New Technologies in the Human Services

Incorporating
Computer Applications in Social Work

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Contents

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Up Front

Welcome to New Technology in the Human Services

Welcome to New Technology in the Human Services Volume 4! Those who have been with us through some or all of the previous three volumes are owed an explanation about the change in name from the now familiar Computer Applications in Social Work.

In reality the old title was becoming less and less appropriate as a description of the content of the journal. In the first place, 'computer' is too narrow a label for the range of technology being covered. Tele-communication has already been featured regularly, and other developments, such as interactive video, seem likely to call for increased attention. Next, 'Social Work' is not a suitable description of either the journal's contributors or its readers. Many of these are DP staff, and others come from different service professions, such as psychology. Volume 3 made a rather cumbersome attempt to accommodate to changing circumstances by adding 'and Allied Professions' to the title. Now the Editorial Board have opted to have a more fundamental renaming.

New Technology - Human Services

'New Technology' probably needs neither explanation nor justification. 'Information Technology' was a possible alternative, but it is more of a mouth full, and some of us look forward to the continuing development of helpful applications which are not solely information-based. 'Human Services' was a harder choice. A problem in the UK is that we have no widely accepted label to cover the range of services and service professionals encompassed by the journal. 'Personal Social Services' might get close, but anyone familiar with North America will be aware how useful the 'Human Services' phrase can be. We would like it to catch on in the UK.

HUSITA '87

The last issue of the journal coincided with the HUSITA conference in Birmingham, and the next 3 or 4 issues are going to be very much influenced by that event. Over 130 papers were presented at HUSITA. A few were only suited to verbal presentation, but a majority were substantial publishable contributions, and the HUSITA organisers are working to find outlets for as many of them as possible. A volume (edited by Walter LaMendola, Stuart Toole and Bryan Glastonbury) will be published by John Wiley during summer 1988. Haworth Press is considering a special issue of Computing in Human Services, and several other journals have been approached. New Technology in the Human Services will not devote whole issues to HUSITA papers, but will print them alongside other contributions in each issue of volume 4.

Future Events - HUSITA 2

The journal will also keep readers informed about events developing out of HUSITA. There are two areas being pursued. One is HUSITA 2, a second international conference, on a date and a venue not yet decided, but certainly not in the UK. No formal organisation exists to set up the next conference, so its future probably depends on what happens in the second area, that of seeking to establish an international association, to retain and build on the links forged at HUSITA. If such an Association is formed it is very likely to have the organisation of future international conferences as part of its frame of reference. On the day after the formal end of HUSITA in Birmingham, a substantial number of people stayed behind to consider the next stages of development, and a small group was asked to conduct a feasibility study and circulate proposals for an international association. Subsequently the Government of the Netherlands has offered a grant to meet the cost of the feasibility exercise, and work is going ahead.

After the major effort of organising HUSITA, this journal's organising group, CASW, will now return to its more traditional activities. These include conferences and workshops, details of which will be circulated to all 'New Technology in the Human Services' subscribers. □

Bryan Glastonbury

Events

International Association of Schools of Social Work

A Special Colloquim
Sunday, July 17, 1988, Vienna, Austria

Use of Information Technology in Social Work Education

IASSW is proud to announce a special colloquim preceding the bi-annual congress to be devoted to the use of information technology in social work education.

The provisional list of presentations includes the following:

1. New Applications of Information Technology in Micro and Macro Clinical Social Work Practice.
2. Computer Aided Learning and Social Work Education.
3. Software in Social Services and in Social Work Education: What is available?
4. Expert Systems and Social Work Education.
5. Open forum for participants to share their experiences and interests. Potential contributors are encouraged to contact the colloquim chairperson directly as soon as possible.

Software products will be available on site for examining, sharing and learning

This special coloquium will enable social work educators from all over the world to get updated on new develop-ments in information technology as they impinge upon social work practice and education. It will further enable those of us already involved in this area to share ex-periences and learn fromeach other.

Co-Convenors

Stuart Toole	Birmingham Polytechnic, UK.
Albert Visser	Courseware Midden, Netherlands

Please refer all enquires and suggestions to the colloquim chairperson:

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Back Issues

CASW Vol.3 No.1
Walter LaMendola from the University of Denver's Graduate School of Social Work looks at the issues and problems involved in developing software for the human services; Bryan Glastonbury (University of Southampton and CASW editor) considers the problems and pitfalls of managing the social services computer system; Paul Dolan and Elis Envall discuss the ethical dilemmas involved in protecting the privacy of clients in computer aided social work; Stuart Toole and Mike Winfield of Birmingham Polytechnic lay down their thoughts on Expert Systems and their implications for social workers; and the FidoNet communications system is introduced.

CASW Vol.3 No.2 **SOLD OUT**
Peter Marsh, Bill Ormerod and Jane Roberts from Coventry Social Services describe the Coventry Social Services Department's experience of introducing I.T. into the department; Birmingham Polytechnic's Harvey and Baggott carry out a thorough review of four Expert System Shells - Micro-Expert, Expert-Ease, ES/P Advisor and apes; Fritz Gruendger from Berlin considers the implications of computer applications in social work education and Victoria Weavers, a social worker at Warley Psychiatric Hospital asks "Can computers do social work"?

CASW Vol.3 No.3
Bryan Glastonbury asks "Why has the software boom by-passed social work?"; the CUSSnet (Computer Use in Social Services Network) electronic communication network is introduced; Dave Arber, a consultant in computer uses for people with special needs, shows how computers can be of use to the sufferers of Alzheimer's Disease; David Challis, John Chesterman and Robin Saunders provide different perspectives on the same computerised record keeping system in Kent; Alistair McNicol describes how Strathclyde Social Work Department is making use of the Themis Viewdata system; and from the US Sharon Kava and Walter LaMendola consider how modern telecommunications can help develop rural social work.

CASW Vol. 3. No.4
Sheila Clark details the use of computers in planning services for people with a mental handicap in Hampshire; David Columbi leads us through his own computer odyssey and wonders why everyone keeps urging him to buy an Amstrad; Peter Ashe describes the Lothian Social Work Department approach to developing computer systems; Hein de Graaf examines the use of computers in Dutch Social Services; Stuart Montgomery relates how Strathclyde Social Work Department have obtained extra staff resources by using special funding measures. Plus reviews of software, books and periodicals and a first look at the new *Aspect* Relational Database. This issue also contains abstracts of over 130 papers which were presented during the HUSITA International Convention held in Birmingham, United Kingdom, 1987.

Single issues £2 plus postage except No.4 which is £4 plus p. Photocopies of individual articles are available at £1 (plus postage) each.

Computer Illiteracy and Human Services

Ram A. Cnaan

The current electronic information revolution has produced several negative effects, one of which is computer illiteracy. This article discusses the causes, major victims, and consequences of computer illiteracy. The article concludes with the new challenges that this modern day social problem poses for human services

Introduction

The aim of modern technology has been to solve a variety of problems. However, technological revolutions leave in their wake social upheavals, as new technologies trigger sweeping changes in people's values, emotions, modes of communication, life styles, norms, rules, and sentiments. (McHale, 1976). Illich (1976), for example, referred to the negative effects of modern medical technology creates while solving existing problems. Perwitt (1983) referred to these negative effects as the "bittersweet" principle of technological change. Lawless (1977) cited over fifty cases in which technology has side-effects detrimental to society. He noted that the first stage in society-technology relationships is adaptation, but that it is only when negative consequences are publicised that the later stages of criticism, shock, and awareness to new problems follow.

Cnaan (1985) noted a wide range of possible negative consequences which may stem from the electronic information revolution. The most fundamental problem associated with this new technology is, undoubtedly, computer illiteracy. Some claim that computer illiteracy is an ephemeral social problem that will be solved within a few generations (Meznies, 1982; Simon, 1977), while others disagree. Nevertheless, computer literacy is the gateway to the new information age. Human services therefore have an important role to play in developing new methods to cope with the problems caused by the new technological tools and to help people adapt to the new technology.

This article focuses on computer illiteracy: its origins, potential victims, and consequences. In this article, computer illiteracy is reviewed as a social problem, one that poses a new challenge for human services which must develop new social policies to address as well as help prevent the problem.

Computer Illiteracy: Major Causes

There are many reasons why individuals cannot acquire basic computer skills. First, those who can neither read nor write obviously have not mastered the basic alphabet. This presents a major obstacle to even minimum computer literacy.

Second, in the United States, the availability of computers in schools is limited. In 1983, the median student-to-computer ratio was 125-to-1 at the high school level (The Johns Hopkins University, 1983). The average time that students actually worked on computers was 15 minutes a week. It is obvious that only the most motivated students, who are willing to work on the computer after school, will become computer literate. Moreover, many school computers are often used solely or mostly for computer-assisted learning (CAL). In such cases, students get very little experience and time for real computer literacy (Becker: 1982; Sheingold, Hawkins and Char, 1984).

Third, the student-computer ratio in schools, mentioned previously, is by no means uniform. This unequal ration, as will be later discussed, favours white, suburban, male students over minorities, inner city, rural and female students. Generally, the schools in wealthier communities not only have more computers but also buy more equipment (Quality Education Data, 1984; Zakarya, 1984). Thus there is an issue of diffusion and opportunities.

Fourth, computer languages are wrongly compared with foreign languages. Learning a computer language is not primarily a matter of linguistics but of a precise new logic that requires an adjustment in thinking methods. Once the thinking method is acquired, additional computer languages may come relatively easily. The problem however is learning the first computer language. Learners find it difficult to adjust to the rigid logical restrictions required by the computer language. For example, computer languages require detailed and exact repetitions over and over. Few deviations are tolerated. There is no body or sign language, terms cannot be defined ambiguously, and more often that not, a minor mistake can be responsible for failure to get results (Kemeny, 1983). Comparing computer science to the natural sciences is also misleading. Menosky (1984) noted that many people wrongly assume that computer programming requires a background in advanced math and even physics and chemistry.

Fifth, Sproull et al. (1984), in their study of undergraduates required to take computer courses, identified three stages of psychological adjustment to this unfamiliar new technology. First, almost all new students encountered reality shock followed by confusion. Next, the students attempted to re-establish control. Finally, successful attempts to control led to adaptation, while failure to regain control led to anger and feelings of loss. Anger possibly could lead to successful control but, "if control attempts are successful, anger or withdrawal ensues and the person is likely to become a cultural dropout" (Sproull et. al, 1984: 35).

Sixth, people who once were computer literate and had mastered one or more computer languages, either in school or on their jobs, may either move to non-

computerised jobs or be required to use a different type of computer. In the latter case, the switch, whether from a mainframe to micro, from batch to interactive, or from IBM to Digital, may be too demanding and involve logic that seemed to be totally different. As a result, those who once considered themselves computer literate become illiterate. Continual learning is essential in order to keep up with the rapid developments in computers and computer languages.

Seventh, resistance is the term mostly associated with automation in the workplace. Taylor (1981: 57) argued that "the computer always threatens to disrupt the power balance within an organization". The threat of the computer is perceived in many ways: constant monitoring, loss of autonomy, status struggle, information leaks, legal concerns, and fear of an imbalance of power (Boyd et al., 1980; Hammer and Hile, 1985). Furthermore, members of the organization may have different, even contradictory expectations concerning the computer (Craig, 1984). Whatever the reason, resistance to computer applications in the work-place is another cause for increased computer illiteracy, since those who object to computerisation are unlikely to learn new computer skills .

Eighth, resistance to computerisation is rarely due to cyberphobia (computer-related anxiety) or technophobia (anxiety related to the use of many modern tools). Frideres et al. (1983) found little evidence of technophobia in today's society. Rice (1983), on the other hand reported a few studies which specifically measured cyberphobia. One such study found that nearly one third of the people who approached terminals exhibited galvanic-skin responses at the level of anxiety. In such cases, cyberphobia could be an obstacle to computer literacy.

Ninth, Lindblom (1959), in his seminal paper on the science of "muddling through", has unintentionally predicted opposition to computerisation. As Lindblom noted, as long as we can "muddle through;" doing what we did yesterday and making minor adjustments here and there; successfully using intuition, experience, rule of thumb, experts; opinion and messages from our environment, why invest in planning and data processing? According to such thinking humans solve problems, not by wasting resources, but by incremental adjustments, therefore computerisation is opposed as contradictory to human nature and a waste of energy. When this kind of technological conservatism prevails, computer literacy is ignored.

Finally, a major cause of computer illiteracy is the lack of appropriate role models. For example, most parents cannot be models for their children as they themselves are computer illiterate. The burden is then shifted to schools. However the teachers themselves are no longer certain about what is expected of them. Prewitt (1983) argued that the shortage of high school science teachers is a major cause of increasing scientific and computer illiteracy. Lockheed and Mandinach (1986) found that most teachers who were asked to teach Basic were not well prepared. Similarly, in business and industry, the company trainers themselves are often barely computer literate. They teach what they know regardless of its specific value to the setting and students (Hall -Sheehy, 1985). Kemeny (1983) argued that most decision makers in government and industry today are computer illiterates. Thus, they do not request computerised analyses and they use computers and computerised data only as status symbols.

Computer Illiteracy: Major Victims

As mentioned previously, computer illiteracy rates vary among groups. In this section, we will review seven major groups whose computer illiteracy rates greatly exceed those of the general population. These groups should be of particular concern to human services since their computer illiteracy has important implications for the future which will be discussed later.

The groups most likely to be computer illiterate are: women, poor people, blacks, minorities (non-English speakers), elderly people, the unemployed, and rural communities. As Brown (1981) noted, "the opportunity to adopt (new technologies) is egregiously and in many cases purposely unequal; and that individual behaviour does not represent free will so much as choices within a constraint set, and that it is government and private institutions which establish and control the constraints".

Boys outnumber girls 2 to 1 in academic-based courses in computer programming (Lipkin and Martin, 1986). Sanders (1986) found that 64 percent of boys and 51 percent of girls reported computers at home. However, girls were three times as likely to say they did not use their home computer. Miura and Hess (reported by Sanders, 1986) found that boys outnumbered girls in computer camps. They also found that the boy-girl ratio favoured boys as the age increased, as the curriculum became more difficult, and as the cost of computer camps increased.

A study by Quality Education Data Inc. (1984) revealed that wealthier communities are more likely to have computers. Gilliland (1986) reported that 70 percent of the schools in affluent areas had computers for students' use but only 40 percent of the schools in low-income areas. Furthermore, low income families are seldom able to purchase computers so that their children can learn at home. Poor children therefore are less likely to be computer literate.

A large proportion of the inner-city poor are black. Current statistics indicate that 35 percent of the US black population are at poverty level. They also have higher rates of illiteracy than do whites. Thus blacks do not have equal opportunities to acquire computer skills. Lee (1986) noted that the emphasis that black communities place on relational reasoning puts blacks at a further disadvantage since computers are primarily based on analytical reasoning.

Many Hispanics and other ethnic minorities who use English as a second

language often do not have a high level of fluency. Therefore, they lack even the prerequisite for computer literacy, the language in which computer commands are given. Bilingual or foreign language software, although available, has limited usefulness.

Elderly people are usually defined as those at the age of retirement and older. In this article, old age differs for each individual and is based on past experiences, habits of new learning, and biological strength. Old people are reluctant to replace old familiar methods with computers. Giving up things that have worked for them in the past creates a sense of loss in elderly people. However, as long as modern knowledge, technology, and tools continue to develop so rapidly, old people will have little chance to keep pace. For example, old people avoid modern technology such as VCRs, microwave ovens, and automated banking machines more than any other age group.

Many people who did not become computer literate in school often find the opportunity in the workplace. However, unemployed people especially those who are chronically unemployed, are denied this opportunity. In Europe and the U.S.A., it is estimated that about 10 percent of those aged 16 to 30 are chronically unemployed. These people do not come into contact with computers and any knowledge they gained in school is rapidly outdated. They also cannot afford home computers.

The final group at high risk of computer illiteracy are those in rural areas. Every technology, with the exception of agricultural inventions, tends to spread first in cities and last in rural areas (Nora and Minc, 1980; Brown, 1982). There have been a few attempts in Europe to establish computer centers in rural areas but they have had no appreciable effect on accelerating the spread of the technology in non-urban areas. Computers, as most other technologies, still reach rural areas last and sometimes in already outdated versions. Village schools, like inner-city schools, have a high ratio of children per computer. On the average, only 15 percent of the 13-year-olds from rural and inner city schools reported use of computers. However, over 30 percent, of their counterparts in wealthier urban suburban schools used computers (Lipkin and Martin, 1986). The end result is that many rural and inner-city communities are apathetic about computer literacy (Nowotny, 1981).

It is evident from the preceding discussion that some of these groups overlap one another. Those identified with two or more of these sub-groups are at an even greater disadvantage and therefore less likely to become computer literate. These seven sub-populations have a common characteristic: their relative weakness in comparison with groups which are stronger politically, economically, educationally, and culturally. The computer illiteracy of these groups in today's technological age widens the gap even more and may help to perpetuate current social stratification.

The causes for compute illiteracy in each group may vary. Table 1 summarises the major causes for compute illiteracy in each group.

Computer Illiteracy: Major Consequences

Recognition of the possible consequences of computer illiteracy should spur society to take measures that will help increasing numbers of people to become computer literate.

The first and perhaps most alarming consequence may be unemployment. Nora and Minc (1980), in a document presented to the President of France, noted that productivity in agriculture and industry remained remarkably high, despite a decline in the number of

Table 1: Causes for Computer Illiteracy in Seven Major Subgroups Predisposed to Computer Illiteracy*

Cause	Women	Poor	Black	Foreign Minorities	Elderly People	Unemployed	Rural Areas
(Real) Illiteracy	3	2	1	1	2	2	3
Lack of Opportunities	2	1	2	1	1	1	2
Different Logic	2	2	1	1	1	2	3
Negative Experience= Withdrawal	1	2	1	1	2	2	3
Outdated Knowledge	3	3	3	3	2	2	2
Resistance to Change	2	2	2	3	1	2	1
Cyberphobia	1	2	2	2	1	3	2
Muddling Through (Culture)	1	1	1	1	1	1	2
Lack of Role Models	1	1	1	1	1	1	1

* Legend:
1 = Major cause for the relevant subgroup
2 = Somewhat important cause for the relavant subgroup
3 = Marginal cause for the relevant subgroup

employees. They proposed that the majority of new workers were hired by banks, insurance companies, social security offices, and postal services. Robinson (1980) pointed out that most of these services require employees who are computer literate. Thus , people without computer skills will be unemployed as computerised industries and services proliferate (Kemeny, 1983). Some non-computer related jobs such as printers, some auto-building positions, bookkeepers, and assembly line jobs have already become obsolete.

Second, computer illiterates may also be deprived of access to services. In more and more offices and services, people must now interact with a computer. Although most programs are user-friendly, the computer illiterate finds them frightening and too complex. As a result, the computer illiterate often requires special assistance which can be embarrassing and sometimes costly. Computer illiterates may also be shut out of major services and information networks which are linked to home computers. As Garrett and Wright (1980) noted, the domestication of computers and computer networking are two significant trends in computer-isation. The end result of these trends is a society in which many services are ordered and delivered via computers at cheaper rates. Those without the skills to use these services will be restricted to the traditional, more expensive and time-consuming, methods of service.

Third, computer literacy influences society in other ways. First, it changes modes of thinking, second, it creates new social rules, jargon, behaviour, communication, and habits. The changes in thinking are mostly cognitive and involve the development of problem-solving and debugging skills (Haigh, 1985), accuracy in definitions, and the division of complex tasks into smaller components (Kemeny, 1983). In addition, the computer will cause socio-cultural changes. Haigh (1985) and Sheingold et al. (1984) noted that computer literacy teaches children to develop task-oriented patterns of communication while working on problem solving. Burns (1985) noted that the dialectic interplay of new technology with human action provides an occasion of the re-structuring and transformation of the rule system of culture and institutional arrangement of society. People who did not experience the mental and social process required for computer literacy may feel somewhat alienated and isolated.

The fourth possible consequence of computer illiteracy has to do with learning. Advanced learning, whether in formal institutions, at home, or in libraries, will require computer literacy. Gaining access to computerised know-ledge and data bases also requires computer literacy. Just as computer literacy will become a prerequisite for advanced literacy, real literacy will be the basis for computer literacy. Any missing link in this process will prevent the next step to a higher level.

The final possible consequence of computer illiteracy concerns the political sphere. Nora and Minc (1980) claimed that the political implications of computers are more important than the economic ones because computers throw traditional power games into disorder. Concerning the consequences of computer illiteracy on the democratic system Prewitt (1983: 11) asks "What is the foundation of intelligent citizen participation in a society increasingly directed by scientific and technical processes often beyond the comprehen-sion of any save the experts". Society in the near future may be composed of many techno-peasants (computer illiterate) who will be unable to function and to understand major political and social issues and policies.

Is computer illiteracy sufficient a force to create a two-tiered society: one that offered great opportunity and reward to the few who control the information age technology but little opportunity for others? The future is unclear, for other social forces can also influence human-machine relationships. However, the social services should be prepared to confront these possible consequences and to alleviate their impact.

Computer Illiteracy: Challenges for Human Services

Computer illiteracy, is a special problem that has enormous implications for policy makers and planners in human services. Some may choose to ignore the possible consequences of computer literacy and concentrate instead on enhancing traditional practices and client services. Others may choose to fight computerisation. As historical precedent for such action was set in the early 19th century when a group of unemployed English workmen - the Luddites - destroyed the new mechanised looms in protest.

In the author's opinion, inaction and confrontation are draconian choices. Human services therefore must consider their unique role in today's technological world. Human services originally created to cope with ;the negative effects of the industrial Revolution, must now prepare to deal with the consequences of yet another revolution -- the techno-logical revolution. This revolution is causing new social problems which will require special assistance now and in the future from human services (Brouns and Kramer; 1985). Should human services fail to provide the necessary solutions, many people will needlessly suffer before new types of service delivery arise to meet their needs. The primary responsibility for computer literacy rests with education. It is important therefore to highlight those major issues which should be considered in formulating educational policy concerning the social impact of computer literacy. These issues are: 1) There should be equitable distribution of computer resources in schools with regard both to the pupil-computer ratio and to quality. 2) A definitive course curriculum should be developed. The curriculum should consider the different needs of different students from various backgrounds and encourage all of them to become computer literate. 3) Educational prog-rammes that enhance use of computers by minorities and females should be developed. 4) As more children in the near future will be computer literate, the emotional, social, and cognitive impact of computers should be studied to determine effects on literate and illiterate children. Changes are expected with regard to self-esteem, competitiveness, social interactions and other personal traits. 5) Special computer education programmes should be required for those

who fail regular computer literacy courses. 6) There should be more female and/or minority teachers and computer instructors, who can serve as role models for the underuser groups.

Since educators alone will not be able to cope with all these challenges, they will require help from the human services. While education is society's major agent for computer literacy, social services are and should be the safety net. It is the basic premise of this article that human services must shoulder new responsibilities and initiate new modes of intervention. Proactive and concerned professionals must be prepared with new programs that will compensate for computer illiteracy. The government, private foundations, and the computer industry itself all have stake in a computer-literate society so that they should be very supportive, both in principle and with finance, support of efforts by human services. A few human services are already engaged in computer literacy. For example, Schubert (1986) reported that the Big Sisters Organization has a computer literacy programme. A Philadelphia centre is being established to help poor inner-city residents to become computer-literate (Metzendorf, 1987). In this respect, teaching of computer skills has a social context that goes beyond the purview of the education sector just as teaching ADK skills to ex-mental health patients or teaching interpersonal skills in family therapy.

Human services can and should bring computers and computer literacy to disadvantaged subpopulations and neighbourhoods. Klein (1984) found that only 10 percent of the computer programmes financed by the Department of Education are geared toward computer literacy. Furthermore, only 9 percent are geared to minority students, 6 percent to rural populations, and 2 percent to females. The percentage of programmes for economically disadvantaged students is even lower. The most distressed neighbourhoods are the settings where computer literacy should be taught. It is an awesome challenge, one which should be initiated and carried out at least temporarily by the human services professionals.

The workplace is another area for intervention by human services. Personal computer training is woefully neglected by most employers (Hall-Sheehy, 1985). Thus human services should urge employers to expend greater effort on employee computer literacy as part of Employee Assistant Programmes. Such programs will contribute to the overall quality and productivity of workers.

Human services must be concerned with social policy related to potential abuse of computers. There is a need to assure people's rights regarding personal data, computer-based discrimination, and social participation. Social action groups will be needed to urge new legislation and enforcement of a more humanistic approach to computer use. Social workers will have to alert individual and society to potential problems so that computer illiterate people will not fall prey to apathy and victimisation. Human service professionals must serve as social advocates, willing to lobby on behalf of the computer illiterates.

Many adult computer illiterates will find it necessary to get organised either for mutual learning or for mutual support. Self-help groups can be useful in this respect. Although there are no such groups for computer illiterates at present, it is likely that such groups will emerge in the coming years. Human services professionals should be prepared to pave the way so that these groups might be successful. Self-help groups could provide services for computer illiterates, access to jobs which are not computer related, and ensure citizen participation by and for the computer illiterate.

Human services should take a more active role in assuring a more equitable distribution of home computers. This will require lower prices, subsidies for poor families, or even free computers. In this instance social workers should be the link between needy people with the potential for computer literacy and those who, for reasons such as tax deductions, public image, and new markets, are willing to furnish either funds or computers. The role of these professionals does not end with providing computers. Once the home computers are available, the professionals should also advise parents on the ways to give their children a head start in becoming computer literate.

Parents also need to be made aware that the computer is also for girls. Too often, it is boys who are enrolled in computer camps and courses and who are encouraged to use home computers. The human services should stress for gender equality in the use of computer resources. Parents should also be reminded that their daughters too will need computer literacy for successful careers.

Finally, human services should provide information and encourage public debates about the computer revolution and its social consequences. Public surveillance of the electronic information revolution and of its impact on society is extremely important. Public debates, projections, and forecasting may prevent unnecessary negative effects, ease the transition period, and enable people to accept modern technology without undue human and social costs.

It is hoped that human services professionals will involve themselves more creatively and passionately in this newest social problem. The problem of computer illiteracy must be met, not merely with traditional methods of problem solving, but by new methods of intervention as well. The human services must make their choice: either to be reactive, wait for events to occur, and only then compensate the new victims; or to be proactive and experiment with methods that will help prevent the potential negative consequences of computer illiteracy. □

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Forging the Missing Links

Clive Miller

References

Becker, H. (1982).
"Microcomputers in the Classroom: Dreams and Realities". (Report No. 319) Baltimore,M.D:Johns Hopkins University, Center of Social Organization of Schools.

Boyd, L., Miller, L, & Proger, R. (1980).
"Equity and Efficiency Project: First YearReport". Berkeley: University of California, School of Social Welfare.

Brauns, H.J. & Kramer, E. (1985).
"Opening Remarks". A paper presented at the International Expert Meeting on New Technologies: New Social Responsibilities and Forms of intervention, in Berlin (West).

Brown, L.A., (1981).
"Innovation Diffusion: A New Perspective". NY: Melhuen.

Burns, T. (1985).
"Technological revolution, social power and welfare". A paper presented at the International Expert Meeting on New Technologies: New Social Responsibilities and Forms of Intervention, in Berlin (West).

Cnaan, R.A. (1985).
"Post industrial technologies, their impact on society and the role of the welfare state". Eurosocial, 40, 11-12.

Craig, T.J. (1984).
"Overcoming clinicians' resistance to computers". Hospital and Community Psychiatry, 35(2), 121-122.

Frideres, J.S., Goldenberg, J., Disanto, J., & Fleising, V. (1983).
"Technophobia: Incidence and potential causal factors". Social Indicators Research, 13(3), 381-393.

Garrett, J. & Wright, G. (1980).
"Micro is beautiful". in : Forester T. (ed.), The Micro Electronic Revolution, Deford: Basil Blackwell, 488-496.

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A critical viewer of the computing scene in Local Authority Social Services Departments (SSDs) would summarise the position as one of missing links. Four main links are missing. They are:-

1. **Policy and Practice Development and Information Technology (I.T.)**

Apart from a couple of nods in the direction of Policy and Practice and Development it is unusual to find specific links between I.T. and social delivery thinking spelt out either in department-wide. I.T. Strategy documents or Client Record System Specifications. Hence I.T. systems are developed outside of the mainstream of practice thinking.

2. **Manual Systems and I.T.**

Although many manual information systems are replaced by I.T. based systems, those most closely concerned with accounting for the main resource, staff time, are not. This seriously impairs the development of resource accounting in SSDs.

3. **Linking I.T. Systems Together**

Despite the technical feasibility of linking together systems as diverse as word processing, facsimile transmission, electronic mail and client record systems this is seldom done. An inability to communicate, i.e. use the major potential of I.T., results.

4. **Management Skills and I.T**

Two skills are required by managers when faced with I.T. One is to be able to manage the development and implementation of I.T. systems. The other skill lies in making effective use of management information. Training for both is being poorly provided. This contributes to ineffective systems design and low levels of systems use by managers.

Each of these missing links is examined in greater detail below. Ways of forging the missing links are then suggested.

Policy and Practice Developments and I.T.

How far can I.T. be used to support new policy and practice developments? How far is the potential of I.T. realised in practice?

An examination of these two questions which relate to 3 diverse yet linked policy developments reveals much about the current state of I.T. in SSD's. The three issues are:

1. Community Social Work
2. Positive Action on Racism
3. Decentralisation.

Each is examined in a similar way. First some aspects of the policy are outlined. Second, the I.T. implications are examined. Third there is a commentary on how far I.T. is currently being used to support the policy.

1. Community Social Work

The Policy
Community Social Work is a good example of practice development which requires changes to take place throughout an SSD. It involves at least the following elements of practice and management (Henderson et al, 1984).

Direct Practice: working with clients' support networks, both formal and informal.

Indirect service: developing and supporting community groups.

Management: the promotion of entrepreneurial first line management.

Policy-making: participative policy-making systems also capable of

engaging staff from neighbouring agencies.

I.T. Implications

Direct Practice: the direct use of I.T. by clients e.g. Home Shopping via Viewdata, (e.g. British Telecom's PRESTEL), communication aids for profoundly handicapped persons; storing information on both clients and their support networks; giving practice advice to professionals, through for example, Child Abuse expert systems.

Indirect service: provision of information services on local resources, local authority decision-making, sources of funding, welfare benefits. An example could be the provision of public Viewdata access to L.A. procedures and committee meetings.

Management: provision of direct access and easy manipulation of information on Local Service Provision.

Policy Making: systems which show how community needs are translated into service demand, and the resource and financial implications that flow from meeting that demand.

Commentary

Although it is easy to sketch the I.T. requirements of community work it is unusual to find them spelt out in I.T. strategy documents of departments pursuing community social work policies. However, other more incremental developments have occurred. It is therefore relevant to ask how far these have gone down the road to supporting community social work?

i) Direct Practice

Clients Record Systems exist but still remain predominantly the tools of clerical staff (Cordingley et al, 1984). Also client use of technology is flourishing as an alternative culture but kept outside of mainstream thinking. This may be a key to its success. Expert Systems are in their infancy. NISW research shows they have a potential for use in Child Abuse; but getting funding for prototype work is

ii) Indirect Service

Some progress has occurred on Viewdata (a generic name for computer systems like British Telecom's PRESTEL) often initiated through Libraries rather than SSDs.

iii) Management

Although most client record systems are justified as Management Information systems they have failed to realise this objective (Cordingley, 1986). The use of decision-support software for priority and objective setting, becoming commonplace in industry, is an SSD rarity (Algie, 1986).

iv) Policy Making

Integration of information on community needs and resources, service utilisation and the resource and financial consequences of service delivery plans, although feasible, have yet to be part of mainstream SSD I.T. development.

clients. More positively it means the provision of services targeted on ethnic minorities in the same way that services are implicitly positively targeted towards non ethnic minorities.

I.T. Implications

Recruitment and Promotion: this should mean having personnel systems which monitor the ethnic background of applicants and staff, the jobs they occupy and for which they apply. These systems should also cover the training for which staff apply and the reasons for promotion/non-promotion and gaining/not gaining access to training.

Service Development: this implies having client records systems which monitor the ethnic backgrounds of clients using services, and comparing this with the ethnic composition of local populations. Also required are service monitoring systems which record the availability and use of

Although it is easy to sketch in the I.T. requirements of community social work it is unusual to find them spelt out in I.T. strategy documents

2. Positive Action on Racism

The Policy

Positive Action on Racism involves taking co-ordinated action on a number of fronts (Commission for Racial Equality, 1985) including:-

Recruitment and Promotion: this involves not only ensuring that ethnic minority applicants do not suffer direct or indirect discrimination but also positively promoting access to jobs.

Service Development: this involves screening services to ensure that they do not discriminate directly or indirectly against ethnic minority facilities such as mother tongue literature, interpreters, the provision of services acceptable to ethnic minority groups and ethnic minority consumer evaluations of services.

Commentary

It is currently difficult to find examples of computerised personnel systems in use in Social Services Departments (Cordingley et al, 1984) let alone ones oriented to the monitoring of positive action policies on racism. Training record systems are starting to appear on an ad hoc basis.

Client record systems are being introduced into SSDs. Ethnic origin of

clients is being recorded in some of these systems. Data is absent on the ethnic orientation of services let alone consumer feedback. Service monitoring is still at the level of client counts and calculation of service utilisation.

3. Decentralisation

The Policy

Decentralisation includes both of the previous developments but takes things one stage further (Miller, forthcoming).

Two examples of this are Decentralised Budgeting and Neighbourhood Forums.

Decentralised Budgets: This is the move to provide first-line managers with 'bottom line' budgets covering staffing, accommodation, equipment and cash to be managed as a whole (Flynn, forthcoming).

Neighbourhood Forums: These are joint (elected member and community) bodies charged with service planning, commenting on local budgets and monitoring local services (Islington, 1985).

I. T Implications

Decentralised Budgets: There is a need to make available financial information, in the form of management accounts, so first llne managers can quickly examine and forecast expenditure by client group, locality, and service type.

Neighbourhood Forums: These require the making of local budget and service information on all local authority departments, plus voluntary, and private services, available to Forum members for easy analysis.

Commentary

There is a glimmer of light on the decentralised budgeting front. East Sussex SSD is experimenting with the provision of unit cost information on services. Most SSDs have not extended their financial information systems much further than financial budgets. The development of management accounts is in its infancy.

Neighbourhood Forums: the picture across local authorities is uneven. Sometimes other departments are ahead of social services departments e.g. Direct Labour Organisations and Housing. Mostly all departments are still at the starting gate. The provision of integrated information on voluntary, private sector, health and social security provision is prehistoric.

Manual Systems and I.T.

I.T. and Resource Control

Resource control is a major issue in Local Government. The Audit Commission, in report after report, has pointed to a lack of information, the need to obtain it and ways of reasserting control over resources (Audit Commission et al, 1985). All this may seem a little strange to some fieldwork teams. Over the last 10 years there has been a growth in workload measurement schemes. It has been fueled by a number of developments:-

1. Task Centred Approach to Intervention with Clients:

This emphasises target setting, and the need to clearly relate actions to goals. It is linked with concerns to improve management of caseloads and the social worker's use of time (Vickery, 1977).

2. The Move from having Senior Social Workers to Team Leaders:

This emphasises the management role of first line managers. One of the primary resources they control is workers' time. Hence their interest in workload measurement (Miller and Scott, 1984).

3. Squeeze on Resources:

Last but not least, a stand-still and in some cases, a reduction in resources available to SSDs has made fighting for resources more difficult. Being able to show that resources are being put to good local use is one way of pursuing the fight (Miller, 1987).

Commentary

There is a puzzle. Most client records systems so far developed have been sold as management information systems. Many of these have been introduced in departments where teams are successfully operating workload measurement. Yet there is no link, nor moves to link the two. Without this information there is no way of accurately gauging the utilisation or cost of social work time as part of different packages of services (Miller, 1984). The management information claims of comprehensive client record systems must therefore be considered highly suspect.

Linking LT. Systems Together

Perhaps the above analysis of social services department I.T. development is unduly harsh. Departments have to start somewhere. Developments are in their infancy. All this is true. Perhaps we should not concentrate on current developments rather evaluate departmental plans.

I.T. Based Communications Strategies

I.T. is sold as a convergence of communications and computing power. I.T. system shall speak to I.T. systems. The promise of information at the touch of a button. Let's look at how departments incorporate a communications strategy in their I.T. plans.

1. Client Record Systems:

They are built to communicate information, but how easily? The number of locations departments plan to link into these systems is limited (Cordingley et al, 1984). Fieldwork teams, yes, and domiciliary care but seldom residential and day care establishments. The reason often given for omitting day and residential care establishments is that they don't have many clients or great data needs. This feeds off a passive view of residential care. It flies in the face of the development of integrated through-care planning, an example of I.T. strategy

implicitly endorsing past rather than future practice.

Fieldwork teams are most likely to be part of the communications net. Does this mean they are well enough supplied with communications equipment? The answer is no. Compare fieldwork teams with high street building society branch offices: one machine to a fieldwork team, one per front line worker in the building society. Communicating via a client record system is more like joining an information traffic jam, a long way from the promises of instant information.

2. Office Automation: this covers distributing internal mail through electronic mail; word processing and automatic distribution of reports; facsimile transmission; word processing of client record data.

None of these is revolutionary. They're all pretty run of the mill. They are seldom part of an SSD's I.T. strategy. Partly it's because they are often dealt with by separate sections of the Local Authority. Partly it is because these are viewed as clerical tasks to be dealt with by clerical workers. Integration between clerical workers, management and service delivery workers is as rare in SSDs as integration between I.T. Systems. The most terrifying thought is that office automation is much cheaper to install, easier to gain agreement over, and brings quicker returns than client record systems. Why then are client record systems pursued with so much vigour?

Management Skills and I.T.

The organisation, structure and management of SSDs seems to contribute to many of the missing links in I.T. strategy and implementation. This should come as no surprise. Most departments' computing effort is going into client record systems sold as management information systems. Major developments such as these require skilled handling. It is relevant to ask what skills are required and whether they are available. Two areas of management skills are required. Those of making effective use of management information and those of managing the development of computer systems.

Management of Computer Systems Development

A two person systems development team for a client record system is still quite a luxury within SSDs. It is often difficult for such teams to obtain sufficient seconded line management time to ensure that computer development gets adequate attention. Senior management commitment is a matter of a distant watching brief interspersed with brief flurries of activity. The budget available for training managers in computer awareness or the managerial tasks inherent in the development and implementation of computer systems is peanuts. Trade Union shop stewards often have better access to such training than managers. Organisational commitment at the level of managerial time and training seldom matches the aspirations of departmental I.T. development plans.

Using Management Information

A terminal on every manager's desk may one day come true, but will they be used? They require a re-gearing of work if they are to be used, otherwise the I.T. system will be ignored in favour of the existing manual system. It may require radical action to effect the shift. A refusal to answer paper memos and the removal of all printed car mileage claim forms is an example of how to ensure an electronic mail system will be used. Changing communication habits is only part of the change.

If managers are to make creative use of management information they will have to develop skills in using data. A prerequisite of this is an analytical approach to problem solving. Such skills are scarce. Yet they are quite easy to develop. Management development and training programmes geared to allowing managers to work on using data to crack live problems can work wonders. The only problem is that few managers are given access to such opportunities. Without them the development of analytic and planning skills is very hit and miss. Without these skills it is difficult for managers to be able to identify what is appropriate management information. The current supply of inappropriate information means, even when the opportunity for use is present, it is not grasped as using the data is not worth the effort. Hence the cycle of non-development of skills is repeated. Without those skills the terminal on the desk will not be used to its full potential.

> Integration between clerical workers is as rare in SSDs as integration between I.T. systems

Forging the Links

This analysis of missing links has necessarily skated over much of the advance made in the use of I.T. in SSDs. However it is true that there is a yawning gap between the potential of I.T. and current practice. New links must be forged. A short list should include:-

Policy Development and I.T.

1. Writing and reviewing departmental I.T. strategies so that their links with policy, practice and organisational developments can be clearly seen. This will allow users to evaluate I.T. against the department's main mission of service delivery.

2. Making the use of computer based information a basic requirement in any

policy development exercise. Much I.T. information remains of low quality because it is not subject to criticism through use. Involving policy developers to use I.T. as part of policy development puts it into the organisation's mainstream.

Manual and I.T. Based System

1. Writing and reviewing I.T. strategies in relationship to their linkage with existing and developing manual management information systems. The question to be answered is whether we are linking up the most important systems from either the policy development or the resource accounting point of view.

2. The development of workload measurement systems as a basic requirement for future resource accounting and decentralised budgeting systems. If you are using I.T. as part of the system ensure it can make use of this measurement data.

Linking I.T. Systems Together

1. Corporate alliances should be formed with other service departments to ensure an integration of office automation and computer services within the Authority as a whole. Central departments are not always renowned for their willingness to support service departments. Often they are hostile.

2. A review of I.T. priorities should consider low investment, high impact systems before high investment, low impact systems. This may lead to integrated development of electronic mail, word processing and facsimile transmission occurring ahead of the development of client record systems.

Managerial Skills and I.T.

1. Either invest properly in I.T. or stay out of it. The level of investment required can only be gauged by taking a closer look at the time required to design, implement and support the use of I.T. based systems.

2. Invest in management development and training both to improve management as well as in preparation for making effective use of I.T. Many of the skills required to manage and use I.T. systems are those required in other areas of management. I.T. training can be used as a way into management training or vice versa.

Conclusion

I.T. does have the potential to effectively support Social Services practice. To do so it must be brought in out of the cold. If it is worth investing in, the investment must match the demands to be met. Adequate staffing and a heavy investment in training are the bottom line. All this investment will, however, be wasted unless I.T. is located in the practice and managerial mainstream of SSD life. A daily Senior Management commitment is needed to ensure I.T. systems are developed or used to support practice and organisational developments. □

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References

Algie, J.
"Weighting Up Priorities,"
Haywards Heath, Community Care, 11th September 1986, No 628, pp. 18-20.

Audit Commission
Local Government Training Board, Institute of Local Government Studies
"Good Management in Local Government: Successful practice and action", Luton, Local Government Training Board, 1985.

Commission for Racial Equality
"Positive action and Equal Opportunity in Employment", London, Commission for Racial Equality, 1985.

Cordingley, E.S.
"Patterns of Computer Use in the UK", in "New Information Technology in Management and Practice", Research Highlights in Social Work 13, London, Kogan Page, 1986, pp. 25-45.

Cordingley, E.S, Clark, E.E.M, Rajan. L
"Computerisation in Social Services and Social Work Departments: A National Survey, 1984, LAMSAC, London, 1984.

Flynn, N.
"Decentralised Management in Four Social Services Departments", DHSS Decentralisation Project, London DHSS, forthcoming.

Henderson, P. Scott, A.C with Miller, C, Smale, G. and Thomas, D.
"Learning More About Community Social Work", London, National Institute for Social Work, 1984.

Islington - London Borough of:
Consultation document on Neighbourhood Forums, 1985.

Miller, C.
"Modest Aids to Participatory Planning", Paper to the Annual UK Operational Research Society Conference, London, National Institute for Social Work, 1984.

Miller, C.
"Can Expert Systems Help Support Good Practice in Cases of Child Abuse?". Overview Report of the National Institute for Social Work, February 1987.

Miller, C.
"Topping the Workload Problem, Social Services Insight, Vol 2, No. 26, 26th June 1987, pp. 16-17.

Miller,C.
"A Short Guide to the Literature Related to Decentralisation of Social Services Departments", DHSS Decentralisation Project", London, DHSS, forthcoming.

Phillips, D.
"Microcomputers as Aids to Social Work Practice", in "New Information Technology in Management and Practice", Research Highlights in Social Work - 13, London, Kogan Page, 1986, pp 123-134.

Vickery, A.
"Caseload Management: A guide for supervision of social work staff", London, National Institute for Social Work, 1977.

Computers and Electronics for the Service of Handicapped People: One Man's View

G. Busby

My first encounter with computers occurred over twenty years ago, when I was attempting to remove myself from an institutional environment into normal society. Of course, to do this, I required a source of income. Given my degree of disability, computing seemed the only profession to afford me any opportunities. Having decided on this course I went on to take a degree in computer studies, thinking that this would open all doors. Of course it did not and I quickly discovered that even with the correct qualifications, companies were not willing to take what seemed to them a risk in employing me. It seemed my outward appearance completely destroyed all of the intellectual qualifications which I had obtained.

I also discovered that Personnel Officers and Management had difficulty, in the time available, to overcome their shock at being confronted by me and be able to carry out their normal interview. The interview situation is something which disabled people have to learn to cope with. My technique, as soon as I had realised the problem, was to initiate conversation which covered all the topics which I knew they would want to be informed on. In a sense, I was interviewing myself. This seems to put people at ease much faster and I would therefore recommend it to other disabled people. Perhaps this is an indication of the state of the art in Britain then, and now, as before I even managed to get into an interview, I had to prove my ability to the outside world. This situation does not seem to have changed as I am inundated with letters from disabled people asking for assistance to find employment.

Consultancy

Returning to myself, I decided that my only remaining course was to set myself up as a consultant and attempt to obtain contracts for work which could be undertaken from home. This was when I had my first stroke of luck, in that I heard that the Ford Motor Company were looking for programmers to work remotely, and had even considered the possibility of employing disabled people. I contacted Ford and was soon undertaking major projects for them.

The British Computer Society Specialist Group for the Disabled

Having realised and proved the potential that the computer profession held for the disabled I decided to try and spread the work to other disabled people; and it was then that I became involved with the British Computer Society, which was the professional body in Britain for those working in the area of Data Processing. The British Computer Society comprises local groups and groups of special interests, and in 1975 the Specialist Group for the Disabled was set up, with myself as Founder Chairman. It caught the imagination of many high level members of the Society and soon became one of their most thriving groups.

When the Group was formed, we set ourselves six aims:

1. To further employment opportunities for disabled people.

2. To enlighten potential employers, and the general public, in the special needs, and the special abilities, of disabled people.

3. To investigate and develop ways in which computer technology can aid disabled people in education, training, and employment.

4. To assist manufacturers to increase the marketability of their products by consideration of the needs of disabled people.

5. To act as the main collector and disseminator of information in the field of computers and disabled people, so that the currently fragmented resources and efforts in this field may be brought together, and be used more efficiently .

6. To initiate and foster links with similar organisations internationally.

A seventh has since become obvious; to make disabled people themselves and those caring for them aware of the potential that the computer holds for them, and we are working hard to correct this oversight. I still find it incredible that the majority of disabled people in Britain and even more those responsible for caring and advising them are totally ignorant of the potential of computers. Hopefully, giving presentations and organising conferences, we will slowly break down this ignorance and in doing so, increase the quality of life for many disabled people.

A quick word on the aims:

I place great emphasis on the aim of collection and dissemination of information, as I am very aware that effort and resources are being used on projects which overlap. When writing this paper I tried to think of an

example of this, and did not have to look very far. On a notice board at GEC Computer Services, where I now work, there are two posters, adertising meeting the subject of the two presentations is inter-linked.

In Rayleigh I was giving a lecture on High Technology with regard to the disabled, and on the same night in Chelmsford a lady from the psychology department of St. George's hospital in London, was giving a lecture on how computers can help dyslexic people. What you may not realise however, is that Chelmsford and Rayleigh are only a few miles apart.

Much effort had been put into these two events, both of which could have merged and made one exceptionally interesting presentation, and the audience would not have had to choose between attending one or the other. This is clearly what we wish to avoid in the future.

Going back to the aim to enlighten employers and the public, this is very important and fairly obvious in its meaning. We had some success in fostering this aim, e.g. in 1985 the London Borough of Lambeth, initiated a staff recruitment scheme which was positively discriminating towards disabled people. Such was the success, they now employ 36% registered disabled, and in consequence they won an award presented to employers who demonstrate a desire to employ the disabled.

The Disabled Specialist Group

The Disabled Specialist Group has come a long way in the last twelve years and this year will be holding our Third Annual Conference, its predecessors having been very successful.

Apart from organising Conferences and Seminars, we have also initiated special twelve week courses held at a college for the disabled and paid for by the Manpower Services Commission, which is a Government agency with the brief of assisting people of all natures, not only disabled, to find employment and necessary training for that employment.

When discussing disability it first has to be defined. There are many disabled people who dislike being labelled with such terms as 'disabled', 'deformed', 'spastic' or 'cripple'. I do not want to enter into this scenario, as I believe society, in order to assist the disabled, needs to be able to identify them. I like to use the word 'disabled' because to me it best describes my condition, in that, I am disabled or unable to do most of the physical things one would normally expect to do, and the things that can be done are rarely done in the conventional way, i.e. I use my nose to work a keyboard or turn a page.

Everyone can become disabled at a particular time

Professor Heinz Wolff, of Brunel University, believes that everyone can become disabled at a particular time, that time being when they do not have the tools they require to achieve a physical objective. He gives the example of somebody with a flat tyre. They are unable to lift the car and change the wheel unless they have the enabling tool of a jack and spare wheel. He and I extend this argument to the view that the computer is a tool which enables the disabled to undertake physical tasks which without such technology could not be achieved.

The majority of queries I receive in my capacity of Chairman of the British Computer Society's Specialist Group are enquiries on the possibilities of finding work. Even now, with the vast demand for data processing personnel, it is not easy to find employers who are willing to take on disabled people.

Nationally, we have a quota system which states that any company who have more than twenty employees must include 3% of registered disabled people in their work force. This would seem to be a good system, but the legislation is such that many loopholes are available to employers, and it also places the demand on disabled people to become registered. I believe there is a moral obligation that we should adhere to, but there is a counter opinion which questions the necessity for disabled people to highlight their differences. To me this is not being realistic.

During my twelve years as Chairman I have represented Britain at an Anglo-German Conference in Munich. Apart from giving two presentations I also visited a hospital for the war wounded. I have to say that, in my opinion, the time I spent at the hospital was probably the most valuable of the whole trip. The majority of the patients had recently suffered breakages of the spine at various levels and therefore it was not particularly 'High Technology' they were interested in. Rather they wished to bombard me with questions regarding how I cope with every day life. I feel it was a pity that I could not have spent more time with these people as they obviously gained from my experience.

This whole experience increased my personal feeling, that my expertise should be available to anyone regardless of any political or religious overtones, and I hope that this is a common opinion which will make it possible for people such as myself to address problems of disability, not only nationally, but also internationally.

Returning to the question of 'High Technology and the Disabled', why is it then that industrial and economic conditions are now right for disabled people to take full advantage of all possibilities of employment? The answer is that we now live in an information economy.

Why should you and I be interested in the plight of disabled people? Firstly as innovators: it is an intellectual challenge; but a more down to earth view is that one in ten of the population is or will become disabled to some degree and it is therefore in our interest that we pursue the methods of using High Technology to the advantage of the disabled. What then are the factors that are involved in producing a society in which disabled people are more able to take an active role?

The Information Economy

The advanced civilisations of the world are moving into a post industrial age which we can characterise as an information economy. We have to learn to think of information as a valuable resource, just like any natural mineral wealth or any highly complex manufacturing facility. Information is one of the basic sources of wealth; any organisation which is rich in information will be rich indeed. The advanced nations are now distinguished not so much by their capital resources as by their knowledge resources. These resources consist of experts, scientists, designers, libraries, information centres, and new technologies including all the means of sorting, retrieving, communicating and processing information.

Exactly the same argument applies to individuals or groups of individuals as applies to whole nations. To the individual, information is power. Anyone with good information resources will fare better in the modern world than those unfortunate individuals deprived of information. It is obviously still true that money or capital is an important aid to achieving one's desires, but increasingly a knowledge of the system, how it works and how to gain maximum advantage from it becomes increasingly important. Disabled people can easily be disadvantaged by being deprived of information and their lives can be made miserable if those who are in control of the information exploit their power in an uncaring or insensitive fashion.

Information and the Disabled

Formal information about disabled people starts with the Register of Disabled Persons. There are of course countless other registers, lists, files and data bases which give information about disabled people or about matters of interest to them. For example, lists of hotels, restaurants, or even public toilets, which are readily accessible to people in wheelchairs are extremely useful to people in wheelchairs, who are much poorer if they do not possess the information contained in such lists.

The medical records relating to an individual contain very useful information which is almost invariably prepared manually and is inaccessible to the individual concerned. There are frequently errors, delays and even losses of patient records which can cause great discomfort to the individual concerned. All the information contained in the bulky handwritten files can be stored on a plastic card, the same size as a credit card but with an embedded chip. 'Smart cards' for this purpose are available in the United States at a cost of under $10 and enable the patient to carry round with him his own medical record in a form which is not easily readable by unauthorised people, which can be duplicated extremely easily, updated easily and can be held by the patient him or herself.

An even more elementary example of the use of information to give a better deal to disabled people comes from the use of simple appointment systems when dealing with doctors in the National Health Service. We must all have wasted many hours in waiting rooms on the assumption that a doctor's time is much more valuable than our time, and that we are not entitled to the information of when the doctor will actually be available to see us. In contrast, he at all times has the information on our availability because we are kept waiting until he deigns to see us.

Information about our infirmities and disabilities is so imperfect and so obviously could be improved in the new information era as we learn to value information and treat it more intelligently. But in addition, information about our physical attributes or personal qualifications are kept on numerous other lists which could be made more accessible to people who would like to have the information in order to improve our circumstances.

Information is Negentropy

It is not simply coincidence that information scientists refer to information as negative entropy or negentropy. Entropy is a rather abstract concept used to describe disorder or randomness and there is a natural law, the second law of thermodynamics, which states that in any closed system, entropy increases. In the absence of information, there tends to be chaos. Where there is good information, that information can be used to make order out of chaos. The thermodynamic analogies are that if there is friction, there will be wastage of energy and where the friction can be removed there will be less wastage of energy. Again, where there is a streamlined flow rather than a turbulent flow, there will be less waste of energy. In all these instances, the avoidance of energy wastage can be achieved by the correct use of information.

Connectivity

If information is valuable to the individual, it is even more valuable when shared with others. There is synergy which makes the collective knowledge greater than the sum of the individual parts. Groups of individuals should be encouraged to pool their information by comparing notes, and this means the establishment of an efficient information network. A simple matching operation of the requirements on the one hand and the available resources on the other can be an extremely productive use of information sharing. Disabled people are one of the groups who stand to gain most from participating in information sharing of this form.

Remote Working

With the increased efficiency of Telecommunication it is becoming increasingly possible to work remotely from the work place. This has problems and I would like to scan a few of them.

Firstly, the concept. The term 'remote working' is used to describe an individual working in a location other than a normal head or branch office of an employing organisation. Although three levels of location can be considered, an individual may well operate in a mixture of these.

The three levels are:

1. working primarily from home, either spending most of the time in the home, or using the home as the base from which to operate.

2. working primarily in a Neighbourhood Work Centre, shared between a number of people doing different jobs for different markets.

3. working primarily from a satellite work centre in which everyone is working for the same employer whose main operating base is some distance away.

These are the three main employment arrangements which are currently used for remote workers.

1. employment on a regular basis by an employing organisation.

2. acting as a freelancer either individually or through some agency.

3. running their own business providing some service or product to a market.

Although telecommunications increase the scope and range of opportunities to work from home, working from home does not necessarily require expensive linking arrangements. At present there are three levels of linkage:

1. a permanent leased line. This is potentially the most costly arrangement and only justified for a few specialist tasks.

2. dial-up, ranging from telephone, telex or viewdata links to dial-up terminal access to some host system.

3. no telecommunication links, with all communication undertaken by person or by post.

Working from home is not the same as working from the office and a number of issues need to be addressed for a remote unit to be successful. Not everyone is suited to home working. Because the home worker is not observed by colleagues or supervisors there needs to be a higher level of self-motivation. Normally in an office when something goes wrong, there are others around who can sort it out. This is not the case with a remote worker who needs to be far more self-sufficient in coping with and resolving problems as they arise.

In the office end of a remote working unit there needs to be a clearer understanding of who does what than if everyone is in the same office, because job issues that arise or procedural uncertainties cannot be resolved by casual conversation. This understanding should be reflected in the job specification and operating procedures. Reporting arrangements are also affected as the relationship between the remote worker and the manager is inevitably different from that which exists if they are on the same site.

Remote working raises a number of questions about productivity and work scheduling. There is every indication that a remote unit can be very productive, more so than a person undertaking a comparable task in the office. Some of this productivity is achieved by the remote worker being able to choose when to work. A strong link with the office activity however can constrain this freedom either because of the need to contact colleagues working to office hours or through some disruption of the linking arrangements.

Work sharing also becomes more difficult. In a busy office someone who has a slack period can often help out colleagues, and heavy loads can be spread around. Such work sharing is much more difficult for the remote worker. Working from home affects, and is affected by, the daily routine of the household. Different individuals will cope their own ways with these circumstances. A homeworker needs to be more disciplined, and the family needs to understand this and be tolerant. Members of the family need to be included when planning to set up a remote unit, and allowance should be made for the impact of family pressures.

Concluding Thoughts

Returning to the overall subject of computer technology and disabled people, I believe we haven't touched the surface of robotics and voice recognition in connection with disability. Feeding andfetching are just two of the functions which spring to mind. I also find the notion of recording books on disks an exciting one, as to my knowledge nobody has yet produced a page turner which actually works. The idea of being able to read and refer backwards and forwards with complete ease is something that disabled people have always longed for and we can now give it to them. I am sure there are many more applications but without the necessary finance they will never come to fruition.

Clearly the finance has to come from Government, Unions, and Industry, which are not co-operating in attempting to meet the statutory requirement. Equally, the legislation has to be made with the unfortunate knowledge that the majority of companies are going to try and avoid the law.

I have painted a rather bleak picture of Britain, through some help is available for buying equipment, or modifications to premises. However, the maximum help available for an individual is £6,000, and this has an inbuilt chicken and egg situation, in that this finance is not available until you have got a job or position, and that job is unlikely to occur until the equipment is available, and the disabled person can demonstrate his or her abilities to the full.

I therefore suggest that we, in common with many other countries, have a long way to go in providing what I would deem to be services inherent in any society which purports to be civilised. Each of us are only on this earth once, and the quality of each life should not be governed by its cost to society. □

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Psychological Assessment in Severe Physical Disabiilty

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Introduction

The advent of the microcomputer, portable, relatively easy to use, widely available and of course, inexpensive has had major implications for the quality of life of people with severe physical disabilities. These machines have found application in many spheres of daily life such as environmental control, recreation, education and perhaps most importantly communication. Furthermore, because microcomputers are now widely used in all sorts of work and home situations, being "high tech" and using a computer carries with it a certain cachet in contrast to the stigma which some people feel from using other aids. These developments have come about because of the ease with which even very severely disabled people can be enabled to use a computer.

The ease with which communication between the severely disabled person and the microcomputer can be facilitated has made it possible to carry out formal cognitive psychological assessment on a section of the population for whom it was previously very difficult or impossible. Conventional psychological tests have, with few exceptions, been developed for use with able-bodied clients. The tests require the person being tested to be able to see and/or hear, to be able to respond by the use of speech and/or the use of a writing implement, or the manipulation of objects such as small blocks: and often responses are required at speed. Such requirements can make the objective assessment of the severely physically disabled adult almost impossible with the conventional tests. It is essential that in psychological assessment the examiner should be unequivocally certain that he/she correctly understands the answers given. Imagine the problems of assessing an individual who, for example, is unable to write and is severely dysphasic.

The use of the microcomputer has particular advantages for use in assessment of people with severe disabilities; there are also advantages for their use as a medium for assessment in a more general context and some disadvantages too. Some will be described at the appropriate points. Full reviews of the advantages and disadvantages of computer-based testing can be found in articles such as Thompson & Wilson (1982), Sampson (1983), Bartram and Bayliss (1984) and French (1986).

An important question is that of the purpose of the application of psychological (specifically cognitive, neuropsychological) assessment to such a population. The answer is to identify both abilities and deficits. Difficulties in communication and indeed living in the protected world of an institution can mask unsuspected abilities as exemplified by Anne McDonald (Crossley & McDonald, 1982). Deficits, such as memory impairments and perceptual disorders can similarly be concealed. Information about abilities and deficits is important for all concerned in setting appropriate goals in rehabilitation.

Development of the computer-based assessment system

The work being described took place at the Royal Hospital & Home for Incurables in Putney, London. This is a residential home for 300 adults with physical disabilities arising predominantly from disease or injury of the central nervous system. According to a survey of the hospital population in 1985, 38% of the residents had multiple sclerosis, 18% cerebrovascular disease, 13% had suffered trauma of the central nervous system (predominantly head injury), 8% cerebal palsy, 3% Parkinson's disease and 12% other diseases of the central nervous system, 5% suffered arthritic disease and the remaining 3% suffered other diseases not involving the central nervous system. The project started at the end of 1980.

The basic system which we started with consisted of an Apple II microcomputer with a disc drive, monochrome monitor and printer, which was later upgraded to a double drive and colour monitor. In early 1985 we switched to using the British Broadcasting Corporation (BBC) microcomputer because of its greater facility for use of sound, colour and graphics. The early developments of the project are described in Wilson, Thompson & Wylie (1982). Geoffrey Wylie, who is electronic engineer and programmer to the project, is responsible for most of the hardware developed specially for the project.

In order to enable our clients to respond to test material we have developed a variety of interfaces and switches. Some are operated by light pressure or touch alone. For individuals who do not have adequately controlled limb or head movement, but do have control of their tongue, the linguo-buccal switch developed by oral surgeon, Colin Parker (Parker, 1981) is a possible alternative. A number of residents have visual impairments. To help cope with these the development of an aural presentation was felt necessary. Although it is possible to read test material aloud, this can be subject to the examiner either consciously or unconsciously cueing the client, or if the test is long and the client needs frequent repetition of questions, vocal strain can ensue! To help combat these problems a voice-over system was developed for use with multiple choice tests. Instructions and questions with their choice of answers are all recorded on audio cassette; a single switch is needed for response. All the client has to do is operate that switch to signify that an instruction has been understood or to select and answer when it is heard. If the switch is not operated then the computer instructs the tape deck to wind the tape back to the beginning of the instruction or question and it will be repeated (as many times as necessary). A full description of this

system is given in Wylie, Wilson & Wedgwood (1984).

At the time of the development of the voice-over system, we considered the option of using synthetic speech; however at that time the cost of synthetic speech of acceptable quality was too expensive. This situation has now changed and recently we have produced a test of immediate memory using synthetic speech from an off-the-shelf ROM with a vocabulary of numbers.

Application of the System

To carry out an assessment using the system is a simple process. Having explained the purpose of the assessment and ensured that the client can operate the response medium satisfactorily, the instructions are shown and usually they are read aloud to the client as well. The client then does the test with the psychologist in attendance, observing and encouraging when necessary. Whenever possible test software is designed to be operable (in terms of response collection) through a single switch. This allows the test to be used by as wide a number of people as is possible.

No matter how severe the disability, if the client is willing we can produce a switch that they can operate. For example, multiple choice tests can be applied through a single switch by using a cursor to move around the possible answers given.

The test software not only presents the tests but also scores them as well. In the early stages of development of the system, the emphasis was on the production of automated forms of standard tests. The rationale for this is that having established the equivalence of the automated and standard forms, then the normative data already gathered for the standard form can be used in the interpretation off results from the automated form. As the collection of normative data is expensive both in terms of time and resources, the advantages of this strategy are obvious.

However, for the psychological functions that we wish to test, not all existing tests are appropriate for automation e.g. those which require the client to draw; some that are automatable are not suitable for use with a physically disabled client population. For example, tasks that require performance at speed may confound cognitive and motor problems. The incidence of visual impairments necessitates that particular attention be paid to clarity of presentation of material and the use of graphic material can be limited by the resolution of the monitor screen.

In their recommendations for the design of software for computer-based assessment, Bartram, Beaumont, Cornford, Dann and Wilson (1986) suggest a resolution of 256 x 56 for simple graphics which require only vertical and horizontal lines, a minimum of 512 x 512 for well-defined oblique lines and for fine detail and curved lines a minimum resolution of 1024 x 1024. Such limitations have enhanced the desirability of the design and development of new tests specifically for administration by computer, but these of course require much work in terms of validation and, if possible, normative data collection.

The computer-based assessment battery we have developed includes tests of verbal intelligence, memory, conceptual shift, attention, visuo-spacial orientation, visuaspacial organisation and visual neglect. We also have a personality measure.

The battery is supplemented by conventional tests where either the test material is in a form that is easily usable with disabled people, such as a two-choice situation where choice can be indicated by eye-pointing, or where the material is not amenable to automated presentation and no validated automated alternative is available.

One of the most important considerations in assessing people with severe physical disability, whether using computer-based or standard techniques, is the positioning of the person being tested. Good positioning can facilitate responses, and in the extreme cases can make the difference between being able to assess or not. Help and advice from physiotherapist colleagues can be very useful in this context.

Alternative Response Media

When work was established on developing the system, an important part of the work was the development of the devices which permitted the disabled clients to communicate their responses to the machine. At this time there were no commercially available alternatives. Now, for the BBC computer, a range of devices exists such as the expanded QWERTY keyboard, made by Possum Controls Ltd, a scanning control made by the same company, which operates from a single switch, or the "Concept Keyboard", developed by Star Microterminals Ltd. Devices such as the Possum expanded keyboard, can be used as direct substitutes for the computer's own keyboard, which gives the disabled user access to a lot of software. The main disadvantage, apart from perhaps cost, of using commercially produced devices in testing systems, is that if the client population is heterogeneous in terms of disability, then a range of devices will have to be acquired and it may be found that the means of interface between computer and devices is not consistent. This would entail having appropriate procedures in the software to allow its operation through each interface.

In Conclusion

The development of this system to assist the psychological assessment of people with very severe physical disabilities has been very useful. Firstly, it enables the objective assessment of people for whom it was extremely difficult if not impossible before. The information gathered is of value to all concerned in the rehabilitation process including, of course, the clients themselves. The experience gained from the development of this system can be further applied to the development of software with therapeutic applications particularly

appropriate for people with very severe physical disabilities. There is also a need for expanding the test material that is available for the assessment of individuals with combined severe physical and mental disability.

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References

Bartram D., Baylis, R. (1984) "Automated Testing: Past Present and Future". J. Occupational Psychology, 57: 221-237

Bartram D. Beaumont J.G., Cornfold T., Dann P.L. Wilson S.L (1986) "Recommendations for the design of software for computer based assessment (CBA)". Scientific Affairs Board of the British Psychological Society.

Crossley R., McDonald A. (1982) "Annie's Coming Out". Harmondsworth: Pelican Books.

French C.C. (1986) "Microcomputers and Psychometric Assessment". British J. Guidance & Counselling, 14(1): 33-45.

Parker C.B. (1981) "A Linguo-Buccal Aid to Control an Electric Wheelchair". British Dental J., 151: 263-264.

Pope P.M., Booth E., Gosling G. (1987) "The development of Alternative Seating and Mobility Systems". Physiotherapy Practice (in press).

Sampson J.P. (1983) "Computer-assisted Testing and Assessment: Current Status and Implications for the Future". Measurement & Evaluation in Guidance, 15: 293-299

Thompson J.A., Wilson S.L (1982) "Automated Psychological Testing" Int.J. Man-Machine Studies, 17: 279-290

Wilson S.L., Thompson J.A, Wylie G. (1982) "Automated Psychological testing for the Severely Physically Handicapped" Int. J. Man-Machine studies. 17: 291-296

Wylie G.A., Wilson S.L., Woodward J. (1984) "The Use of microcomputers for the Psychological Assessment of Physically Disabled Adults". J. Med. Engineering & Technology, 8: 224-229.

SOSCIS 'Three Years On'

Malcolm Douglas

Introduction

Within the field of personal Social Services, the quest for access to accurate, meaningful information goes on unabated. Information is needed to facilitate both the efficient day-to-day running of the department and to allow for effective forward planning. Departments are realising that no longer can they place reliance on what, in many cases, can only be described as archaic manual control systems because the data duplication and inconsistencies inherent in such systems are all too evident. Without access to up-to-date information, no department, however well structured, can surely hope to function efficiently.

Coupled with this quest for information, there has, over the past decade, been a growing awareness that technology has a role to play in satisfying this need, and as such release valuable human resources into more meaningful areas. This trend continues, with many departments now actively using computers to satisfy specific business needs, but because of the high cost of 'in-house' development and protracted timescales, progress has tended to be somewhat fragmented, with no overall strategy being followed. Many departments still have not answered the question 'where do we want to be in five/ten years time'.

This situation is increasingly leading many departments to look beyond their DP Departments for a way forward, a solution that will give them a framework for growth in both a timely and cost effective manner.

ICL, with its SOSCIS 'family of products', its complimentary software offerings and extensive range of hardware, provides such a solution.

Soscis: Modular Version

Although we have successfully installed the original SOSCIS product in some twelve sites throughout the UK, it has become increasingly evident to us that whilst many departments readily acknowledged that this was indeed the way forward, they have been unable to

justify proceeding because of both the high initial cost of ownership and the manpower resource required to effect implementation. Taking cognizance of such feedback from the marketplace we have taken the decision to break down the offering into three constituent parts, namely:

- Basic Client Index
- Domiciliary Care Module
- Residential Care Module

Thus the user can now take the Basic Client Index, implement this throughout the department and then grow it, should that be a departmental requirement, into a fully fledged Client Information System, in one of two ways: i.e. add either/both of the other modules, or develop additional facilities 'in-house', specific to the department's needs

This represents a cost effective, flexible and manageable way forward.

Basic Client Index: - this provides an entry level system, a 'core' around which a department's evolving needs can be met. The facilities that it provides cover the areas of operation that experience has shown match most departments' needs in this area. The level of detail stored against the individual client is at the discretion of the individual end-user, but here again experience has shown little variance in requirements between departments.

- ability to process referrals and create both client and household records
- client search facilities, ie by precise address
- facilities to monitor overall resource situation
- case reviews, ie medical reviews of children in care, boarding out reviews, reviews of specific service provisions
- service history records
- maintenance of statutory registers
- case load analysis
- ability to store free-form text messaging facilities
- integration with word processing
- integrating with business graphics

Domiciliary Care Module - this facilitates the collection and storage of data on clients currently in receipt of a service, or who have been in the past or are on the waiting list. The level of detail held is determined by the end-user, the software being customised to reflect the individuals's needs. Indeed it is in this area of assessment that departmental requirements vary consider-ably, some departments wishing to hold all the assessment information against which a decision has been made ie. dwelling details, general health of the client, etc, etc, and others merely wishing to record the fact that a service has been refused, granted, or client placed on the waiting list.

It is the decision of the individual department to determine its requirements in this area and ensure that they are not storing redundant data - a situation that experience has shown is only too easy to fall into.

Areas covered by the module include

- Day Care Centres
- Provision of Home Care
- Provision of Meals on Wheels
- Provision of Aids/Adaptations
- Childminders
- Playgroups

Residential Care Module - this covers all client groups, from children through to the elderly, in essence:

- Children and Young Persons
- Residential Placements for the Mentally Ill
- Residential Placements for the Mentally Handicapped
- Residential Placements for the Physically Handicapped
- Part III Accommodation for the Elderly

All movements of clients into/out of residential care are logged and held within the system, thus facilitating enquiry procedures whereby vacancies can be readily identified. A register of all Foster parents used by an authority can be set up and maintained, thus again providing enquiry facilities whereby vacancies can be identified.

The logging of all child care placements facilitates the production of the onerous DHSS SSDA904 Child Care Episode Return.

As with the Domiciliary Care Module this facilitates the storage of assessment information, if that is a departmental requirement and again the level of detail is determined by the end-user.

Adhoc Enquires

In addition the three elements outlined of our current offering, great emphasis is also placed on the use of both *QUERYMASTER* and *REPORT-MASTER* by management at all levels within departments, to enable full exploitation of their data: the former to facilitate the answering of ad hoc enquiries through terminal networks, the latter to formulate additional reports over and above those provided as standard by ourselves. It is only through the use of such tools that full benefit to the end-user will accrue, since it is impossible to determine 'today' what 'tomorrow's' information requirements are likely to be. In addition and through the use of our 4GL *'APPLICATION MASTER'* package, or indeed through the writing of additional Cobol programs, the user can design new enquiry screens for presentation of information in a way specific to his/her needs.

Whilst accepting that no package will ever satisfy an individuals end-user's requirements 100%, the high degree of customisation inherent within the software, coupled with the use of tools such as *QUERYMASTER/REPORT-MASTER* and *APPLICATION MASTER*, ensures a very high degree of flexibility. This fact is reflected in the diverse range of data items being held in our current users databases, and the way that it is presented as meaningful information both through the terminals and by way of printed reports.

The Future

With regard to the future, a department having committed itself to the use of technology can readily add value to this investment, by the implementation of,

over a period of time, other software products pertinent to its business needs, ie.

- text retrieval, accessing resource registers, procedures manuals, etc.
- electronic mail, to overcome the communication problems inherent in such a decentralised operation
- diary management systems
- statistical analysis packages, facilitating aggregation of raw data.
- business graphics

Indeed it is in this latter area that much work is currently going on to facilitate the full integration of our graphics offering with the SOCSIS 'family of products' - allowing raw data to be extracted form the databases, ported down onto intelligent micros and output in graphical form, ie. histograms, bar-charts, line graphs, etc.

A growth area indeed, and another example of how an end-user can add value to his/her initial investment by utilisation of the terminal network to address evolving business needs, is that whilst using the same terminal, the user can access the client database, send memos via electronic mail, check the availability of colleagues for meetings via diary software, retrieve text relating to departmental procedures and produce graphic output for management/ committee reports.

All this is possible if time is taken to plan and develop an overall IT strategy for the department. Failure to do so will soon become self-evident, with fragmented development, the proliferation throughout the department of incompatible terminal equipment and the need for different terminal equipment to access the various business solutions, whether packages or corporate systems. This is a solution that no department can surely afford to countenance. □

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Influences on the Development of Computerised Information and Knowledge Systems: An International Case Study

F.H. Bolitho & N.J. Smith

Similar technological innovations in the field of information processing have developed in different countries within comparable time spans. The application of the technology to information processing tasks in the human services has, however, been more country and setting specific. That is, applications have been influenced by particular and specific contexts.

Using the UK, USA and Australia as cases, this paper will show the effect of legislative and administrative contexts on the development of information systems in human services. The USA was heavily influenced by legislation which emphasised the need for programme and agency accountability. In the UK, the effect of administrative reorganisation of local authorities and social services departments played an important part in determining its kinds and types of human service information systems. But in the case of Australia, whose organisational and legislative context is a mixture of both USA and UK elements, information system development has been affected principally by software engineering accompanying the emergence of the micro. It has missed the major influences of large mainframe systems on information system building in the human services.

It will then be argued that as a result of changes in the purposes information will be required to serve, coupled with conceptual developments in the field of knowledge engineering, more inter-country commonalities will start to emerge. Having achieved the ability to group and order data to meet organisational needs, attention is now being given to manipulating information in order to emulate professional judgement contexts.

To this end, conceptual frameworks currently being used in AI are increasingly being used. Both the rationality behind work on professional judgements and the cognitive science approach of AI transcend country specific contexts. The evolution of the use of computers for data analysis, information systems and integrated tasks have just been preparatory stages to one in which information will be used to widen and extend our conceptual understanding of a range of phenomena in the field of human services and their provisions.

Background

The arrival of the computer and subsequent development of information technology is now a world wide phenomenon. Born out of a threat to national security on both sides of the Atlantic but sired over the centuries by human curiosity and inventiveness thecomputer has revolutionised our ways of dealing with information and data complexity.

There is no doubt that the world wide spread of computers was accelerated by their revolutionary power and the growing demand for information and information dissemination. Their spread was also helped by the presence of international organisations seeking to extend their commercial empires in what was yet another opportunity for sales.

Despite the development of some national companies, internationality of standards is evident, e.g. operating systems, programming languages, command conventions, etc. There is

also the availability of software applications which, apart from certain monetary symbols and dates are compatible between different countries.

The power of computers is manifest in their ability as flexible general purpose information processors. That is, their ability to adapt to different needs and tasks. This can be seen in the human services not only between different users and organisations but between countries. However, despite hardware, software and expertise compatibility, different applications and uses of the computer have developed according to specific organisational and contextual settings. It is useful therefore at this time to consider the early experiences regarding these differences in terms of the USA, UK and Australia all of which have some common human service connections and yet at the same time marked differences.

Historically large commercial organisations, and national and federal governments, were the first users of computers. They were primarily used for tasks which had a highly routinised content. According to one author, Lamb (1973, p. 166) the principal factor in the decision to initially introduce computers was the shortage of staff to undertake this type of routine work. In the USA and UK the 1960's was accompanied by a rapid growth in welfare provision which increased routine administrative and clerical tasks.

Because computers in the commercial field had been directed predominantly towards financial and accounting needs, computing technology and expertise was easily transferred to similar tasks in the human services. Thus we saw the installation of computer systems to deal with such tasks as national insurance contribution records and family allowances in the UK (Brown 1975, p. 83) and AFDC cheque preparation and food stamp administration as well as the processing of medical claims in the USA.

Whilst the administrative side of human service organisations started to utilise the computer it does not however seem to have played a direct part in social policy development (Lamb 1973 p. 134; Weiner 1982 p. 303). Rather it had a more incidental and less discernible role. For example, the production of the Family Expenditure Surveys in the UK was only feasible, in the time scale required, using the computer.

Computers also influenced State, regional and local community level of operation. In the USA this was State specific like the handling of public welfare provisions. In the UK it was those services which had developed on a regular basis like parts of the National Health Service. By contrast Australia, which has always had proportionately fewer welfare provisions than either the USA or UK, but whose pattern of provision is a blend of both, has only latterly begun to share a similar computer utilisation model.

It was estimated in 1974 that Australia was about five years behind the USA (Thacker 1974) in computer utilisation. This time period has, however, narrowed and there are indications that Australia may have missed some of the problems experienced by the UK and USA associated with large computers in welfare settings. This may be because of its particular organisational pattern and its more cautious approach to the technology. There is some evidence to suggest that experiences of others, coupled with the time lag in technological diffusion and a cautious approach, have enabled a number of Australia's welfare organisations to consider the latest micro computer technological developments before the decision to computerise, because they had not previously committed to mainframe technology themselves (VCOSS 1982).

The period from the 1960s until the early 1970s was marked by a general increase in computer applications. This was accompanied by a basic change in the form of data input and information output, as well as alterations in the organisational management of information. The next important changes occurred at a different level of welfare activity and as the result of legislative and organisational, rather than technological forces. There is no doubt however, that the experience of implementing technology in social welfare activity up to this time influenced expectations surrounding the way these legislative and organisational changes should, and did, take place.

For both the USA and UK the administrative and emphasis of service provision by state, county and local municipality was changed over this time period. In the UK the changes related to the 'personal social services'. In the USA the changes applied to a similar range included under the title of 'social' or 'human' services. In Australia the major emphasis on welfare provisions did not occur until the mid-70s and the Whitlam era.

We will now examine the changes for each country.

Early Developments in the UK

In England and Wales, during 1970-71 local social services, which had developed piecemeal over the years, were organised into large scale Social Services Departments, in of each local government area. The social needs covered included those generated by adults who where aged, mentally ill, chronically sick and disabled, homeless and children in need of care. This rationalisation quickly highlighted the necessity for new organisational and managerial systems. But managerial and organisational changes had to be contained within the existing administrative pattern of each local authority. This resulted in different administrative and managerial styles and forms of social service provision throughout the country.

Up to this point local government authorities had been following the central government pattern of computer usage. That is, adopting it for general financial and administrative purposes. But local authorities were more at liberty than central government to experiment with areas of applications and types of equipment. As a result, some authorities began to

examine the possibility of creating common record keeping systems for use by all of their departments. In other authorities individual departments concentrated on their specific needs.

In order for local authorities to create common computerised record systems, personnel from the Social Services Departments, mainly research officers and systems analysts, became active in exploring computer applications in Social Service Departments using a newly formed Social Services Research Group (SSRG) and the Bulletin of British Urban and Regional Systems Association (BURISA) as platforms for their interests. Thus the impetus for computerisation came not from social and other human service workers but from groups with different information, interests and needs.

The principal aim of the move to computerised record keeping was to explore the possibility of creating an efficient social services client record system serving the total organisational needs of any given local authority. These record systems were for '...assist(ing) staff at all levels, ranging from caseload management by individual social workers and their seniors to statistics required by headquarter staff for planning, for committee reports, and for government annual returns' (Du Feu 1982, p.17)

However, before the use of the computer in other areas of Social Services Department activities could be considered local authorities found themselves in the process of yet another re-organisation. This re-organisation was the consequence of geographical boundary reallocation bringing local government in line with social and population changes, and also in order to produce more effective administrative units. One immediate consequence of this change was the need for new local authority departmental and management structures. This need was given increasing impetus by the then current interest within local government circles in the idea of corporate management. This form of management was to include control of the authority's computer system, since computers were seen increasingly as 'corporate systems' belonging to and used by the whole of the local authority and not the prerogative of any single department.

Attempts were also made by local authorities to devise new, and appropriate, record and information systems. This move naturally included the involvement of Social Services Departments, who by this time were facing increasing requests for their services as a result of increased demand and an extension of their legislative responsibilities. For example, the Chronically Sick and Disabled Persons Act in 1970 laid more responsibility on Social Services Departments. In addition to their own growing information needs Social Services Departments had also to fit in with the demand for information from their respective local authorities.

This domination of the information needs of corporate management of local authorities is understandable because of the geographical, administrative and managerial re-organisations which had taken place, resulting in new departments and types of management structures.

Like central government, local authorities were also having to adjust to the general impact of computerisation on their approach to information management (Lamb 1973 p.84). Attention was given to the ways of utilising computer methods in the social service area as the result of specific organisational needs at the upper levels of management, rather than from an interest by human service providers.

Early Developments in the USA

In the USA the move towards use of computers in the human and social services, as in the UK, was influenced by a variety of factors.

Organisationally the social welfare sector in the USA consists of many large and small autonomous bodies providing a wide range of services, directed at specific needs through financial grants from State and Federal government or on a fee for services basis. Additionally, some services are provided directly through Federal and State governmental bodies such as Veteran Affairs and Public Assistance.

Following the enlargement of US welfare services in the 1990's the next decade witnessed a more austere approach through a series of Federal financial and organisational strategies. First, there were amendments to the existing Social Security legislation requiring service providers to undertake more rigorous enquiries into applicants' eligibility for services. In 1974 enactment of Title XX of the same legislation took place. Under this legislation States could provide personal social services within the Authority of the Act and qualify for financial assistance from Federal Government (Hoshino 1981). To be eligible for Title XX provision, services had to demonstrably meet certain requirements. These included the provision of adequate accounting procedures, evidence of planning, and an indication of how needs would be assessed and services evaluated. These latter two

Attention was given to the ways of utilising computer methods in the social service area as the result of specific organisational needs at the upper levels of management, rather than from an interest by human service providers.

requirements, coupled with the need for greater scrutiny of applications for service, were to take on a major significance as they constituted the need for service providers to demonstrate prescribed levels of accountability. States were also required to establish a basic data record for each client, to include documentation of service eligibility and type of services(s) provided.

Secondly, the enactment of the national Health Planning and Resource Development Act of 1974 enabled regional health systems in the USA to plan services for health, to include mental health, alcoholism and other services, and to fund them from Federal sources. This legislation required data collection as a basis for services provision, thus reinforcing the trend towards greater service accountability.

As a result of these legislative mandates requiring an increased emphasis on accountability, a need emerged for the construction of highly specialised computerised information systems.

Prior to the 1970's the US Federal government had given support to an experimental scheme for examining ways of collecting client data, establishing measurable service goals and reviewing program progress. It also supported research into the design of a 'Social Service Information System', which was to be built around quantitative measures of social service effectiveness. As a result, there emerged the Goal Orientated Social Services System (GOSS) which, although used by a number of States, was never universally adopted (Booz Allen 1972).

Within the early literature there are few reported cases of specific active computer systems dealing with the delivery of social services to meet the conditions just outlined (Young 1978). In a review of the literature on the use of computers in social work from 1970 to 1976 Boyd, Hylton and Price (1978) identified 31 papers of which 15 discussed particular information systems. As with the UK these systems were involved predominantly on tasks with a high routinisation content; instances of computer applications being used to aid policy making were rare.

About the same time in a wider context Bowers and Bowers (1977) made the distinction between 'social services information systems' which support the delivery of services such as foster care, and counselling and 'referral systems' which were established for linking the individual to community resources and are similar to the service provided by Citizens Advice Bureau.

Despite the lack of reported applications at that time, preparatory conceptual work was underway which was to provide a framework for subsequent computer applications to emerge. This conceptual work focussed on the identification and delineation of the kinds and types of the data needed to form the basis of computer applications. In particular, attention was given to the creation of a useful problem and service taxonomy, a subject which formed the substance of a number of papers (Seaberg 1965; Elkin 1967; Reid 1974; Donahue et. al 1978).

Subsequently there emerged ideas for different computerised applications to fulfill specific requirements under 'social service information' and 'referral' systems (Schoech 1982 pp. 42-59). These applications included the ability to quantify units of service, such as the number of foster placements or referral sessions given, and programs which could show the results of services provided in order to analyse what was successful and why. In addition there were programs to integrate the different applications.

Developments in Australia

Australia, with a land mass in excess of that of the British Isles and all of Europe, has a population of only 15 million, which is predominantly spread around its eastern coast line. Although federated since 1901 its States have, and like to maintain, considerable autonomy. Its range of welfare provisions, although much smaller than either the UK or USA, is based on the UK model, with a free market form. Hence, there exist a large number of small self-maintained organisations, as well as some State and Federal services.

Computerisation and the development of information systems are a recent occurrence in Australian human and social services, although they have been present in some Federal agencies since the early 60s. For example, in Victoria the Community Services of Victoria (CSV) did not computerise client records until the early eighties.

It is since the arrival of the micro that some small organisations have been considering the potential of computers. In line with a tradition of relying on ideas from overseas the tendency in Australia has been to travel to the UK and USA to examine developments there before embarking on innovation. This has been reflected in their desire to 'find, out first' by looking at others experiences as well as attending seminars and demonstrations.

Within some Australian organisations the idea of specialist subgroups, like social workers, having their own micro network linked to a mainframe computer is becoming a reality. Examples of this can be seen in CSV and hospitals in Victoria and Western Australia.

There is some evidence to suggest that Australian social workers and other human service workers were more directly involved and concerned about the introduction of computers in the provision of social services in their organisation than were their UK and USA counterparts. This is thought to be for several reasons. Firstly, because of the general availability of powerful, easy to use, low cost microcomputers. Second, because of the existence of friendly, powerful and appropriate fourth generation application development languages. And, finally, the introduction of computer education in some professional human service courses.

Coupled with these factors there is a notably positive attitude on the part of

human service practitioners towards the technology in their work sphere which may be partly accounted for by reason of the structure of their organisations. A majority of these organisations are small independent units reliant on public appeals and donations for their operation. It is in the area of fund raising that computerised information systems were initially used. The use of these systems enabled the collection, recording and tracking of donations and potential donors. Hence, all employees were affected by the need and use of computers in maintaining the viability of their own organisation. From this experience interest spread to using the technology for other uses in service tracking and delivery systems.

Issues Arising from Computerisation

Alongside technical innovations has been the emergence of some important concerns. Bowers and Bowers (1977) in the USA pointed out that social workers, like their counterparts in the UK, were frequently opposed to technological innovations. A principal concern to emerge was the likely effects of the technology on personal privacy, particularly the way it applied to people seeking social welfare assistance. Disquiet was expressed about the type of personal data that was collected and recorded as well as who would have control over that data (Kelley and Weston 1974; Stallings 1974; Kelley and Weston 1975).

This was in line with concerns in the UK, Australia and some European countries leading to varied forms of legislation dealing with data protection (Laver 1980, p.78). These factors may also account for the subject not developing more importance as a specific issue in social welfare literature, as it was associated with other matters such as the role of record keeping generally.

In fact the major issues emerging form the scant UK literature focus on the attitudes and feelings which emerged as computerisation was undertaken. In his review of the results of the reception of computerised client information systems in Social Services Departments, De Feu (1982) identifies three phases. First the period of initial enthusiasm where systems were designed and implemented with little experience but with great hope (Watts 1974). This led on to the second phase, one of disillusionment and, in some instances abandonment of schemes because of their failure through poor quality of data input by social workers (Du Feu 1982, pp. 63-65). Lessons learnt from this process indicate that computerisation was often introduced with little attention paid to first establishing information needs (Langham and Flowers 1974). As a result of the varied experience of the final period of reorientation and assessment took place. The late 1970s was a period when computerisation as a subject of interest was no longer a key topic of discussion (Thomas 1976). However, the need for systematic record and review systems to generate information about social work activity was still recognised (Goldberg and Fruin 1976).

The introduction of micro computers has however shifted attention back to the role of computers in assisting in the monitoring and provision of human services. But there is a major difference.

The versatility and power of the micro, together with the development of sophisticated software and the generation of yet another level of use is focussing our interest on decision support and knowledge engineering applications. It is these developments which will increasingly blur the historical differences which were evident in the use of mainframe computers in the USA and the UK. Since decision support and knowledge engineering applications emphasise the professional area of human service practice rather than the administrative and organisational aspects of their work, they will not be country specific in their applicability. Rather than focussing on organisational needs the emphasis will be on practice and professional aims. □

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References

Booz Allen Publication Administration Services Inc.
"Social Service Effectiveness, Evaluation of Alternative Measures and Their Potential for Implementation". Final report. Washington DC. 1972

Boyd L.H., Hylton J.H., and Price S.V.
"Computers in Social Work Practice: A Review". Social Work 23, 5, USA, 197a, pp. 368-71.

Bowers G.E., and Bowers Margaret
"Cultivating Client Information Systems". Project SHARE, US Department of Commerce Washington DC, 1977.

Brown R.G.S
"The Management of Welfare: A Study of British Social Service Administration". Fontana Collins, London, 1975

Donahue J.E., Angeli Elizabeth, Becker A.J., Cingolani Judith & Nelson M.
"The Social Service Information System". in Slavin S. (Ed.) Social Administration the Management of the Social Services. Haworth Press, New York, 1978, pp. 481-92.

Du Feu D.J.
"Computers and Social Workers: The Reception of a Computerised Client Record System in Social Services Fieldwork District Offices". Unpublished Ph.D. Thesis, Edinburgh University, 1982.

Elkin R.
"A Conceptual Base for Defining Health and Welfare Services". Child Welfare League of America, FSA of A, New York, 1967.

Fein E.A.
"A Data System for an Agency". Social Work 20, 1, USA, 1975, pp. 21-4.

Goldberg Matilda E. & Fruin D.J.
"Towards Accountability in Social Work". British Journal of Social Work, 6,1, UK, 1976, pp. 3-22.

Hoshino G.
"Computers: Tool of Management and Social Work Practice". Administration and Social Work 5, 3/4, USA, 1981, pp. 5-11.

Kelley V.R. & Westen Hanna. B.
"Computers, Costs and Liberties".
Social Work 20, 1, USA, 1975, pp. 5-11.

Lamb G.M.
"Computers in the Public Service".
George Allen and Unwin, London, 1973.

Langham B.A.J. & Flowers J.
"Hertfordshire Social Services Client Information System".
BURISA, 14, UK, 1974, pp. 3-5.

Laver M.
"Computers and Social Change".
Cambridge University Press, Cambridge, 1980.

Reid W.J.
"Developments in the use of Organised Data". Social Work 19, 5, USA, 1974, pp. 585-93.

Schoech D.
"Computer Use in Human Services: A Guide to Information Management".
Human Sciences Press, New York, 1982.

Seaberg J.R.
"Case Recording by Code".
Social Work 10,4, USA, 1965, pp. 92-8.

Stallings C.W.
"Local Information Policy: Confidentiality and Public Access".
Public Administration Review 34, 3, USA, 1974, pp. 197-204.

Thacker J.B.
"The Information Revolution and Social Change". Computing Australia 74, 2, Australia, 1974, pp. 451-67.

Thomas N.
"Two Steps Forward One Step Back".
BURISA 21, UK, 1974, pp. 205-6.

Victorian Consultative Committee on Social Development.
"The New Technology for the Provision of Community Information".
Seminar Proceedings, Melbourne, October 1982.

Watts N.
"Computers for the Social Services".
Municipal and Public Services Journal, UK, 1974, pp. 205-6.

Winner L. "Autonomous Technology".
MIT Press, Cambridge Mass., 1977.

Young D.W."Management Information System in Child Care".in Slavin S. (ed.) Social Administration: The Management of the Social Services.Haworth Press, New York, 1978, pp. 505-16.

Computer Automated Psychological Assessment of Cognitive Abilities

David Jones & Andreas Stavrou

The advent of computer-controlled psychological testing needs to be greeted with both caution and enthusiasm. Caution because there are obvious dangers in making tests too widely available for proper professional control over their administration and interpretation. Enthusiasm because computer automation is likely to make many tests easier to administer and even more so because of some of the exciting advances in measurement techniques which will become possible through the use of computers.

Psychological testing has a long and controversial history. Tests have been used to measure individual differences in intelligence and aspects of personality. Other procedures have been developed to monitor academic attainment and to predict performance in examinations. Further major applications have been in the areas of career guidance and job selection at all levels. The better tests have tended to be those which are individually administered although these involve skilled testers having to devote a considerable amount of time to repetitive tasks. It is not surprising then that educational psychologists frequently have long waiting lists of children to be assessed or that clinical psychologists object to being asked to carry out screening assessment on all hospital patients. Group tests certainly provide an easier method for collecting data from large numbers of subjects but introduce a greater risk of measurement errors through the possibility of ignoring such subject factors as motivation and the degree of comprehension of the instructions.

An initial reaction of computer controlled testing is to think of it as an extension of group testing, although closer examination will show that the method incorporates many of the advantages of individual testing. Early criticisms of computer testing suggested that the computer would be insensitive to many aspects of the subject's performance and inflexible in its demands for co-operation. Research has indicated that these fears were mostly ungrounded and that most subjects, including children, will co-operate at least as well and often better with the computer as with the human tester.

Technology is not yet at the stage where the computer can replace the human tester for the administration of all types of tests. Replication of existing tests is a relatively straightforward procedure for many questionnaires and a wide range of group tests. Even with this modest goal of replication automation offers some advantages over conventional testing:

1. There is a higher degree of objectivity in test administration and a minimising of the influence of uncontrolled effects attributable to the human tester.

2. The computer will often be more accurate than the human tester in the recording and scoring of subjects' responses.

3. The ease of test administration and scoring makes possible the delegation of aspects of testing to less highly skilled staff.

4. Automation allows immediate availability of test results which can

facilitate feedback in counselling or treatment situations.

Whilst it is important to identify situations in which the computer might equal or improve on the efficiency of the human tester in the administration of existing tests, it is of much greater interest to consider how computers have given psychologists the opportunity to review both the nature and use of tests. Automation greatly expands the power of testing procedures to analyse the underlying skills involved in complex problem-solving behaviour and individual differences in solution strategies. The new features of automation which make these advantages possible are tailored or adaptive testing procedures, on-line test item generation and detailed analysis of performance.

Tailored Testing

In conventional individual testing everyone has to proceed through the same series of items. Much of the testing time is spent on items which are well within the individual's ability and only a few items are near the threshold of performance. With tailored testing performance on a test is continuously assessed and the items presented are selected according to achievement to date. Typically a subject is presented with items of increasing difficulty until he or she starts failing. At this point the subject is presented with items of equivalent or less difficulty and depending on continued success or failure slightly more difficult or easier items are given. Termination of the test session is controlled by a preset criterion such as the number of test items presented, or a set number of trials after failure, or when the subject has reached a required level of performance. To consider tailored testing in more detail it would be helpful to examine the two major ways in which a computer can be involved in process control of test item generation and determination of item difficulty.

At the simplest level of program analysis performance it generates the next item following rules from a pre-determined list stored in the computer or from a backup memory source. Sophisticated branching can be achieved if a sufficiently large pool of items stratified according to levels of difficulty is available. The procedure can involve large amounts of memory and speed of item generation may be a factor to consider when external memory is used. A second procedure, and the one which uses the potential of the computer more fully, is rule-based item generation, the actual test items are not stored but rules for the on-line generation of items are incorporated in the program. A relatively simple example is of a visually presented version of the Digit Span test, which is a test of short term memory. There are 15,200 ways of arranging 10 digits in different sequences of 6. Storing them all would be pointless and a simple procedure can generate a sequence at random with various filters added to eliminate easy to remember sequences.

The main advantage of this approach to testing is that a precise estimate of competence may be obtained within a short testing time. This is very useful for the assessment of subjects who are unable to tolerate long testing sessions, such as disturbed children and elderly psychiatric patients. Since it is less time consuming, it is practical and economical to use it for routine testing in settings where large numbers of subjects are to be assessed in a short period, for example screening for brain damage or psychological symptom-atology in outpatient clinics.

Tailored testing, apart from being less time consuming, can improve testing in a number of other ways. The proportion of successes and failures can be controlled and hence the subject's motivation is manipulated. The quality of data is also greatly improved since more information is collected near the upper threshold of ability. It also makes possible the study of strategies which lead to success or failure.

Performance Analysis

A breakdown analysis of performance on even simple tasks shows that they involve a number of underlying processes, the composition of which might vary between individuals. Conventional testing rarely came up with more than an overall score based on number of items correct. For example, an IQ score is a measure of a combination of different skills and abilities which provide an estimate of an individual's cognitive functioning in relation to a peer group, but it does not provide us with any detailed information about the nature of the specific cognitive processes involved in the test performance. Potentially valuable information on both cognitive and non-cognitive aspects of an individual's performance has often been ignored.

Computer testing through accurate timing of response components, such as inspection times, decision times, movement times and times devoted to checking, allows the analysis of the component processes of problem solving behaviour. It is also possible to take into account near correct solutions and to analyse error correction strategies. Insight is provided into both the range of abilities necessary to solve a given task and into individual differences in response strategies and cognitive styles. Factors which have been considered are speed-accuracy trade-off, impulsivity-reflectivity and degree of persistence. Higher level analysis allows the identification of preferences for holistic or analytic strategies in problem solving.

Repeated Testing.

An important application of computer testing is in the repeated assessment of the same individuals on successive occasions over a period of weeks or months. Conventional tests are effective in assessing gross differences between individuals and the relatively large changes within individuals which may accompany maturation and education. In general, however, they are insensitive to small changes in individual competence. Also most conventional tests rarely have more than a second parallel version and it will be time consuming to test a number of subjects repeatedly. The computer is

able to generate parallel versions of the test on-line and by means of tailored testing to obtain an accurate estimate of ability on any occasion.

The importance of repeated testing is that it allows us to distinguish between day to day fluctuations in performance and specific effects attributable to treatment or other forms of intervention. A good example of such an application is in the evaluation of changes in attention, memory, accuracy and speed as a consequence of drug administration. Similarly the method can be used to distinguish between normal ageing and the effects due to progressive diseases. Further applications of repeated testing come in the field of education where there are frequent needs to monitor progress or assess the effectiveness of different teaching methods. An example of an application in the field of occupational psychology is the measurement of performance at different times of day and night.

Screening

Computer automated testing provides an alternative and often better system for screening large numbers of subjects than the traditional paper and pencil group testing. All the advantages of computer testing apply. The results are immediately available and the time involvement of highly skilled staff is kept to a minimum. Regular screening of academic attainments in children would facilitate the early identification of those with special educational needs. Screening of cognitive functioning in adult medical patients would improve the early detection of deterioration in dementia or due to the long term effects of alcohol.

Test Systems

A wide range of psychometric tests have been adapted for computer presentation. Some are new tests but most are adaptations of existing tests. The long term goal for automated testing is an intelligent system able to select appropriate tests on-line. The current level of development in the evolution of test systems is collections of about half a dozen tests, usually referred to as a battery, being administered on the same configuration. A brief description of three computer-controlled test batteries will illustrate the range of developments in this country.

BMAPS and BMCST

The MAPS system (Maudsley Automated Psychological Screening Tests) developed by Acker (1980) is available on both Commodore and Apple configurations. This system includes the Synonyms section of the Mill Hill Vocabulary Test; a test of perceptual analysis where graduated differences in geometric patterns must be discerned; a Right and Left discrimination task; and a digit symbol test. More recently Acker (1983) developed the Bexley-Maudsley Automated Screening (BMAPS) and the Category Sorting Test (BMCST) which is a battery of six tests, designed to assess psychomotor speed, simple visual discrimination, complex visual spatial skills, verbal memory and non-verbal abstract thinking.

Leicester System

Beaumont (1981) developed automated versions of eight existing tests: Mill Hill Vocabulary Scale, Raven's Standard Progressive Matrices, Wisconsin Card Sorting Test, DAT Language Usage, DAT Spelling, Money Road Map Test, a Digit Span Test and the Eysenck Personality Questionnaire. This battery runs on an Apple configuration.

APT

Elithorn et al. (1982) developed a system which allows individualised batteries to be created from the following tests: the Perceptual Maze Test, the Lexical Decision Test, a Digit Span test, a Coding Test, a Trial Making Test, a Finger Tapping Test, Simple and Choice Reaction Time measurers, the Karolinska Impulsivity Scales and a Stress Questionnaire. These tests can be administered on Research Machines and Apple configurations.

Reviews of current applications of automated systems can be found in Elithorn et al. (1982), Bartram and Bayliss (1984) and French (1986). It is difficult to compare the various automated systems available since they have been developed with different aims in mind and therefore include different types of tests and run on different systems. For the future standardisation of test systems will become increasingly important. The minimum requirements for a new automated system should be as follows:-

1. Must be reliable (in both software and hardware)
2. Should be relatively cost effective
3. Should be simple to operate
4. Tests should be fairly quick to administer
5. Should be readily available at sites of use
6. Must be capable of processing complex visual stimuli
7. Must produce a record of performance quickly and in a form comprehensible to the user
8. Data from testing should be saved in such a way as to allow easy statistical analysis
9. As far as possible there should be consistency with other systems
10. Degrees of equivalence with paper a nd pencil versions of the test should be known

The British Psychological Society has recently brought out a series of recommendations for the design of automated test systems in the hope of encouraging more standardization (Bartram et al., 1987).

Problems Relating to Computer Auto-mated Testing

a) Relating to Tests.

The present state of micro-technology imposes constraints on the nature of tests suitable for automation:

1. Tests involving verbal response are not possible to automate effectively at the present stage of computer technology.

2. The constraints on the nature of responses make it almost impossible to use items with open-ended questions. An alternative would be to convert such items into a multiple-choice form.

3. The necessity to rely on the silent screen method of presentation has meant that most tests require subjects to have a minimum level of reading skill. Rapid developments in the ease of control of synthesised or digitalised speech by computers can be expected.

4. The presentation of items in two dimensions on screen and the mechanical entering of responses makes it impossible to have tests where three dimensional physical manipulation is involved.

5. Another limitation is that although microcomputers can produce sharp geometric designs, they are not very effective in producing good pictorial images.

Because of these limitations, there is a danger that in adopting computers the emphasis will fall on tests which are suitable or easy to automate and other areas of assessment, for example, verbal fluency and constructional ability, will be neglected.

b) Relating to Hardware

The wide range of microcomputers currently in use in psychology has given rise to problems of hardware and software incompatibility. Even if a system is made to run on different computers the problem of test equivalence has to be resolved.

Attempts to overcome the limitations of the standard QWERTY format keyboard have resulted in a diversity of purpose build keyboard and touch-pad systems. Diversification has unfortunate consequences for standardisation and a test user might need to have access to a number of these specially built keyboards to run different test systems.

c) Relating to their General Use

The equivalence of automated versions of standard tests with the paper and pencil versions can not be assumed without empirical verification. In the case of new tests the traditional requirements for test standardisation and validation have to be met before the test is released for general use.

Concluding Remarks

The tests or procedures which might be computerised will ultimately depend on the development of microcomputer hardware and appropriate software. However there must be parallel developments in psychometric practice to accommodate these new opportunities offered. The main challenge of computer automated testing for psychologists is to develop new tests and testing procedures which exploit the available computer technology, and to identify new test situations which are made possible with automation.

At this stage of computer automated testing, the advantages begin to outweigh the disadvantages. Automation gives greater control over testing conditions by increasing objectivity, reliability, ease of administration and efficiency of scoring. The method is often more cost effective than traditional testing and may allow screening procedures when other tests would not have been used. Most importantly advances in tailored testing, response strategy analysis and repeated testing are likely to change the future of psychometrics.

We must finish on a note of caution. Access to computer tests must be controlled in the same way as there is now restricted access to conventional tests. Test results must be treated as confidential information and the storage of results must conform with the requirements of the Data Protection Act. □

References

Acker, W. (1980): "In Support of Microcomputer Based Automated Testing: A Description of the Maudsley Automated Psychological Screening Tests (MAPS)". (British Journal on Alcohol and Alcoholism, 15, 144-147.)

Acker, W. (1983): "A Computerised Approach to Psychological Screening - the Bexley-Maudsley Automated Psychological Screening and Bexley-Maudsley Category Sorting Test. (International Journal of Man-Machine Studies, 18, 361-369.)

Bartram, D. and Bayliss, R. (1984) "Automated Testing: Past, Present and Future". (Journal of Occupational Psychology, 57, 221-237.)

Bartram, D., Beaumont, J.G., Cornford, T., Dann P.L. and Wilson, S.L. (1987): Recommendations for the Design of Software for Computer Based Assessment - Summary Statement. (Bulletin of the British Psychological Society, 40, 86-87.)

Beaumont, J.G. (1981): "Microcomputer-Aided-Assessment Using Standard Psychometric Procedures". (Behaviour Research Methods and Instrumentation, 13, 430-433.)

Elithorn, A., Mornington, S. and Stavrou, A. (1982): "Automated Psychological Testing: Some Principles and Practices". (International Journal of Man-Machine Studies, 17, 247-263.)

French, C.C. (1986): "Microcomputers and Psychometric Assessment". (British Journal of Guidance and Counselling, 14, 33-45.)

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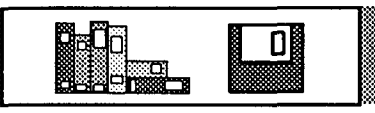
Review



The Human Edge: Information Technology and Helping People

Edited by Gunther R. Geiss and Narayan Viswanathan

Haworth Press, Inc. New York 1986.
ISBN 0 86656 407 1

The Human Edge is the product of a three day conference held in June 1984 in Queenstown, Maryland, USA. The Lois and Samuel Silberman Fund set the objectives for the conference and met the costs. The conference and the book are intended to:

> "...serve as a basis for establishing some new directions in social work education and practice and for opening the discussion of critical issues in the classroom, in the practic professions, in the institutions (at both their executive and their administrative levels), and among those actually involved in designing information systems."

The book is aimed at all persons concerned with and committed to the future of the human services.

It was this conference that inspired the HUSITA Conference in Birmingham in September 1987. This volume of 370 pages was given to each delegate as part of the conference package.

This is not a volume for the faint-hearted! The experience of reading it is similar to the experience of finding oneself at the top of some substantial hill and viewing, perhaps for the first time, a breathtaking vista. In this case, the vista is of the range and the variety of both conceptual thinking and creative activity that the micro-computer is stimulating in the hands of a relatively few imaginative people: people who are, for the most part, capable of appreciating the technology as well as understanding the needs of practitioners in the human services. The challenge of the book lies in its successful communication of the experience of being engaged by the issues as the conference participants so obviously were.

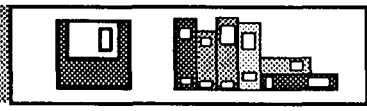
The book is set out in three parts. The foundations are laid by a review of the contemporary scene in Information Technology, including definitions of key terms. Then, a section on opportunities and threats presented by the new technology. The final section identifies key issues and explores alternative ways forward for the development of constructive and helpful applications of the new technology, facing squarely the value issues that inevitably underlie any activity in this field.

It is wholly an account of the American experience. Investment in new technology there is much greater than in the U.K. and has a longer history. There is therefore much to be learned both from their achievements and their mistakes. In any event, there are links between the American and the British practice of social work that makes the reported applications immediately relevant and interesting to British readers. Most important of all, the behaviour of organisations both small and large in responding to the opportunities presented by new technology seems based less on national characteristics than on all too familiar human foibles for equating 'knowledge' with a data-bank. Examples abound both in the U.K. and in America of the almost mindless collection of data about anything and everything the organisation possesses and does, usually stored in some central place, and rarely if ever interrogated. Apart from the conspicuous waste involved in such practices, there is the important point about knowledge being an outcome of our ability to make connections between facts and events rather than simply collecting and storing them! Our ability to make those kinds of connections, rather than simply the storage capacity of computers, raises human rights issues that are of concern to politicians, professionals and clients on both sides of the Atlantic.

These values are explored but unhappily only superficially. The conference lacked a philosopher of stature in this field. *Christensen* contributes a paper that poses five central questions for establishing a coherent ethical position:

1. What makes right acts right?
2. To whom is a moral duty owed?
3. What kinds of acts are right?
4. How do rules apply to the specific situations?
5. What ought to be done in specific areas?

The absence of any coherent conference discussion of this paper is disappointing, the more so as the paper is one of the driest and least stimulating in the collection. Yet, the subject is a vital one. What seems specifically to be missing is a discussion of values. It is values to be realised that inspire and



focus human behaviour as well as rules for conduct that are useful for guiding that same behaviour.

Palombo contributes a useful paper posing the question: "Is the ultimate test of the benefit of New Technology in social work the extent to which it adds or enhances 'meaning' to peoples lives.....?" He goes on to define 'meaning' as the sense of personal value and the sense of personal control that it is important for each of us to have in and over our personal and working lives. As a 'hooray' statement none will want to disagree with it, be he Allende or P.W. Botha. In reality, the relationship between the increasingly powerful information technology and the field of human values is the paradigm of the relationship between I.T. and anything else. I.T. challenges us to be clearer than we have ever been before about the outcome that we want our choices to have for the quality of the lives that we are able to live. This is so, not because I.T. is irreversible in any of its developments but because of its awesome power to respond to the basic assumptions guiding our applications of it. This gap between intention and action can be exploited by new technology more quickly and more thoroughly than we have experience of hitherto. The requirement for moral philosophy is not so much for teaching computers how to choose as for we who use them to be ever more sensitive to the possibilities of their existence both intended and unintended.

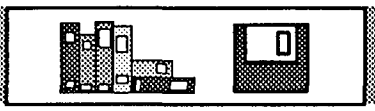
The best paper, at least in the sense of illustrating the issues, is contributed by *Robert Pruger* of the University of California. He describes the development of a program to assist workers manage the assessment of and allocation of hours for domiciliary services. The impetus came from a recognition of widely varying allocations to clients with apparently similar profiles of need. An environment of tighter financial constraints implies an urgent need to demonstrate consistency of allocation across a varied population. The target was to develop a program that would aid decisions by modelling the process by which the best professional decisions were made. The program would be a tool for workers to use as well as generating useful information for managers and politicians about the disposal of resources.

The approach to the task was 'bottom up', starting with those who undertook the assessments and allocated the hours. Only after the system had been installed were the managers trained in the use of it. Pruger reflects honestly the complexities of undertaking multi-faceted work simultaneously through the medium of a project team that has itself to be managed. The simultaneous concerns with the technically challenging task of building an algorithm that was sensitive to the task: engaging the interest of key workers whose trust in information technology varies from nil to very limited; maintaining the confidence of managers through phases of time when there is little progress to demonstrate and whose trust and confidence is critical; securing and retaining the resources from politicians whose expectations of the final system vary from the naive to the totally unrealistic; sustaining the commitment and morale of the project team through its vicissitudes. All this and managing the technically demanding task of keeping each part of the project in step with the other parts.

Anyone with a responsibility for managing the introduction of New Technology to an organisation will find Pruger's paper a rich vein of material for identifying problems that can be anticipated and planned for. For those, who like the author of this review, have been involved in similar work in the past, the paper provides a valuable source of reflection which helps the illumination of otherwise confused experiences.

The end of the project is a brilliant vignette of the relationship between information technology and the balance of power between interest groups in welfare services. The model was developed and applied successfully. That is, prior to the implementation of the decision support model only 60% of the variance in allocations could be explained by variations in the profiles of client needs. After the implementation of the model 85 - 90% of variations in allocation could be explained by variations in client need. Workers were thinking more clearly, rationally and consistently. The final step required a similarly rational allocation of resources to each area rather than a response based on who could make the most 'fuss' Pruger and his team failed disappointingly; he offers no analysis of why. The reader is left to guess that perhaps the politicians decided that they alone had the authority to decide what allocation is 'rational' in any set of circumstances. If this interpretation of the politicians refusal to be bound is correct, then it is a compelling reason for applications of new technology that empower interest groups, particularly where those groups enjoy little formal organisational or political power. For power to be properly exercised it must be shared, the exercise of it must be on the basis of explicit and understood information and rules for interpreting that information. In this arena, computers offer hitherto undreamt of assistance.

The use of new technology to assist social workers develop their own diagnostic skills, develop new skills through interactive, computer assisted video; to keep themselves well informed about welfare law, benefits and practice developments; all this and more is proposed, reported and discussed in the HUMAN EDGE. It recalls the childhood experience of visiting Aladdin's Cave of toys. These possibilities do exist, at least in America, and are within our reach in the U.K.. There is an important qualification. The



financial investment in the technology, both the hardware and the software can be of enormous proportions. It is at its greatest in the field of Systems Development, the design of completely new software. There are choices. Applications involving micro-computers and existing software are cheaper than applications requiring main-frame machines, local terminals and new purpose-designed software. There is even more fundamental choice. Are the welfare services to develop their computer applications on the coat-tails of the commercial and industrial users of new technology; picking up, as it were, the crumbs from the rich man's table by bending to welfare uses the software designed for industry and commerce? Or are we to demand some original and innovative investment in the welfare sector that creates systems designed uniquely for our purposes? The later will be expensive, at least until there is a greater recognition of the similarity of purpose in systems design. The purpose, surely, is similar to both welfare industry and manufacturing industry. Namely, the use of the power of the computer to assist us identify and connect the myriad factors that make up the 'messiest', least well defined situation that we wish to understand.

In the U.K. in 1988 there are shortages of qualified and experienced social workers; political determination to make people more responsible for themselves, including the poor and the least able; managerial concerns for all that is economic, efficient and effective. In this environment the HUMAN EDGE has sound messages for social workers, social work teachers and managers and for social services committee politicians. Every Director of Social Services should either read it or arrange for a concise summary of its content. BASW needs to pick up both the practice and the ethics issues. But above all, social workers can find in this book clues to the uses of new technology that will enable them to enhance what they give to their clients and through that the satisfaction that they once again may obtain from their jobs.

The book begins, but this review ends, with prognostications about the future. People with an interest in well-informed science fiction will enjoy the paper by *Jacques Vallee*. It proposes a well reasoned if, for some, startling vision of two futures where communication is equally sophisticated, all-embracing and fast. One enhances humanity by building on and encouraging natural instincts for association whilst the other imposes networks of relationships with which we all have to conform. Like all good science fiction the paper illuminates the present and the choice before us.

Finally, let us return to Pruger - his is the final word:

"It is possible to screw things up with a computer but without them there is a zero chance that we will make better decisions tomorrow that we were able to make yesterday."

Perhaps in twenty-five years or so we shall look back on THE HUMAN EDGE and the first HUSITA conference as the watershed between current 'hit and miss' practice and the by then contemporary culture of continuous practice learning through the utilisation of an electronic wizard who helps us remember, connect and communicate but, who does so only at our instigation. I hope so! □

Chris Cheadle
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Contributions to the Journal

New Technology in the Human Services welcomes articles, reviews, news items and letters from readers.

Articles should be from a minimum 750 words to a maximum 5,000 words.

Reviews of printed material or software should not normally exceed 300 words, unless discussed beforehand with the Editor or Review Editor.

All contributions to the journal should be typed or printed (draft quality is acceptable), double-spaced and single-sided. Please send three copies of articles and reviews.

The journal does not maintain a long waiting list of material for publication and those who have a contribution accepted can expect it to appear within the next two issues. Potential contributors are invited to contact the Editor or the Review Editor, to discuss a possible item.

References

Gilliland, K. (1986).
"Equals in computer technology: An intervention". AEDS - The Monitor, 24 (7-8), 21-22, 26.

Haigh, R.W. (1985).
"Planning for computer literacy". Journal of Higher Education, 56(2), 161-171.

Hall-Sheehy, J. (1985).
"Let's forget computer literacy". Training and Development Journal, 37(9), 24-25.

Hammer, A.L. & Hile, M.G. (1985).
"Factors in clinicians' resistance to automation in mental health". Computer in Human Services, 1(3), 1-25.

Illich, I. (1976).
"Limits to Medicine".London: Marion Boyars.

Kemeny, J.G. (1983).
"The case for computer literacy". Daedalus, 112(2), 211-230.

Klein, S.S. (1984).
"Computer Education: A Catalog of Projects Sponsored by the U.S. Department of Education" - 1983, Washington, D.C.: U.S. Government Printing Office, U.S. Department of Education, National Institute of Education.

Kozol, J. (1985).
"Illiterate America". Garden City, NY: Anchor Press, Doubleday.

Lawless, E.W. (1977).
"Technology and Social Shock, New Brunswick"., NJ: Rutgers University Press.

Lee, M.W. (1986).
"The match: Learning styles of black children and microcomputer programming". Journal of Negro Education, 55(1), 78-90.

Lindblom, C. (1958).
"The science of muddling through". Public Administration Review, 19(1), 75-88.

Lipkin, J. & Martin, L. (1986). "Sex bias at the computer terminal: How schools program girls". AEDS The Monitor, 24(7-8), 14-16.

Lockheed, M.E. & Mandinach, E.B. (1986). "Trend in educational computing: Decreasing interest and the changing focus of instruction". Educational Researcher, 15(5), 21-26.

McHale, J. (1976).
"The Changing Information Environment".London: Paul Elek.

Menosky, J.A. (1984).
"Computer Worship". Science, 84 May, 40.

Metzendorf, D. (1987)
"An Urgent Need: Equal Access of Computers for the Poor". A paper presented at the HUSITA Conference in Birmingham, England.

Meznies, H. (1982).
"Computer on the Job".
Toronto: Lorimer.

Miller, J.D. (1983).
"Scientific literacy: A conceptual and empirical review"., Daedalus, 112(2), 29-48.

Nora, S. & Minc, A. (1980).
"The Computerization of Society". Cambridge, MA: MIT Press.

Nowotny, H. (1981).
"The Information Society: Its Impact on the Home, Local Community and Marginal Groups".Vienna: European Center for Social Training and Research.

Parsons, H.M. (1985).
"Automation and the Individual: Comprehensive and comparative views". Human Factors, 27(1), 99-112.

Prewitt, K. (1983).
"Scientific illiteracy and Democratic Theory". Daedalus 112(2), 49-64.

Quality Education Data, Inc. (1984). "The 1983-84 Microcomputer Usage in Schools Survey". Denver, Colorado.

Rice, B. (1983).
"Caring Cyberphobia"
Psychology Today, 17(8), 79.

Robinson, A.L. (1980).
"Electronics and employment : Displacement effects", in : Forester, T. (ed.), The Microelectronic Revolution. Oxford: Basil Blackwell, 318-333.

Sanders, J. (1986).
"The Computer Gender Gap: Close it while there's time". AEDS - The Monitor, 24(7-8), 18-26.

Schubert, J.G. (1986).
"Ideas about Inequity in Computer Learning". AEDS - The Monitor, 24(7-8), 11-13, 26.

Sheingold K., Hawkins, J. & Char, C. (1984).
"I'm the Thinkist, you're the Typist": The interaction of technology and the social life of classroom". Journal of Social issues, 40(3), 49-61.

Simon, H.A. (1977).
"What computers Mean for Man and Society". Science, 195, 1186-1191.

Sprouil, L.S., Kiesler, S., and Zubrow, D. (1984).
"Encountering an Alien Culture". Journal of Social Issues 40(3) 31/48.

Taylor, J.B. (1981).
"Using Micro-computers in Social Agencies". Beverly-Hills: Sage, A Sage Service Guide No. 19).

The Johns Hopkins University, Center for Social Organizations of Schools (1983, June), Schools, Uses of Microcomputers, Issue No. 2.

Zakarya, S.B. (1984).
"The Rich get computers, The Poor get Poorer". The American School Board Journal, 171(3), 30.

Zimbardo, P.G. (1980).
"The Hacker Papers - and - The age of Indifference.
Psychology Today, 14(3), 62-68, 70-81.

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