the easiest and most effective way to fix and tune up your Windows 95, 98, Me, NT and 2000 systems. It scans for viruses, saves and backs up system files, cleans out old files and the registry as well as defragments all of your disks while you attend to other business.

Warning!!

With power, caution is advised. The first time you run the Fix-It Wizard, make sure that you uncheck the box marked “remove unused files.” On examining the screen you will note that some of the categories have a + next to them indicating that they can be expanded. When you expand the “remove unused files” box you will find the categories of files that will be removed when the
box is checked. Included are .bak files as well as temp files and files in the recycle bin. You may not want to remove some of these “unused files.” The ample size of current hard drives makes the necessity of deleting unused files minimal. Always delete with care.

The next stop is file management, Power Desk 4. How many times has a project been delayed by what appears to be a disappeared file. Or you have been frustrated by one of those “xfile.??? not found” messages, followed by the suggestion that you call the vendor? But you can’t call the vendor, because you don’t have the slightest hint which application “xfile.???” belongs to. Even before the shift from megabytes to gigabytes and hard drives the size of a Montana zip code, it was location, location, location. That’s why Windows added a Find program to the OS. The addition of the power of Power Desk 4 to System Suite 3 makes all the difference. Power Desk 4 not only has the power of an enhanced Find program called File Finder to give you control over the location challenge, it includes a content filter.

Before you start adapting System Suite 3 utilities and Power Desk 4, you will find that each time you left click on a file or a folder you will find that power desk and the zip magic wizards are at your beck and call. Once you have found the file or folder, just click on the file and the System Suite 3 modified menu is ready to move, copy, convert, zip, decode, or scan for viruses. You can rename or place the file or the folder wherever you want it and make sure that it does not get lost again. Add to these features the above mentioned bridge to Xtree and Commander, so you can use the keyboard commands to your heart’s delight or point and click. Let’s just say that with Power Desk 4 you have the best of both the point and click and keyboard commands.

The College Laundry Test

Reviews should have a test. The test I used is the college laundry test. This test is reminiscent of the days when your kids brought all their dirty laundry home for cleaning. Things have changed. Now they bring home their dirty hard drives. I was into a laundry cleaning project before I realized it. I started to upgrade my daughter’s desktop to a Pentium III and ran into a semester’s worth of assorted viruses. This was a test that would rival any difficulties users are likely to encounter. I was careful to uninstall System Suite 2000 and Power Desk 98 before installing System Suite 3. Then I ran the Fix-It Wizard. During the virus scan I received a screen message advising me that the virus database was outdated. As a result, I downloaded the upgraded virus patterns. Because I had run the Fix-It Wizard before the Easy Update, some of the more than 40 viruses located could not be removed. After the Easy Update, the viruses were removed without difficulty. With the HD cleaned, I used Power
Desk 4 Pro to find and root out other pesky problems my daughter had reported with her screen saver. Once these problems were fixed and the System Suite 3 Jetdefrag was run, we had a clean machine.

The next part of the laundry test came in the form of a plaintive wail, “Dad, my laptop won’t boot.” The laptop is a Pentium running on Win 95 that had been on loan to another student because my daughter decided that it was unfair that she had two computers while other students had none. I used the rescue disk to reinstall Win 95 and the Fix-It Wizard to complete the job, clean out the viruses, and other stuff that had accumulated. The laptop dirty laundry was done and the only complaint was that I had not used the correct background image. Well, System Suite 3 gets the job done, even though you may not be a total hero.

After you get the Mom and Dad or IT work done, it’s time for even the busy to play with System Suite 3. Take a look at the Power Desk 4 and the tool bar the Ontrack folks call the Coolbar. A Coolbar includes at least one or more of the basic tools that come with Power Desk. There is a clock tool, a quick launch tool, a command line tool, a print manager tool, a multi-view tool and a start menu tool. You can design an unlimited number of these Coolbars. Each of them can be activated by keyboard commands when you need them.

The Coolbars are easy to set up and the only limit is your imagination. These Coolbars can help you to streamline the way you work or you can use them to set up a single PC so several people can share it, each having their own set of Coolbars. Or perhaps you can have a Coolbar with Power Desk 4 configured to work like Xtree. You can use Notepad or WordPad to edit files and write batch commands for use at the DOS prompt.

The Ontrack Company

A major strength of the System Suite 3 product is the company. Ontrack’s commitment to customer support is far ahead of the rest of the pack. While most software companies don’t talk “tech” with you until they have a credit card number, Ontrack offers a year of free tech support.

I delayed the obligatory review call to tech support until I found a legitimate reason to call. I was impressed by the patience and knowledgeable responses given by the tech staff that I talked with. They are very user friendly and, as the following tale demonstrates, will go beyond the call.

The tech support team received a call from a user who was angry because the System Suite 3’s Virus Scanner found a virus in an attachment sent by a friend. The caller argued that the Virus Scanner was wrong. The attachment could not have a virus because it had been sent by a friend. The tech support crew listened patiently and pleaded with the caller not to open the attachment. Their warnings went unheeded and the caller opened the attachment. OOPS!
The tech support staff listened to the caller’s “play-by-play” report of the virus at work and then helped the caller recover. Two of the tech support staff I talked with told me that even though a year of free support was the company policy, they had never heard of a user being denied tech support because their year of free support had expired. During several calls to tech support, at no time was I asked gatekeeper questions, such as a serial number or any other information regarding how long I had the program.

The Documentation

I’m as guilty as the rest when it comes to plunging in without reading the documentation. System Suite 3 is so adaptable and easy to run that I expect most users will adapt System Suite 3 as they discover it. Because there is so much in there to help get out, spending some time reading the documentation is strongly recommended. Docu-phobes should start with “quick tour.” If you want to dig in, the documentation contains a detailed descriptions of each of the utility wizards. More importantly, this documentation provides ideas for adapting the program.

There Is More

The disk and files wizards include a disk fixer and a data eraser. EasyUninstall makes it safe and simple to free up disk space in just one click, plus when you open the EasyUninstall program you will find some surprisingly handy utilities. Not only does this group of utilities uninstall files, it will move an application and its components to another drive or partition, transport an application to another computer, and archive programs that you don’t use for later restoration. These programs are real time savers for busy managers and those who are frequently working under the hood alike.

A final warning to those of you who didn’t follow directions and get a copy of System Suite 3 and work with us, we know who you are and where you work. We even know who you go to when you have trouble with your PC. But we’re not going to tell. At least not right away. We won’t have to. We’ll just smirk when you come and ask for help and want to borrow our System Suite 3.

Summary

System Suite 3 package with Power Desk 4 contains a group of powerful utility applications from the “must have” to the handy, as well as a few that are likely to be on the veteran user’s wish list. The package is easy to adapt so it can be recommended for a variety of user types, ranging from managers of
large human service organizations installing the Suite on many machines with different needs to the novice user on a single PC. While the file manager Power Desk 4 is recommended for all machines, selective installation of System Suite 3 is warranted. Fortunately System Suite 3’s customized installer makes it possible to install based on the users skills and needs. Every PC can use the one step automated Fix-It Wizard, do-it-yourself data rescue, and virus protection applications. When the many features of the System Suite 3 package are added to the Ontrack company’s excellent customer support, System Suite 3 with Power Desk 4 is a must buy.

People will take over the Internet. By 2006, the sheer volume of Internet traffic will mean that government control will be impossible. Self-governing little societies will spring up with people living in ‘virtual villages.’ Everyone will be free. Government will take over the Internet. By 2006, Big Brother will really be watching you. All your emails, all your bank details, all your personal schedules and purchases—everything will be recorded and scrutinised. Internet computers will be fitted with cameras that will monitor you 24 hours a day. Totalitarian regimes will be in power everywhere. Everyone will be oppressed. (p. 30)

Human Rights and the Internet draws upon the experiences of multiple professionals to explore the dynamic interplay between new information technologies and human rights around the world. What emerges is a conflicting picture of the Internet as a potential tool for both the liberation and the repression of global society.

This book will prove useful to a wide variety of students, professionals, and policymakers interested in the interface between emerging technologies and human rights. The authors provide an easy-to-understand assessment of issues vital to new human rights activists. Seasoned human rights workers can also benefit from a reflection on these issues.

Disappointed will be those readers who do not embrace democracy as a human rights priority. Human Rights and the Internet looks at human rights from a Western perspective. While alluding to differences in cultural values, the authors repeatedly trumpet the march toward global democracy with the aid of the Internet. This differs from the approach taken in East Meets West, in which
Daniel Bell defends East Asian challenges to liberal democracy, taking the middle ground between the extremes of this intercultural human rights debate.

OVERVIEW

Editors for Human Rights and the Internet include: Steve Hick, Professor in the School of Social Work at Carleton University in Ottawa; Edward F. Halpin, Senior Lecturer in the School of Information Management at Leeds Metropolitan University; and Eric Hoskins, Senior Policy Advisor to Canadian Foreign Minister Lloyd Axworthy. Hick has authored Land Our Life: A Study of the Struggle for Agrarian Reform in the Philippines and several articles on social work and the Internet, participatory research and human rights. Halpin’s published works include The Use of the Internet for the European Parliament’s Activities for the Promotion and Protection of Human Rights and an article on human rights and the Internet. Hoskins is a recipient of the Lester B. Pearson Medal and the Governor General’s Meritorious Service Cross. He has written the paper, The Impact of Sanctions: A Study of UNICEF’s Perspective, which was published in 1998.

The book contains 21 chapters and is divided into five parts, each with a common theme. Also included is a Forward by Mary Robinson, United Nations High Commissioner on Human Rights, and a Preface written by Abid Hussain, United Nations Special Rapporteur on Freedom of Expression.

Part I consists of an introduction by the editors and perspectives by three authors: Lloyd Axworthy, Minister of Foreign Affairs, Canada; Glyn Ford, Member of the European Parliament; and Patti Whaley, Deputy General Secretary of the International Secretariat of Amnesty International. Axworthy praises the Internet as a powerful tool for promoting human rights and democracy while voicing the need to guard against its use in spreading hate propaganda and child pornography. Ford analyzes further the issue of harmful content on the Internet. In addition, he provides some background information on ECHELON, a surveillance system using the latest computer technology to scan phone calls, faxes and emails from around the world. Finally, Whaley examines the ‘love-hate relationship’ human rights NGOs have with the Internet. While recognizing the many benefits NGOs obtain from the Internet, Whaley challenges the widely held assumption that increased information on the Net can in and of itself lead to greater freedom and global democracy.

In Part II, examples are given of everyday use of the Internet by human rights activists. Sharpe looks at the use of new technologies by Internet ‘guerillas’ engaged in human rights campaigns. He briefly describes human rights efforts in El Salvador, the former Yugoslavia, Africa, Indonesia and China.
Grassroots movements are the topic of an analysis by Hick and Teplitsky. Historical information on online activism by Derechos Human Rights follows. Michael Katz-Lacabe and Margarita Lacabe tell the potent story of an Argentine youth, who upon surfing through Derechos and Project Disappeared Web sites, discovered he had been stolen following his birth at the notorious Naval Mechanical School. Lastly, Sottas and Schonveld present the case for controlled dissemination of human rights reports to avoid the negative consequences of information overload.

Part III contains an overview of the use of the Internet to promote human rights around the world. Gauthier paints a dismal picture of human rights in Africa, acknowledging that much assistance will be needed to increase the availability of the Internet in African countries and to ensure that users receive adequate training. In Latin America, a major issue facing human rights NGOs is fear of government interception of communications. Nevertheless, Pacheco maintains that improved access to the Internet could assist poor, marginalized regions in Latin America to obtain the ‘voice’ needed to prevent human rights violations. Lane addresses Internet policy issues of freedom of expression and security in Europe, warning against restrictions on the use of encryption that could jeopardize the work of human rights organizations. Scharfe explains how human rights efforts in East Timor have benefited from Internet technology. Unfortunately, no mention is made in Section III of Internet technology in the Middle East, despite the fact that human rights organizations such as B’Tselem are actively using the Internet to disseminate information. This omission is noteworthy given the sparse coverage of the Middle East elsewhere in the book.

Part IV covers the controversial issue of regulation of the Internet to protect against cyberhate and sexual exploitation of children. Mock declares that the use of law, community action and education are necessary to counter the increase in hate propaganda on the Web. She places the greatest emphasis, however, on education as a key to battling cyberhate. Hecht and Neufeld note that the International Criminal Police Organization (INTERPOL) has described the Internet as ‘fast becoming the most significant factor in the sexual abuse of children and the principal means of exchange of child pornography.’ They present a compelling case for the development of new strategies to ensure protection of children. Also in Part IV, Knezevic expounds upon efforts by women’s groups in the Former Yugoslavia to promote human rights and democracy. In the final chapter of this section, Roth addresses the ‘colour of the Internet.’ While pointing out that the majority of Internet users are from the predominantly white continent of North America, she says Internet usage is expanding to include more minority constituency groups.
In Part V, insight is given into a variety of subjects including privacy, free speech, political control, communication, education and information on human rights. Wright’s chilling account of the emergence of unaccountable global electronic interception and surveillance strategies is based primarily on the 1998 report to the European Parliament’s Scientific and Technological Options Assessment Committee (STOA report). An overview by Conley and Patterson of citizen development via the Internet follows. Claude and Hick argue for formal and informal human rights education, which they consider to be an international obligation. In the final chapter of the book, Halpin and Hick manage to bring into sharp focus the use of email to convey human rights information, cautioning on the vulnerabilities and barriers of Internet communication.

EVALUATION OF CONTENTS

Multiple experts and practitioners in the field of human rights delving into a broad range of topics serve as the book’s strongest selling point—and weakness. The price for compacting so much factual information, albeit excellent in quality, is a certain degree of overload.

Many of the issues explored in Human Rights and the Internet are also dealt with in Liberating Cyberspace: Civil Liberties, Human Rights & the Internet. However, the focus of the latter is primarily on civil liberties, with one chapter dedicated exclusively to the subject of human rights and the Internet. Liberating Cyberspace provides a deeper analysis of cryptography and copyright. On the other hand, Human Rights and the Internet contains a more thorough description of the ECHELON system.

Human Rights and the Internet clearly and accurately describes the dilemma of human rights activists who recognize the value to the Internet as a tool for education, fundraising, and quick dissemination of human rights appeals. More than half the world’s households do not have a telephone, let alone a computer. In Africa, where human rights violations are reported daily, only 1.14 million out of 762 million people use the Internet. Online access is increasing rapidly in Africa, Asia and the Middle East. Still, the majority of Internet users live in North America or Europe. Those most in need of empowerment tend to be less likely to have access to the Internet.

The authors are strikingly qualified to illuminate use of emerging technologies for promotion of human rights. Human Rights and the Internet constitutes a significant contribution to the field of human rights.
ORGANIZATION/STRUCTURE

The organizational structure the Human Rights and the Internet is a bit difficult to follow, as some overlapping of contents is evident. Furthermore, there are chapters that could easily be placed under more than one section heading. When searching for information on a particular subject, the reader will find the index beneficial.

The editors provide a brief and essentially honest outline of the book’s contents on pages 2 to 3. However, the description of “Women’s Voices Against the War: The Internet in the Fight for Human Rights During the War in the Former Yugoslavia” as a chapter on women’s rights might be misleading to the reader. The chapter outlines the work of women activists in the former Yugoslavia in promoting a wider agenda of human rights and democracy.

CONCLUSION

Human Rights and the Internet explores the impact of Information and Communication Technology (ICT) on human rights. Viewed as a tool in the battle for human rights and democracy, the Internet nonetheless poses risks for populations most in need of protection.

Janet Olson, RN, MSN
718 Via Elena Drive
Goodyear, AZ 85338
E-mail: janetolson@sprintmail.com


The growing use of computers and information technology in the workplace makes understanding the Internet, and its capability as an information resource, a priority for social work students and practitioners. This slim text has been written for the student learning about the Internet. Its primary intent is to be used as a textbook for undergraduate social work programs. Martinez and Clark provide a basic introduction to the Internet with this textbook. As the authors note in the preface the text has been written “...to address the need for a
This book may be useful as a supplementary text or as part of a continuing education program on the Internet. However, I don’t believe many readers will find it useful by itself.

This little book (111 pages plus an appendix of Web sites) can be used as an outline to build an Internet course for people with limited experience. Readers will need further elaboration and guidance, however, as they go through the chapters; the information in each chapter needs additional elaboration not found in the book. While brevity and simplicity of explanation is appreciated, I found myself, at times, waiting for an instructor to expand on the topic. When compared to other fairly recent books about the Internet and the World Wide Web (Grant and Grobman, 1998; Vernon and Lynch, 2000), this ambitious work attempts to do too much with too little information.

Each chapter opens with vignettes of social workers using the Internet. Each of the vignettes serves to introduce the chapter topic and the following discussion. There is a brief summary at the end of each chapter as well as questions for class discussion. Screen shots are used extensively throughout this text. Generally, the overall quality of the screen shots is good and illustrates the topics being discussed. However, at times screen shots are too small or dark to read.

Beginning with a definition and brief history of the Internet, the first chapter provides a review of how social work is using Internet technology for professional and personal development. The book then follows a logical progression of describing connecting to the Internet, the use of electronic mail, listservs, newsgroups, chat, the World Wide Web, file transfer, and telnet.

The discussion of connecting to the Internet is brief and glosses over a variety of connection methods (cable access, dial-up connections, campus network and “terminal access”). The chapter summary acknowledges that “new computers” come preloaded with at least one sign-on program (AOL is mentioned) that gives a new user a connection to the Internet with little hassle. The chapter on electronic mail briefly outlines Netscape and Internet Explorer’s mail programs and, frankly, I was confused by the discussion. There is a brief “how-to” and discussion of “Pine” (a UNIX based electronic mail program) for students in “institutions or colleges that do not offer PPP or SLIP connections.” The authors also discuss using newsgroups, listservs and real-time communication (chat). There is no discussion, however, of the various “messaging” services currently available such as AOL’s Instant Messenger, Excite Pal, etc. This kind of real time alerting/chat service may well have many uses in a variety of social work settings, such as communication between remote members of a work team, informal “chat” among “self-help” group members and, facilitat-
ing electronic groups without the trouble of “scheduling” a time for users to meet at a chat site.

The space given to discussion of the World Wide Web, from a page count perspective, is fifty percent of the book (give or take a few percentage points), including a “tour” of the World Wide Web, an introduction to the Web, a chapter on creating a Web page and an annotated bibliography of Web sites in the appendix. One example of the unevenness of this text is the Web page authoring section. The book assumes that the reader will not have prior knowledge of the Internet but relies on the reader’s ability to navigate the World Wide Web to locate information about creating Web pages.

One important item not included in the discussion of Web resources, especially for the newcomer to the Internet and the World Wide Web, is the need for critical evaluation of Web sites or Web content. This topic is too important to be omitted, especially in an introductory text. As a librarian I often see people using the World Wide Web as an information source without thinking about a site or its creators. Since there is no “editorial” control of Web content, “caveat emptor” should always be observed. Sites will often reflect the bias of their “parent” organization or business or the “personal views” of the author. And for whatever reason, the content is accepted as given. I am reminded of the line “On the Internet no one knows you are a dog.” For anyone interested in exploring critical thinking and the Web, see http://www.peru.edu/libre sources/thinking.html.

File Transfer Protocol (FTP) and telnet are also covered. Both of these functions are becoming more transparent everyday with the “user friendly” approach provided by graphical Web browsers. And like DOS, these command driven protocols may be on their way to fading out of memory for the non-technical user. However, like DOS, understanding their workings may be useful in some settings.

The Appendix is a bibliography of Web sites arranged by curricular topics such as “Diversity,” “Promotion of Social and Economic Justice,” “Research,” “Social Welfare Policy and Services” and so on. The sites I visited were “live” but there is no warning that sites, depending on their hosts and creators, have a tendency to come and go and be from the Internet or be redesigned with a different emphasis. The appendix includes a URL for JSTOR, a membership site with access to journals in full text format. For students and faculty at institutions that subscribe to the collection, it is a valuable resource. For the general researcher hoping to find articles from the site, the results will be disappointing.

A chapter on using search engines and how to structure a search for information on the World Wide Web would have been useful. When a reference is made to a specific site there is the distinct possibility that the referenced site...
may no longer exist. Researchers, especially newcomers to the World Wide Web, often lose their way when links to sites become outdated. More time on how to search would be beneficial, in my opinion, than bibliographies of specific sites. To paraphrase an old community development adage, “Give someone a fish and they eat for a day; teach someone to fish and they can eat when they want.”

If you are looking for a similar book with more detail but a similar approach, then The Social Worker’s Internet Handbook (Grant and Grobman, 1998) is worth a look. Grant and Grobman’s handbook can be used as a reference or as a text to help social workers learn about and navigate the Internet. If you are looking for something more in-depth about the World Wide Web, Web search engines, operations and how to evaluate the information found on the Web, then a book to consider is Social Work and the Web (Vernon and Lynch, 2000). Focusing entirely on the World Wide Web, it covers Web browsers, security, and confidentiality. It includes extensive coverage of how to use the Web, including search engines and evaluation of Web information. It closes with a brief look at Web page design for agencies and the future of the Web in social work practice.

REFERENCES


Art Biagianti
Director, Lillian F. and Milford J. Harris Library
Mandel School of Applied Social Sciences
Case Western Reserve University
Cleveland, OH 44106-7164
WEBSITE REVIEWS

Introduction

John Grohol began editing this column in the journal in 1997. The Web was three years old then and few people beyond dedicated academics, the affluent, and well funded agencies had access to the Web. How times have changed. We now have countless Websites to choose from instead of handfuls. We can access Websites with palm pilots instead of depending on dial-up modems. The wealth of visual information and data is no longer limited to just a few sources, but instead is international, pervasive, and extensive. Staggering. As the new editors for this column, we look to build on John’s pioneering work, and will be introducing some new changes because the Web has grown so much in the intervening years.

First, we will focus on central themes relevant to human services workers, administrators, and consumers, one theme per column. The increase in available Websites now makes this possible. Next, we will be favoring larger or “meta” sites such as gateways and portals whenever possible because these provide access to additional resources. Finally, we will be including disability access as a dimension for review.

We are deeply concerned about access to the Web. Computers and connections have plummeted in price yet many people still cannot surf because of disability and language limitations. As a result, this column explores three different dimensions of access for everyone. The first, written by Dr. Susan Sarnoff at Ohio University, investigates three major Websites that address “the digital divide.” The next, written by Ms. Janet Wright, a social work student at Indiana University, looks at disability access. This is a dimension of the divide that should be of concern to all human services professionals. The final set of reviews by Dr. Steven Marson at North Carolina University at Pembroke and Dr. Barbara Marson at Fayetteville Technical Community College analyze language access to Websites through the use of automated language translation utilities.

We plan to explore three more themes for the coming issues. One will be on research-oriented Websites that provide useful data for human services planners and administrators. Another will take up policy resource Websites. The
third will address Website construction for human services agencies. We look forward to these and other emerging themes, and invite you to send us your recommendations and reviews. The review criteria for this column may be found at: http://www2.uta.edu/cussn/jths/wwwrevgu.htm. E-mail concerning this column may be sent to: d-bpresentations@home.com

As an introduction to ourselves, Dr. Darlene Lynch is director and professor of social work at the George Williams College, Aurora University in Aurora, Illinois. Dr. Bob Vernon is an associate professor of social work at the School of Social Work, Indiana University Purdue University Indianapolis. We wrote the book Social Work and the Web and teach how to use technology. We also produce the bimonthly column “Social Work on the Web: Tools for Cyberpractice,” for the Indiana Social Worker. Dr. Vernon is on the Council on Social Work Education’s Board of Directors and chairs its national Technology Committee. Dr. Lynch is a member of the CSWE Commission on Women. Dr. Lynch holds her MSW and PhD in Social Work from the University of Illinois Chicago. Dr. Vernon holds his MSW from San Diego State University and his PhD in Urban, Technological and Environmental Planning from the University of Michigan. Dr. Lynch maintains a practice in clinical social work and Dr. Vernon practices in adult day care. We have a shared website at: http://members.home.net/d-bpresentations/

Robert Vernon
Associate Professor of Social Work
School of Social Work
Indiana University Purdue University at Indianapolis
902 West New York Street
Indianapolis, IN 46202
rvernon@iupui.edu

Darlene Lynch, Professor of Social Work
Social Work Department, George Williams College
Aurora University
347 S. Gladstone Avenue
Aurora, IL 60506
dlynch@aurora.edu
Websites and the Digital Divide

The digital divide means different things to different people. There are digital divide Websites that address the divide between children and adults, poor and rural residents of the United States and other Americans, people outside of the United States and those within it, other language speakers and English speakers, ethnic, racial, cultural minorities and people with disabilities plus everyone else. Some even define as the “digitally divided” people with equal access to computers and the Internet who, nonetheless, have special information needs such as women and the lesbian, gay, transgendered and bisexual communities. (See the report Online Content for Low-Income and Underserved Americans, http://www.childrenspartnership.org/pub/low_income/.)

As a result, there is no clear definition of the “digital divide.” Similarly, there are only a handful of Websites that pull together information about more than one aspect of it. Three of these provide very useful information, are operated by entities that are likely to remain in existence for some time, and are likely to be regularly updated.

The first and most extensive site is the Digital Divide Network, http://digitaldividenetwork.org/. This site was developed jointly by the Benton and Ford Foundations, and incorporates a wide range of information on all aspects of the digital divide, although the mix of information might be described as more serendipitous than comprehensive. The topics in the site are separated into the broad categories of digital divide basics, access, literacy and learning, content, and economic development. The site contains information on digital divide research, recent journal articles and news stories on the divide from a range of sources, funders who provide grants to bridge the digital divide, conferences on connectivity, and a discussion list on digital divide issues. These features make this a good place to start to learn about the issue and how to become involved. The site also includes a feature that enables users to search for free or low cost Internet access and training opportunities by zip code. This feature includes a location map and directions to each location, making it particularly helpful to users who are traveling without a computer or who are new to a community. This site is easily navigable and meets the requirements for Bobby Approved status for accessibility by people with disabilities. It contains some graphics that are not accessible by voice translation, but provides alt text options for all of them.

The second site is operated by the United States Department of Commerce at http://www.digitaldivide.gov/. It was developed to apprise the public about the
digital divide, with information of particular interest to people preparing grant proposals to the Department to bridge the divide. Some of the information on the site has more public relations value than educational interest, particularly the content under press releases, speeches and events. This Website primarily focuses on government plans to address the digital divide, including funding opportunities offered by the Department of Commerce. The Website has links to private, government and international agencies with similar interests, as well as a newsletter and a number of reports and statistical analyses on aspects of the divide. The site also contains examples of grants funded by the Department and evaluative reports of the programs funded by these grants. This site is particularly useful for those seeking government funding opportunities, or who are interested in which departments within government agencies are charged with bridging the digital divide. Perhaps the most significant feature of this site is its series of reports titled, Falling Through the Net, the most recent of which was published in October 2000. Nearly every relevant site contains a link to this report, making it one of the easiest resources to locate on the topic. The Website is otherwise easily navigable, but does not meet the requirements for Bobby Approved status, making it difficult or impossible for people with disabilities to access.

Finally, the Bill and Melinda Gates Foundation Website, http://www.gatesfoundation.org/learning/digitaldivide.htm, incorporates the results of research funded by the Gates Foundation on computer ownership and online access by income level, race, educational level, household type and age. The Gates Website primarily contains research about the digital divide, although it also contains a few spiffy graphics on computer access by user demographics. However, this site is extremely limited. Links other than those to the research connect back to other aspects of the Gates Foundation, not to further digital divide information. The site, too, is easily navigable for the able-bodied and well-sighted, but fails to meet Bobby Approval status, meaning that it is not accessible to people with a variety of disabilities, particularly sight impairment.

Access limitations of Websites designed to bridge the digital divide cannot be better exemplified than by the fact that two of the three Websites that address the subject most comprehensively fail to be accessible to people with disabilities. Insufficient resources is the only reasonable excuse for this failure but, as they are operated by the federal government and the Bill Gates Foundation respectively, this is not likely to be the cause.

This raises a major issue for human service professionals and Web designers. The Web is increasingly the primary way that public and private agencies and organizations publicize information and the public learns about this information. As a result, access to the Web may be the most significant social justice issue of our time—one which has the potential to either widen the gap between digital haves and have nots or close that gap for all time.
Unfortunately, varied definitions of the digital divide—and rivalry among groups for resources targeted to the divided—require considerable understanding of issues not addressed by the rush to define and identify the most technologically distanced. This raises another set of critical concerns.

Research variously defines the digitally divided as people without access to computers, without computer skills, and without their own computers. Similarly, connectivity can mean access to the Internet at a central location (a public library or cybercafe, for example), ownership of a computer with Internet access, internet navigation skills, a personal e-mail account, or high speed access. Further, these distinctions will soon have to reflect the type of access hardware as well. For example, does the divide apply to desktop computer access, Internet-specific devices, palm pilots and other wireless technologies, and telephone/modem connections? Clearly, a common definition must be developed in order for access by different groups to be realistically compared and understood. Attention must also be directed to frequency of access and the number of users per system. In addition, whether specific content is available at all, whether the cost of data renders it inaccessible to users with limited incomes, whether users with disabilities have accessible hardware, and whether Websites they wish to access can accommodate their special needs must be considered.

Finally, the law, particularly the Americans with Disabilities Act and the W3C Guidelines for Website accessibility for people with disabilities, available at http://www.w3.org/TR/WAI-WEBCONTENT/, that are being developed to comply with the Act, and professional ethics dictate that certain types of information must be offered in ways that can be universally accessed.

Closing the digital divide also requires grappling with questions of access, usability and cost. For instance: How much, and what kind of access, is sufficient? To what degree is language a barrier, and should it be addressed through language training of users or content translation by providers or an “accessory” service? Does shifting the cost to consumers of connecting and printing place unfair burdens on some users? At what point, if ever, can organizations consider the posting of information on a Website sufficient dissemination to forego redundant systems?

While these questions have yet to be answered, one fact is certain. The quality of the dialogue will be seriously compromised if human service professionals do not share their vast experience regarding people with special needs and their professional commitment to social justice for all. These three Websites will give you a foundation for understanding the digital divide and are most worthwhile—provided you are able-bodied.

Reviewed: June 12, 2001

Susan Sarnoff, DSW, Assistant Professor
Ohio University Department of Social Work
Morton Hall 522
Athens, OH 45701-2979
sarnoff@ohio.edu
Cruising the information superhighway? Put on the brakes for a minute and consider the accessibility of the Websites you visit. Would you feel comfortable referring your favorite human service gateway to a disabled colleague or client? Would they be able to enjoy your favorite portal? Do you know how to evaluate a Website’s accessibility before referral? Whether a colleague or client, a disabled person who is unable to access information readily available to the general public, is left further disadvantaged in their daily living and professional life? The original purpose of the Internet was to transport data and other information from one location to another. During the Internet’s beginning years, personal computers were operated by DOS-based software and program instructions were executed by a set of textual commands. Every transmittable piece of information was in an ASCII text format and the playing field for the disabled and temporarily able-bodied was pretty level. The Windows platform with its Graphical User Interface (GUI) created a whole new dimension of computer technology. The Internet became not just an avenue for knowledge, but the bustling world of e-commerce, amusement, and instant information. It now serves as a venue for support groups and ongoing social connections for disabled people. It is no longer a convenient luxury; it has become an essential resource for economic and social survival. Yet access is inadvertently denied to many disabled communities when Websites are thoughtlessly designed with only the sighted, the hearing, and the well coordinated in mind.

Computer technology has also found its way into almost every employment setting. People with disabilities are becoming less competitive traversing the passageways of the Internet and are being left out of the employment loop. Technological advances, which support high graphical content and audio/video streaming, are roadblocks instead of pathways for success. The Americans With Disabilities Act’s implications for the information superhighway outlined in Titles II and III are vague and left to the individual Web designer’s discretion. Furthermore, the Telecommunications Act of 1996 addresses only adaptive equipment, and not software, for improving communication accommodations. These ambiguous policies have been an ongoing
concern for disabled communities and their advocates. Advocates demand electronic curb cuts to better cruise the Internet. Yet the more closely the creators of human services Websites mimic the designers of complex commercial layouts with myriads of graphics, audio, and movie files, the more difficult it is to find the simple ASCII text so vital for disability access. Electronic curb cuts for alternate access demand that the information be easily separated from visual structure and captioning be provided for both video and audio streaming so that the disabled get the full benefit of the site.

Enter CAST, The Center for Applied Specialized Technology (http://www.cast.org). CAST is one of a handful of not-for-profit organizations whose mission is to expand educational opportunities for individuals with disabilities through the development and innovative uses of technology. CAST is dedicated to researching and developing programs and products that address the many models of learning, and to aid the educational community in assisting those learners in a healthy and successful manner. While education is central to its mission, CAST’s resources are relevant for health, human, and social service organizations. One of the most significant contributions CAST has made is the development of “Bobby,” a tool that Webweavers can use to test Websites against the current accessibility standards advanced by the World Wide Web Consortium’s (W3C) Web Accessibility Initiative at http://www.w3.org/wai/.

W3C is an international organization dedicated to the technological evolution of the Web and to making its information and activities accessible to those of differing cultures, languages, educational levels and physical challenges. W3C’s founding and continuing goals are to develop common protocols that promote technological evolution, ensure the Web’s interoperability and support an open forum for discussion of accessibility issues. Its Web Accessible Initiative, WAI, is dedicated to providing equal access for those with disabilities by supporting ongoing research, the development of software and the standardization of Web platforms. The WAI provides a prioritized list of recommendations for Webweavers called User Agent Accessible Guidelines, or UAAG.

CAST’s program, Bobby, can be found at http://www.cast.org/bobby/. The main feature of Bobby is its testing ability for UAAG. Anyone can enter the URL for a Webpage and quickly learn how well it conforms to accessibility standards. A free downloadable version of the BOBBY program is available for anyone who chooses to critique their batch of Webpages before submitting them to the server. This allows Webpage developers to make necessary changes while the page is in its initial design stage, which is much easier than altering it after it has already been published on the Internet. One can use the program to examine a complete Website.

There are three levels of checks that Bobby performs. The first is Priority 1 Accessibility and Bobby checks for seventeen high-priority rules that must be obeyed
or many disabled users will not be able to use the Website. These high priority rules are the most essential for access. Violating any of the thirty-three medium-priority rules in Priority Accessibility 2 will make access difficult, but not impossible. There are also sixteen low-priority rules, known as Priority Accessibility 3, that will improve accessibility, but may be violated with minimal inconveniences to disabled users. Dividing these rules into these three levels makes the design task less overwhelming and more manageable for Webweavers.

The only criticism that one can levy against the Bobby Website is that the extensive feedback can be daunting. A simple one-screen Webpage can yield many screens full of feedback on accessibility problems worded in technical jargon intelligible only to the advanced Webweaver. On first use, one may wonder if any Website besides CAST and Bobby itself meets the Bobby qualifications. Webweavers may become so discouraged that they do nothing to address the access problems on their site. Using Bobby feedback requires the Webweaver to master the Website’s “How to Read the Bobby Report.” Web developers, who do so and resubmit their Webpages and meet at least all of the Priority 1 Accessibility checks, may display the Bobby symbol of accessibility on their Website. This tells others that the site is accessible to all.

While Bobby compliance is very important for disability access, it is also important to keep in mind the differences between typical users and those needing adaptive equipment to access the Internet. Adaptive equipment or assistive technology may include screen reading software, voice recognition software, or external devices such as switches and tracking balls for easier mouse manipulation. MAGpie, the latest technological advancement, developed by the National Center for Accessible Media in partnership with WGBH Communications of Boston, allows for textual captioning of audio and video clips. Visit http://ncam.wgbh.org/webaccess/magpie for more information.

Viewing the screen for the purpose of gaining knowledge is quite easy to do with standard definable text. However, with the desire for originality and aesthetically pleasing presentation, it has become more challenging for disabled people to extract the needed information from a Webpage. Interactivity is also becoming more problematic. Filling out tax forms, banking, paying bills, purchasing items, and taking surveys is very challenging when ability needs have not been taken into consideration. Although screen readers have made considerable strides in the world of technology, poorly labeled graphics, links hidden within image maps, and columns and tables make it much more difficult for the disabled to view and navigate through screen contents. In addition, Websites that have not incorporated the MAGpie software in the design do not offer captioning for either audio or video clips. This leaves both blind and deaf users unable to access interviews and sites with extensive firsthand news coverage. As a result, while Bobby is certainly a wonderful tool for Webweavers, other design
problems must also be taken into consideration if a Website is to be useful to every visitor.

The Bobby testing tool is priceless and allows anyone to test a Website for accessibility. Sending the URLs for Bobby and W3C’s WAI as references to any visited site found to not be accessible is a simple way for all of us to advocate for universal accessibility.

Reviewed: May 29, 2001

Janet Wright, BSW Student
Indiana University School of Social Work
407 S. Michigan Ave.
Greensburg, IN 47240
jwright@iupui.edu
Translation Websites

Have you ever found a promising Website, one you suspect has just the information you are after, but it is in German and you have only passing fluency in Spanish? One of the major access barriers to Web-based information, yet to be overcome, is the abundance of information available on a global basis. For the past several years, we have become complacent with technological advances, but blind to multicultural and international access issues. Few advancements since the development and use of the World Wide Web have been impressive. We are no longer complacent since experiencing BabelFish3 http://BabelFish.altavista.com (Table 1); iLanguage, http://www.ilanguage.com (Table 2); and Alis Translation Solutions, http://www.teletranslator.com:8080 (Table 3). These Websites can successfully translate Website information into a variety of different languages. We find these utilities amazing and reminiscent of Star Trek.

Each of these three Websites functions differently and has different graphical interfaces. First, it is appropriate to contrast the languages each site is able to translate (see Tables 1 and 2).

Alis Translation Solutions

Alis Translation Solutions is the most flexible because it will translate in any combination by using the “FROM OPTIONS” list to the “TO OPTIONS” list (see Table 3).

Although Alis Translation Solutions is included as part of Netscape’s version 6.0, it can be accessed through earlier versions of Netscape and from Internet Explorer.

All three Websites will translate Web materials at no cost. However, iLanguage differs from the other two by offering translation services for non-Web documents such as extensive word processed files for a fee. Details of this service are available at http://www.ilanguage.com/en/request_for_quotation.asp, but no specific prices are cited. BabelFish includes a function that translates short word-processed files. The BabelFish is not as extensive as the fee for translation service available from iLanguage.

We conducted a timed test for each Website using Internet Explorer. Using a stopwatch, each language translator was directed to translate the homepage for the Council on Social Work Education, http://www.cswe.org, from English to Spanish. BabelFish completed the task within the shortest length of time (10.7 seconds) with iLanguage following (18.2 seconds). It took Alis Translation Solutions 50.3 seconds to complete the task on Internet Explorer. However, since the Netscape Navigator and Microsoft Explorer are competitors, using Explorer might have been an unfair comparison. An additional test was run for Alis Translation Solu-
tions by using Netscape 6.0 (its home) as the browser. Even with this advantage, Alis Translation Solutions still had the slowest rate of 38.0 seconds.

Translation limitations on all three services are identical. The translations are word-by-word and may not be perfect. However, in translating English to Spanish, we found that all did an impressive job. In addition, we learned that BabelFish performs well in translating English to Korean. However, words identified as proper nouns may not be translated. The translator program may not know a particular word, leaving the word untranslated. Only standard HTML text can be translated for all three services that were tested. Words or sentences that are generated using a special scripting language, such as JavaScript, will not be translated. Thus, .jpg or .gif files that contain text will

<table>
<thead>
<tr>
<th>TABLE 1. BabelFish Translation Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>English to Spanish</td>
</tr>
<tr>
<td>English to French</td>
</tr>
<tr>
<td>English to German</td>
</tr>
<tr>
<td>English to Italian</td>
</tr>
<tr>
<td>English to Portuguese</td>
</tr>
<tr>
<td>Spanish to English</td>
</tr>
<tr>
<td>French to English</td>
</tr>
</tbody>
</table>

Source: Website - BabelFish - http://BabelFish.altavista.com

<table>
<thead>
<tr>
<th>TABLE 2. iLanguage Translation Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>English to German</td>
</tr>
<tr>
<td>English to Spanish</td>
</tr>
<tr>
<td>English to French</td>
</tr>
<tr>
<td>English to Italian</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>TABLE 3. Alis Translation Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translates “from”</td>
</tr>
<tr>
<td>English Spanish</td>
</tr>
<tr>
<td>Translates “to”</td>
</tr>
<tr>
<td>English Spanish</td>
</tr>
</tbody>
</table>

not be translated. All three services will define such text as an image. Although it is still possible to get such files translated, the process can be a bit cumbersome. One must convert the file to standard HTML, translate the file into the desired language, and then substitute the file for the original.

Each of the three services was rated on the dimensions of user-friendliness and intuitiveness. We defined user-friendliness as the ease of following directions, while intuitiveness was defined as the ease of using the translator without directions or “help.” The results are summarized below (see Table 4).

Based on our evaluation, BabelFish was the most accessible translator Website. Many users might be interested in posting an alternative language Website with a hot link on their English home page such as: “Tecleo aquí para el web page en español/Click here for the web page in Spanish.” Of the three Websites, BabelFish offers the most accessible directions for including such an alternative link.

Each translation Website was analyzed through the use of “Bobby.”4 Developed by the Center for Applied Special Technology, Bobby helps Webpage authors identify necessary changes to make Websites more accessible to users with disabilities. Thus, the Bobby insignia on a Webpage indicates “seal of approval.”

Without a thorough manual investigation into all the user checks features, it was not possible to assess the Websites with 100 percent accuracy. However, several generalizations can be made. Accessibility Priorities 1 and 2 were analyzed more closely because these produce the preferred minimum conformance levels for an accessible site. The only Website with no Priority 1 Accessibility errors was BabelFish. The Website did, however, have six user checks or potential problems at this level. Closely ranked with BabelFish was Alis Translation Solutions, with only one Priority 1 error and user check. At the Priority 2 level, it exhibited only one issue with two user checks. It was apparent that both BabelFish and Alis Translation Solutions had the fewest potential errors. iLanguage had the most positive and potential errors at the Priority 1 and 2 levels. The disability access differences are presented below (Table 5).

**SUMMARY**

Our purpose was to present and compare Websites that offer language translation utilities in order to make the Internet more accessible. The three Websites reviewed are not equal in their accessibility and performance. However, all are quite impressive, and none can be identified as inadequate. The reader must remember that these programs make literal translations by machine and are no substitute for translation by professional bilingual writers. Webweavers often acknowledge the importance of making the Internet language friendly and ac-
cessible on a global basis. Such language accessibility is critical for the continuation and growth of e-commerce. As with many technological advances on the internet, commercialism is the reason for these impressive translation Websites, and others may be found as well. However, public and private nonprofit human services agencies can reap great benefits from this profit-driven initiative. We have three Internet services that can translate a human service agency’s Website into the language that workers and consumers can read if this includes any one of several of the more dominant languages in the world. Agency directors and their

### TABLE 4. Translator Comparisons for User-Friendliness and Intuitiveness

<table>
<thead>
<tr>
<th>Translator</th>
<th>User-friendliness</th>
<th>Intuitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>BabelFish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too cumbersome</td>
<td>Exceptionally friendly</td>
<td></td>
</tr>
<tr>
<td>Too complicated</td>
<td>Immediately accessible</td>
<td></td>
</tr>
<tr>
<td>iLanguage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too cumbersome</td>
<td>Exceptionally friendly</td>
<td></td>
</tr>
<tr>
<td>Too complicated</td>
<td>Immediately accessible</td>
<td></td>
</tr>
<tr>
<td>Alis Translation Solutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too cumbersome</td>
<td>Exceptionally friendly</td>
<td></td>
</tr>
<tr>
<td>Too complicated</td>
<td>Immediately accessible</td>
<td></td>
</tr>
</tbody>
</table>

Source: Websites

- BabelFish - [http://BabelFish.altavista.com](http://BabelFish.altavista.com)
- iLanguage - [http://www.ilanguage.com](http://www.ilanguage.com)
Website designers should investigate adding a translation option for their consumers. At this point the translation service is at no cost but we do not know how much longer this will be the case! Most importantly, such translation services are likely to increase the use of the Internet by human service consumers and reduce the cost of service delivery. While the overwhelming majority of the world’s 6,809 known languages (visit http://www.sil.org/ethnologue/ for more information) cannot yet be translated, these three Websites offer significant resources for making the Web accessible to everyone.

Reviewed: June 14, 2001

Stephen M. Marson, PhD
Professor/Director, Social Work Program
University of North Carolina at Pembroke
One University Drive, UNC-P
Pembroke, NC 28372-1510
marson@papa.uncp.edu

Barbara M. Marson, PhD
Librarian
Fayetteville Technical Community College
2201 Hull Road
Fayetteville, NC 28303
marsonb@ftccmail.faytech.cc.nc.us

### TABLE 5. Disability Access Comparisons

<table>
<thead>
<tr>
<th>Name of Translator</th>
<th>Priority 1 errors</th>
<th>Priority 1 user checks</th>
<th>Priority 2 errors</th>
<th>Priority 2 user checks</th>
<th>Priority 3 errors</th>
<th>Priority 3 user checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alis Translation Solutions</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BabelFish</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>iLanguage</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>11</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: Websites:
-BabelFish - http://BabelFish.altavista.com
-iLanguage - http://www.iLanguage.com
NOTES

1. Please see the next review in this column about the Center for Applied Specialized Technology’s “Bobby” program for assessing disability access, http://www.cast.org/.

2. For more information on these issues visit The National Council on Disability at http://www.ncd.gov/.

3. The term “Babel Fish” comes from the late Douglas Adams’ novel, The Hitchhiker’s Guide to the Galaxy, where it is written, “The Babel fish . . . is small, yellow and leechlike, and probably the oddest thing in the Universe . . . The practical upshot of all this is that if you stick a Babel fish in your ear you can instantly understand anything said to you in any form of language” (page 42).

4. Please see the previous Website review by Ms. Janet Wright.