observe businesses and professions in operation. This is an extension of a system termed "Adopt-a-School" which was developed by the United Bank of Denver in the late 1970s. This involved Branches of the Bank adopting local schools, acting as a contact point for speakers on business-related topics, providing tours of their branches to the school, work-experience opportunities, and possibly a representative on school councils. The opening of data banks is limited: students only have access to daily "executive summary"-type reports which previously would have been included in annual reports. However they do also have access to a number of decision-makers whom they can question via their terminals.

These techniques have highlighted to both young people and educators the broadening range of skills which persons need in order to be effective in business and professional environments. There is little talk of a need to "return to basics"; the emphasis is now on redefining the notion of basic skills in a society in which everyone has access to word processing packages which can check spelling and grammar, and financial planning packages which can assist with the modelling of numeric problems (and naturally also with the calculations involved).

These techniques have also had enormous benefit in the areas of vocational guidance and training. Students in schools can "monitor" in great detail the work of surgeons, engineers, draughtsman, computer technicians and so on. The world of work is directly accessible to every child in every school.

5-6. COMMUNICATIVE COMPETENCE

Communicative competence is seen to be a much broader concept than simply the ability to communicate effectively both in
writing and verbally. It is now seen as incorporating the ability to:

* identify issues;
* design ways to gain information;
* process information;
* lobby for change;
* understand power structures;
* use various types of communication media; and
* understand which media should be used for different purposes and how to design messages for maximum effectiveness.

The need to broaden the meaning of communicative competence was highlighted as it was seen that merely providing access on a large scale to such things as computer packages, and computer conferencing facilities, was insufficient for individuals to be able to use these technologies effectively. It was seen that it was necessary for these technologies to include a training component in their introduction.

The APS was one of the first to take up the challenge of this in the mid-1980s. It introduced courses on such things as:

* using word processing software;
* integrating financial and word processing software for maximum impact;
* communicating from home using computer terminals;
* inputting information into Videotex systems for maximum effect;
* using cable T.V. to gauge public perceptions on governmental programs and proposed programs;
* finding appropriate uses for computer networks as a
supplement to face-to-face communication;

* developing innovative uses for loud-speaker telephones in administration and policy development.

Education departments also took up the challenge. They developed special programs for young people. T.A.F.E. systems were involved in running broad-based communications programs for adults.

The running of such innovative programs (which are relevant to all age groups), and the emphasis on lifelong education, has led to a greater awareness of the need to keep accurate records on the development of competencies by students throughout their life, in order to ensure that they gain maximum benefit from the educational programs which they undertake.

5-7. NATIONAL EDUCATIONAL DATA BASE.

Teachers can easily access information on the background of their students (a national data base on students is kept which is linked to an international data base), innovative educational programs, evaluation of programs and professional development opportunities.

The data base on students is similar to one developed in the United States in the 1970s. It was decided that a similar data base was needed in Australia because of the increasingly common national and international mobility of students. In the late-1980s it was decided to link-up national student data bases so that students who were internationally mobile could have their records accessed. Some students were also mobile through their terminals. For example, by the late 1980s some students who had a strong grasp of French were being taught in the French
educational system even though they lived in Australia. This had advantages both for migrant children, and for children who were especially gifted in languages and in relating to different environments, but who could not afford to travel. The data base allowed foreign schools to have an evaluation of a student's strengths and weaknesses, and minimised problems caused by changes between educational systems (across both States and countries).

Studies in politics, social sciences, botany, biology and geography have also been transformed with this new technology. Students can, for example, experience the realities of life in Central Europe while physically being in their homes or classrooms in Australia.

National and international visual linkages are now economically possible for educational purposes. These allow for the display of still imagery, with changes possible at regular intervals. "Continuous movement" visual conferencing is relatively expensive, and is still only routinely possible between capital cities using optical fibre linkages, with the aid of studios especially set aside for this purpose. This is because it is far too expensive to hire the band-width required on satellites or normal telephone lines to allow for "real time" visual conferencing. The transmission of still visual information via satellite has enhanced the teaching of numerous subjects in the "School of the Air", and in adult training programs beamed to isolated areas. The technology to do all of the things considered in this paragraph had been available for over twenty years; the key new factor in 1995 was the continuing dramatic reduction in cost of all but "continuous movement" video conferencing.
"Continuous movement" video conferencing has been used for linkages in high priority areas (such as emergency medicine in isolated areas) in Australia, but authorities have discouraged its use in other than emergency situations because of the large amount of band-width required, compared with such approaches as audio or terminal-based conferencing.

Research is being undertaken into how linkages could be developed between Cable T.V. systems, optical fibre cable networks (between States), and new "broad band-width" satellite systems to allow for economical small-scale educational usage of "continuous movement" video conferencing systems on a large scale over great distances.

All teachers and educational administrators have their professional interests recorded in a data base and are notified of professional development opportunities by the system. This is an extension of a more focused approach to information dissemination which has been made necessary as access to masses of information has become more economical. For example, the Victorian Education Department in the early 1980s started producing a listing of conferences indexed according to subject areas. Previously this listing was produced purely in date order. In a sense this was a forerunner to more advanced approaches, in that it recognised that educational professionals are far more likely to use professional development information tools if they can access areas of interest to themselves directly without needing to wade through large amounts of irrelevant data.

Where cost or time is a factor, teachers can attend international
conferences via their terminals while remaining in Australia. Needless to say, this does not fully accommodate the social intercourse benefits of in-person attendance.

5-8. DISTANCE EDUCATION

The National Educational Data Base has assisted in the running of better distance education programs. It has meant that students who move frequently around Australia have a continuous record kept on them, which can be accessed by teachers in new locations.

There was some talk of organising a National Distance Education School, but this was resisted by the States and NT. Instead, there is very close contact between distance educators in each State and the NT, facilitated by satellites. Pilot programs for such liaison began in the early 1980s using the Intelsat Satellite.

It has been found that satellites have been useful for other distance education programs. Teachers who were previously not able to attend national conferences because of distance regularly participate now via audio-satellite link-ups. This was often possible before the advent of the domestic satellite using terrestrial linkups, but it was found that the availability of the satellite both allowed for the participation of teachers in areas with no conventional telephone access, and tended to "raise the consciousness" of professional development personnel regarding the options available.
5-9. ADULT EDUCATION

The availability of satellites has also assisted with adult education in isolated areas. The need for retraining for adults has been generally accepted, but problems did arise in implementing this concept in isolated areas with limited communications linkages.

Now all Technical and Further Education authorities have developed programs which include mastery learning sequences and linkages via terminals for interaction. These programs can be transmitted either via terrestrial linkages or the domestic satellite.

All professional associations now have requirements for continuing professional education if a member is to maintain his or her standing. Continual up-dating is essential, because changes occur so rapidly.

The Australian Public Service continues to encourage its members to undertake study leave related to their work and in certain areas has begun to direct public servants to do so if they wish to retain their substantive positions. In the mid-1980s an innovative form of this approach was developed incorporating the concept of permanent part-time work, and a lifelong education philosophy. This allows officers to work one year, then take a year off, then work another year for a pre-determined time. It has been found that this approach has advantages over the traditional approach of giving large blocks of time for study leave. Officers participating in this scheme are also allowed to undertake some consultancy work during their study leave. It has been found that this has real advantages for officers undertaking
such degrees as the Ph.D. and new Te.D. (Doctor of Technology). It has meant that the officers maintain contact with the APS. There are also tax advantages in spreading the periods of no income over time, since this allows for an "averaging of income" for tax purposes which does not occur when large blocks of study-leave are taken.

The APS particularly encourages this approach for officers who need to keep in touch with both the APS and the business world if they are to remain at the cutting-edge of their fields (for example, data-processing professionals, long-range policy analysts, organisational consultants, and adult trainers).

With approval, some of the officers have continued with this program after gaining their higher qualification. This has diminished the financial disadvantages of being in the APS for those officers who work in fields which are very highly paid in the private sector, in that one year in two can be spent in consultancy activities. Naturally, there are significant restrictions on officers involved in this program to ensure that there are no conflicts of interest.

AUSTRIALIAN_PUBLIC_SERVICE

5-10. NEW EDUCATIONAL ROLE FOR PUBLIC SERVICE BOARD

Since 1984 the PSB has been conducting extensive training courses on the use of computer packages for public servants. The impetus for this resulted partly from the finding of the JMR that "Modern system development tools including very high level languages (i.e. non-procedural and user oriented) are not in common use in the APS." (Arthur Andersen, 1982, p. 2). Politicians have
increasingly been encouraged to participate, as it has been recognised that "...upgrading the professionalism of senior administrators while leaving the capacities of politicians and political institutions low will change the balance of power between administrators and politics in directions which may often involve undesirable alienation and de-democratization." (Dror, 1971, p. 269). There has been a particular emphasis on decision-support systems, particularly systems designed to assist with quantitative analysis, the development of models, and systems designed to produce reports efficiently. This emphasis coincided with a shift in policy towards part-time work. From 1985 public servants who wished to work from home and were involved in clerical-type or policy work have been allowed to do so for 50% of their time. This has been particularly helpful as an equal opportunity measure. It has meant that a number of men, who otherwise would not have been able to, now work from home and contribute to child supervision. It also has broadened many women's options. There are many families in which "...man and wife split a single full-time job." (Toffler, 1981, p. 227).

The PSB developed a tender document in 1984 for micro-computer systems with communications capabilities which allow officers (with approval) to work from home. The Public Service pays for half the cost of these systems and the public servants using them pay for the other half.
5-11. CUSTOMISED STATISTICAL REPORTS

The general availability of terminals has had other effects.

Statistical reports are rarely made available in a hard copy format (that is, on paper). This is because all executives now have access to computer terminals. Also, as the amount of information available became more and more overwhelming, it was seen that to provide all the information which executives needed in a paper form involved much redundancy. The emphasis now is on having customised reports produced around the parameters which executives specify.

This has also had an impact on education, and on adult training in the APS. Just as calculators changed the emphasis placed on repetitive calculation in schools in the early 1980s, computer packages have had an effect on the emphasis placed on students producing tables manually in schools, and on learning computer programming. Since the late 1980s there has been a dramatic change in mathematics in schools and APS training programs. A new form of mathematics called "information analysis" has been introduced. This involves students using quantitative and non-quantitative data to produce reports. There is little emphasis on students producing reports themselves from the "ground up"; the emphasis is on students setting parameters which computer packages use to produce "skeletons" of reports. Students need to "flesh-out" the reports produced by the packages. Packages are now available which interact with the students and assist them in defining the parameters of the reports. Similar packages have been in use in the APS since the late 1980s.
5-12. INFORMATION CO-ORDINATION

The new types of statistical packages have had a significant impact on the APS. For example, reports which could not have been produced in the early 1980s are now regularly prepared with the assistance of packages. Freedom of Information reports have been much easier to provide. In the mid-1980s there was a proliferation of micro-systems in all Departments. By the late 1980s this was controlled through the use of "information co-ordination plans" which recognised the value of data and planned for it - as with the other resources of the Departments. By 1990 it was generally recognised that information systems had become so powerful that the "information co-ordination approach" needed to be taken across the APS. This emphasis on a need for a Service-wide approach to information seemed to be an extension of the approach of the Committee on Integration of Data Systems, "...which reported in 1974...[suggesting] that efforts be made to ensure that official data systems...[were] mutually compatible." (Coombs, 1976, p. 349).

5-13. FREEDOM OF INFORMATION

The need for compatibility of information systems has been highlighted by the trend to interpret the concept of Freedom of Information more broadly than in the 1980s. This is because of the decreased need to use expensive manpower to search out information. Much information under the Freedom of Information Act is gained directly through computer terminals. This means that advocacy groups often follow the development of legislation and regulations from the early stages. Also, they follow the public administrative responses (including early drafting
discussions) through their terminals. Early attempts were made by a number of public servants to develop confidential schema on an "unofficial" basis but this has been made almost impossible by the regular scanning of computer systems by "policing software" which had been developed by the Auditor General in the mid 1980s to pick up such activities along with attempts at fraud.

Personal information is still protected under the Freedom of Information legislation. Access to adults' school records and childrens' court records are particularly restricted. Some access to researchers is allowed, but only where there is no way that individuals can be identified (that is, data is only available in an aggregate form). Where data could be used to identify individuals (for example, where the data involved refers to a very few individuals) dummy data is inserted at random in order to make this impossible. The Bureau of Statistics has used this approach for many years with Census data, and continues to research ways of preventing the identification of individuals when other data of a confidential nature is being analysed with powerful computer systems.

GENERAL ASPECTS

5-14. NEW APPROACHES TO PARTICIPATION

School and work governance is much more participatory. Young people are heavily involved in the governance of schools, particularly in the selection of material to learn outside the core curriculum. They make their selection on terminals and can make suggestions for new types of learning activities. They are also encouraged to liaise with other students and develop coalitions for change.
In government there is a significant emphasis on worker participation, with expanded staff suggestion schemes, the use of autonomous work groups, and related techniques being widely used in the APS. Computer conferencing is used to assist with the implementation of these techniques.

Cable T.V. (based on optical fibre technology) has been in operation in all major Australian cities since 1990. It is mainly used for the distribution of films, computer programs, data base access, and related information purposes. However, there has been a significant increase in educational and political documentary material on the normal Australian Broadcasting Corporation and commercial television channels, which is in addition to the two "access educator" channels — one for primary and secondary students, and the other for tertiary and Technical and Further Education students. The system is also used partly for polling groups of citizens on issues, and to facilitate the purchasing of goods from home. Appropriate guidelines have been legislated to ensure the privacy of voting "records" produced by such systems (this is necessary as a number of the issues voted upon are controversial — for example, the restriction of smoking rights to consenting adults in private). Also, if it were legal, the system could have been used to produce (without consumers' consent) detailed records on the types of goods purchased by specific households.

Citizens are encouraged to participate in various government-established task forces on societal problems. They can also access the deliberations of most government bodies (local, state, federal, and global) via computer terminals (access is via
various key terms, and responses to the deliberations can also be entered in the terminals and directed to backbenchers, Ministers, or other key decision-makers).

The use of key terms as a lobbying tool has increased. For example, some environmentalists have instructed their terminals to contact them whenever environmental issues are discussed (individuals would generally be more specific; for example, they might distinguish between environmental issues affecting their local area as compared with global issues, or perhaps they might be particularly interested in one type of environmental issue [for example, the preservation of specific areas of wilderness or species of animal]). Similarly, libraries have programmed terminals to co-ordinate the recording of television programs pertaining to a wide range of curriculum areas, using the same technique.

A number of lobbyists have developed "standard" responses to be sent to decision-making bodies when issues of interest are discussed. All of this has been made possible through the use of improved index systems of deliberations. Initially, abstracts of deliberations with key words linked to them were developed. However, as the power of computers increased, greater use was made of accessing according to every word used in discussions.

5-15. LEISURE

As participation has become easier, more and more people are participating in societal governance in their leisure time.

When word processors were still relatively uncommon, access to them gave persons a degree of power which was previously
unobtainable without significant support staff. This resulted from the ability to, for example, customise letters to a large number of decision-makers. As word processors became more common, this differential in potential power became less obvious. However, the people at the forefront in using word processors for lobbying then began using data base packages to focus their lobbying for maximum effect.

By the late 1980s artificial intelligence systems were available to people to assist in leisure pursuits. These could be run on micro-computers and assisted with such things as:

* advising on political strategy;
* advising on how to relieve tension;
* medical advice;
* child-rearing advice;
* learning;
* career planning advice;
* marriage guidance;
* leisure options advice; and
* networking advice (to assist in linking-up with others with similar interests).

These systems are also used widely in the APS. They use a large amount of storage space, and it was not until the mid-1980s that it was recognised by both the management and unions in the APS that they would have a significant effect on "higher-level routine work" (undertaken by such persons as senior clerks, doctors, accountants, and other professionals) in the APS.

This was surprising when one takes into account that even in the early 1980s artificial intelligence systems were available to
assist with mineral exploration activities, and medical diagnoses.

5-16. ACCESS TO TECHNOLOGY BY THE POOR

As the power (and personal power-enhancing capabilities) of available systems became increasingly obvious, it was perceived that, if the democratic process was to continue, it was critical that the poor not be excluded from access to information, conventional computer systems, and artificial intelligence-based systems. This was initially a problem when systems were introduced, because of their few users and high fixed cost. However, it was soon recognised that the marginal cost of additional users was often not high, and that the Government had a responsibility to fund the involvement of such people in the system (free use of such systems other than in libraries [for example, in the home] was restricted to those who passed a means test).

This awareness was not immediate. In the late-1980s there was still discussion on how such facilities should be provided to the poor. It had been argued for a number of years that terminals should be made available in the homes of people who could not afford them, but Telecom had resisted this concept (or at least resisted funding of the required terminals – it had been argued that this was a responsibility of the Department of Social Security). Eventually the problem was overcome by making the provision of information terminals to the poor a national priority. A number of Departments were involved in making a Joint Cabinet Submission on this matter (a key component being a significant grant to Telecom to implement the policy) and this
was accepted by Cabinet in the late 1980s.

5-17. MONITORING OF STUDENTS AND PUBLIC SERVANTS

The question of access to information about oneself recorded in systems was highlighted in the late 1980s when the public and union members in the APS became increasingly aware of how all-encompassing were the computer systems operated by the APS and educational systems.

Educational administrators monitor the progress of teachers and students via terminals. The APS in the mid-1980s resurrected the Mandata system partly because of the need for a comprehensive Service-wide system for monitoring staff. This monitoring was partly to assist with career planning (both for individuals and Departments) but also had a component dealing with the evaluation and supervision of staff. At the more junior level the emphasis was on specific evaluation around output measures. At management levels the emphasis was on using prose comments around key themes by supervisors. Computer packages were developed in the late 1980s to assist with the interpretation of such prose comments. These packages were particularly useful in highlighting themes which occurred over a number of years in individuals' evaluation reports, or in groups of evaluation reports in Sections, Branches, Divisions, Departments, or the APS as a whole.

Computer packages are available to produce summary evaluative reports on both staff and learners. As learners are increasingly involved in real-life problem solving, and staff have a responsibility to learn, the packages are very closely related.

Initially, learning facilitators (especially teachers) and unions
were concerned about the use of such approaches. However, safeguards were developed which ensured that the systems are used to assist with the development of individuals, not purely for negative evaluative and supervisory purposes. Learners are now assisted in the most appropriate fashion possible.

With regard to staff evaluation, the emphasis is very much on evaluations being used to assist with the individual concerned; both with encouragement when he or she is doing well, and with remedial suggestions where there are problems. This means that officers with difficulties (for example, in coming to work on time, or logging-on on time) are identified within a short time of the problem arising and remedial action is generally taken quickly to ensure that the officer concerned is given assistance to overcome the problem.

The emphasis at the macro-level in these approaches is to ensure that broad policy is being adhered to, whilst allowing for appropriate flexibility for individuals in the implementation of that policy. Exception reports are produced listing only those people for whom action needs to be taken. The computer system also gives advice on the most appropriate action in such cases. For example, it might indicate that one student comes from a very poor home where there is no transport to school, and suggest that remedies be investigated when it is found that a student is consistently coming to school late. In the case of a staff member, it might indicate that an officers' spouse was dismissed the week before and so the officer would be given a warning to be on time in future, but not too much pressure would be placed on him or her at this time.
Specific controls have been built in to ensure that personal contact and interpersonal interaction are maintained. Also, the use of telephones which allow for a stationary visual component has greatly improved the "personal" touch in distance and other non-direct interactions (which is particularly important when evaluative activities are being undertaken).

5-18. SOME SCHOOLS AND GOVERNMENT DEPARTMENTS NO LONGER HAVE BUILDINGS.

In the late 1980s the government used as one justification of the need for close monitoring of citizens via computer systems the fact that a number of schools and government Departments no longer had buildings, and that in such a context traditional less-structured approaches to monitoring would not be practicable.

A number of correspondence schools sold their buildings in the late-1980s and allowed staff to work from home 100% of the time - as do their students. Some new schools were developed without buildings - particularly where there was a limited number of potential students, or where the students were widely spread geographically. Some schools which initially planned to maintain their buildings found this was almost impossible to justify as the number of students decreased. Also, some teachers who initially found the idea of working from home unattractive (because of a concern that career prospects might be limited, or that professional interaction would be cut off) soon came to appreciate the advantages of this approach and more and more are now applying for "home" rather than "school" placings.
The first Government Departments with no buildings were small ones. A number of these Departments were in areas which involved the analysis of future trends and had a heavy reliance on information in data bases and could operate without a heavy emphasis on face-to-face supervision and communication.

As the cost of space became more expensive, and the cost of communications technologies continued to decrease, the Department of Administrative Services developed a set of guidelines in the mid-1980s outlining the types of positions which could be operated from home. To the surprise of many senior officials, it was found that almost half of the policy positions in the APS had a 50% or greater component which could be done from home. This meant that some officers were working from home up to 4 days per week. This dramatically reduced the rent and overheads bill for the APS in Canberra. The effect in Regions was not felt as greatly, as much more of the staff were involved in direct interaction with the public. However, by the early 1990s more and more of the public were using their terminals for interaction, and greater numbers of Regional Office staff were able to work from home.

5-19. "TERMINAL ADDICTION" AND PERFORMANCE DIFFERENTIALS.

A problem which was not generally recognised until the mid 1980s was, that in using terminals regularly, students and professionals could over time develop extremely close relationships with the systems they interacted with, and lead unbalanced (as traditionally interpreted) lives as a result.

There has been a significant decrease in the quality and regularity of much inter-personal interaction. Some students are
described as being anti-social, having lost, or never learned, good inter-personal skills. This is a serious negative consequence of increased terminal usage which is causing educators and politicians much concern. In some areas, special classes in social interaction are conducted in an effort to counteract this problem.

A number of students and professionals have become "terminal addicts". The highly motivational aspects of using computer terminals for work and study had not been fully recognised until the early 1980s. Computer systems provide immediate feedback, and do not have personality faults. They respond to instructions immediately, assist with the clarification of needs, and have the potential for repeated testing without criticism – explicit or implied (as compared with teachers, friends, supervisors, and companions). They can also tailor the interaction to the needs of the interactor. A significant number of students are now starting Ph. D. studies before 18 years of age as a result of these factors (in particular because students can proceed at their own pace using such systems).

In the work situation such features have resulted in clear performance differentials between officers, which can be monitored by the system. This has resulted in less need for “broadband” type supervisors, and more need for supervisors who can assist with the follow-up of specific difficulties which individuals might face. One reason for the massive difference in the performance of officers is that there is now virtually limitless clerical assistance-type support (for example, in accessing, filing, checking spelling, copying, indexing, and
mailing documents). The trend towards the employment of fewer clerical assistants in the early 1980s by the APS was seen to be an appropriate step by the end of the 1980s and virtually all clerical assistant-type tasks are now being carried out by computer systems. The places originally filled by these persons are now filled by programmers, systems analysts, and other computer-related professionals, so that employment opportunities have not been lost but have been redefined. This has not reduced the career prospects of clerical assistants on the payroll. They have been able to rise through the ranks purely on ability (with a five year experience bar) since the early 1980s, and when it was perceived that there would be less need for their type of skills, the PSB made a special effort to involve such officers in retraining.

Performance differentials have resulted in some officers entering the upper executive echelons of the APS (specifically the Senior Executive Service—containing less than 1% of the administrators in the APS) in their early twenties. Initially this was seen as a good thing, as it highlighted that age discrimination (even if it had existed in the Service) was no longer a problem; but by the early 1990s it was increasingly seen that technology could provide more support than most people could cope with (that is, it was seen that more and more individuals [both students and professionals] were suffering from "burn-out" as a result of overstimulation from their environment).

From the late 1980s, to avoid addiction to terminals, students and office workers were being encouraged to participate in sport, arts and crafts, drama, and various other forms of physical and social activity. All new office buildings have provided sports
facilities and showers, reading rooms, and other facilities for physical and intellectual leisure. As many students and workers are located in their homes, this is not always of great help in getting them away from their terminals. In an effort to overcome this, research is being undertaken into new types of sports which incorporate the feedback and self-correcting aspects of terminals. Also, computer systems themselves are being increasingly designed to avoid "burnout" in operators, by "keeping tabs" on their use of the systems and notifying the operator and supervisors of unhealthy trends. Some models have built-in warning lights and buzzers to indicate to the user that a rest-time is overdue.

5-20. INTERNATIONAL TASK FORCES

Students, public servants, and other adults and young people who have the ability, are increasingly working on international task forces established by such bodies as the United Nations. A strong push for increased youth involvement in U.N. task forces resulted from pressure placed on the U.N. by young people during the International Year of Youth in 1985.

A number of private groups have also facilitated youth involvement. The Club of Rome in their book published in the late 1970s "No Limits to Learning" was particularly supportive of the twin thrusts of youth "participation" in society and of young people being trained to "anticipate" (possible, probable, and preferable futures). It argued that young people should not only be allowed to participate in societal activities, but should be trained in how to anticipate, so that this participation could be real and not tokenistic. Since the mid-1980s there has been an
increased use of computers to allow both for participation and training (and facilitating) in the use of futures techniques.

Telecommunications technology has made significant participation by previously non-involved persons possible at the international level. This is particularly the case at the early stages of discussion when innovative ideas are being sought.

5-21. MULTIPURPOSE SOCIAL INSTITUTIONS

All social institutions are seen as multipurpose rather than single purpose. Increasingly, professionals and trades people are participating in community education activities. Education is seen as a lifelong process, in which all professions and trades have a function. Also, there is growing recognition that clients need to be educated to use the powers which they are increasingly being given by the government in the areas of health, housing, the law, and education. The emphasis is on assisting the community to create its own future, rather than having a future thrust upon it by forces over which individuals have no influence.

The increased potential influence which individuals can exercise over their own futures has partly resulted from smaller institutions. In a sense, schools have become one-student institutions: the student has significant control over what is learnt, when it is learnt, the way it is learnt, and the pace at which it is learnt. The same is true for public servants. Those in policy positions now have the equivalent of a statistical section, library, large numbers of clerical assistants, an editorial team (both for graphics and written work), and a
personal assistant at their service. This means that virtually any officer can have great administrative support at a very low cost.

The supportive nature of this environment for both learners and workers came as a shock to many; it was thrust onto a society which was little prepared for it. Most of these changes occurred in the decade 1985–1995. It has been a period of exponential growth. Governments have been hard-pressed to keep control of developments.

5-22. REDUCED HIERARCHICAL EMPHASIS.

The powerful technologies available have tended to break down the hierarchical approaches to education and public administration which have existed for so long. Information is a form of power. Access to information is thus related to power. With manual systems it was much easier to restrict access than it now is with automated systems. As all data analysis is done within computers using standard packages, it is difficult to argue that requested information is difficult to produce. Also, in the late 1980s there was an acute awareness amongst the public about any information to which they were not allowed access. A law has been passed requiring that a red light flash on an individual’s terminal when he or she attempts to access information with a higher security classification than he or she possesses. If the person feels that the restriction of access is unreasonable, there are established procedures for appeal. The ease with which participants in the educational and government process can obtain information has broken down hierarchical structures. More and more a person’s power is related to his or her ability to
contribute to the goals of the organisation rather than merely to his or her formal position within that organisation.

5-23. MATRIX STRUCTURES IN EDUCATION AND PUBLIC ADMINISTRATION

Related to the reduced emphasis on hierarchical structures has been the all-pervasive nature of matrix approaches to organisation in education and general public administration. These incorporate the advantages of project and functional approaches to organisation, with an emphasis on, respectively, the achievement of specific measurable results facilitating accountability, and on the maintenance of functional expertise. "The result is that vast numbers of people report to one boss for purely administrative purposes and another (or a succession of others) for practical get-the-work-done purposes." (Toffler, 1981, p. 278).

It has been found that "...computerized conferencing is particularly good for interdisciplinary communications and multidisciplinary projects." (Hiltz and Turoff, 1978, p. 249).

In education, teachers are allocated to functional areas (for example, curriculum development, instructional technology, community development, professional development, or a subject area). Each functional area has a head who is responsible for the development of expertise amongst his or her staff. Staff are allocated to projects as required. Projects are organised on topics as diverse as "The impact on education of the average life span increasing to 100 years" and "The use of holographic technologies in graphic communications". Staff work on project teams for as long as necessary. Each project has a head who is responsible for ensuring that deadlines are met. There is less
emphasis on the traditional teaching function in specific subject area skills (at least in the cognitive domain, as compared with the psychomotor and affective domains); much of this is done more efficiently and effectively by computer.

In public administration there has been increasing emphasis since the mid 1970s on the need for specific results to be achieved. There was also a feeling that there was a need for public administrators to be more willing to shift between areas within the APS. By the mid 1980s increasing emphasis was being placed on the use of matrix approaches in the APS, although, initially, it was found that the complexity associated with large scale adoption of matrix approaches in large systems resulted in much confusion. However, the approach was found to work well in clearly defined sub-sections of organisations - for example, in the development of computer systems within large statutory authorities.

By 1990 these difficulties had been overcome with the assistance of data processing and telecommunications technologies. For example, all projects are now co-ordinated with the assistance of computerised PERT (Program Evaluation and Review Technique) packages. Information on such things as staff preferences for different types of projects, staff qualifications and experience, staff development needs, and project progress, is all integrated into the system.

"Ongoing transcripts of all conferences among middle managers permit monitoring and/or intervention if an unwise decision seems imminent." (Hiltz and Turoff, 1978, p. 144).
5-24. NEW APPROACHES TO PLANNING

There has been great emphasis on integrating matrix approaches to organisation into a corporate planning perspective.

In the early 1980s the Department of Administrative Services developed guidelines for the development of ADP strategic plans for Commonwealth Public Service Departments. These plans incorporated a five-year time horizon.

By the mid 1980s it was increasingly realised that Departments needed corporate plans with broad goals, specific measurable objectives (to facilitate accountability), and clear strategies designed to achieve the objectives outlined. Strategic plans were then integrated into this plan for each functional area (for example, data processing, personnel, and finance). In 1985 the Public Service Board issued guidelines on the development of corporate plans for Departments and also ran training courses in this area for middle and top management. It was also decided to hold regular six-monthly meetings between all Permanent Heads and Ministers to assist with broadening the vision of Permanent Heads on government goals (and the perspectives of Ministers on the administrative implications of their ideas, the implementation of which would relate to more than one Department).

As it was increasingly seen that there was a need to integrate education with other areas at the State level, it was appreciated that there was an increased need for State Education Departments to also develop corporate plans. A particular emphasis in most of these was on efficient interfacing between Education and other relevant Departments. Education Departments were increasing their roles in such areas as adult training (with a particular emphasis
on retraining, in comparison with initial training), training for participation in societal decision making, and the implementation of a lifelong education philosophy. The complexity of this (in particular in relation to the need to use resources from a number of Departments on many of the less traditional projects) was controlled by using matrix approaches and by having clear goals and objectives to work towards.

5-25. USE OF FUTURES TECHNIQUES

Rational techniques (such as strategic planning approaches) are used to the maximum for efficient and effective policy development. However, it is also recognised that "All these rational techniques are auxiliary to creativity, which is the central way to invent new and better alternatives." (Dror, 1968, p. 179). Futures studies techniques such as scenario development techniques, delphi, CIMAT (Cross Impact Matrix Analysysis on Transparencies), games, role plays, and BOM (Brainstorming on Microfiche) are used to facilitate the development of creative alternatives. It is also increasingly recognised that face-to-face meetings are not necessary for the generation of creative approaches, and may actually inhibit their development.

5-26. "OPENNESS" OF COMPUTER CONFERENCING - ADVANTAGES FOR EVALUATION.

As well as an increased emphasis on the use of futures techniques in the development of programs, there is an expanded emphasis on the need for structured evaluation of the results of programs.

Face-to-face communication is used less than in the past in evaluation exercises because it is much easier to make candid
comments via a computer terminal. Candid comments are essential if educational and more general public administrative organisational improvement consultancy is to work effectively. "Experience confirms the point that the advisory relationship is most effective when decision makers are willing to allow themselves and their operation to be fully examined, and to receive, as well as make, candid disclosure." (Lasswell, 1971, p. 79). This is facilitated at the beginning of the consultancy process by allowing the participants (both consultants and management) to make comments anonymously into terminals.

The openness of computer conferencing has also been found to have indirect advantages in the area of evaluation. "One of the many advantages of an open society is that evaluations of social progress come from a variety of sources." (Jones, 1977, p. 19). Evaluations too often tended to be closed-shop affairs, and were often of a self-justifying nature. With computer conferencing it has been easier to allow for wide participation in the evaluation of educational and public administrative systems. For example, one school council used conferencing to allow parents to input ideas and criticisms at the early stage anonymously. It was found that this increased dramatically the input at this stage. One Commonwealth Department with a large number of service locations allowed clients to input comments when they came for service via the operator. The comments were analysed by a computer package.
CHAPTER 6: CASE STUDY

This section of the thesis is based on an interview which the author held with Dr Mick March, Principal, Narrabundah College, Canberra on 10 September 1983. Section 6-1 deals with the key themes, and how they apply to the College at present. Section 6-2 deals with the broad question of how relevant the scenario outlined in this thesis is likely to be to Narrabundah College in 1995.

A non-structured interview approach was used in which Dr March was encouraged to comment on his own experience in relation to the key themes and the scenario. The emphasis was on gaining an appreciation of one Principal’s views on how the key themes are being implemented in one school system, and also his views on the potential for the scenario to be realised by 1995. In relation to the scenario the emphasis was on gaining one senior educational administrator’s perceptions of "probable" futures (as compared with possible [as in the scenario] or preferable futures).

The interview with Dr March lasted for over two hours. This section of the thesis does not consider Dr March’s comments exhaustively — instead the author has focused on a number of key areas considered in the discussion.

Dr March has been principal at Narrabundah College since the early 1970s. He has had previous experience as a High School Principal in N.S.W. Narrabundah College is a Government senior college in the A.C.T. schools' system (students being in Years 11 and 12).

My own comments on Dr March’s views are included at the end of
each sub-section.

I have also included a section giving an overview of the usefulness and implications of this interview (section 6-3) and have included a number of proposals, flowing from the interview, in the recommendations section.

6-1. THE KEY THEMES

6-1-1. Co-ordination.

Interviewer's comments:

Dr March indicated that being strongly technology-oriented can tend to result in one losing sight of human-relations aspects of administration. There is a possibility of depersonalising information-processing once one gets into the machine age. He indicated that if properly used, however, technological aids are very useful.

He felt that one of the basic problems with data processing technologies is the requirement that data input be extremely accurate. Many teachers feel frightened and "put off" by the precision required. One frequent criticism is that it will be the computer, and not educational requirements, which will determine how the school will be administered. There is a continual need to personalise the information processing. It is important that the people who put the information into the system get it back; that is, that they have a sense of "ownership". A key aspect in the ownership process is to train users.

Dr March also indicated that sometimes it is better to adopt a less efficient model than a totally efficient model, if staff are
willing to support the less efficient model and make it work.

Researcher's reflection:

I agree that efficiency is not the only objective which needs to be aimed for in developing data-processing systems to assist with the co-ordination of educational processes. There is a need for participants to feel some "ownership" of the system (in terms of both its development and refinement). Human relations aspects are also central if co-ordination is to be carried out effectively (for example, teachers need to be "sold" on the need for input data to be extremely accurate if the output is to be useful).

6-1-2. Devolution.

Interviewer's comments:

The A.C.T. government school system is a highly devolved one. Devolution to schools is counterbalanced by the fact that it is a very small system and a very visible operation. Although responsibility for decision-making rests in the schools, the results of that decision-making are very visible.

In the A.C.T. the Principal is working with a highly educated community. Dr March felt that this internal co-ordinating factor makes for an excellent environment for devolution. He indicated that, for the individual teacher in the A.C.T., there is much more involvement in decision-making than in N.S.W. In the A.C.T., the structures are more fluid, and project teams can be more easily formed.

A difficulty with devolution is that governments are responsible for decisions taken by public bodies. It is virtually impossible
for the Minister of Education to detach herself ultimately from
decisions taken in individual schools. Thus, there is a limit to
the extent to which devolution can take place.

Dr. March indicated that devolution tends to be a representative
rather than a full participatory process. This can create a new
elite within the structure. Representatives tend to be better
educated people, who are already involved in the system at some
level. "John Citizen" will not necessarily either stand for
election or get elected. However, to make participation less
elite would involve the administrator attending even more
meetings than at present.

Another difficulty is that the more people become involved in the
decision-making process, the less weight the views of any one
participant on average will have. The more educational
administrators try to involve people, the less power any single
individual has. This results in a feeling of powerlessness for
people who are participating. There is, however, a non-zero sum
of power. One can share power, build it up, and form coalitions.

Dr. March indicated that most people experience frustrations at
times because of the slowness of the A.C.T. educational decision-
making structure. For example, even the A.C.T. Schools Authority
cannot make decisions which will "stick". They attempted to close
Watson High School and failed - as a result of community
pressure. The school is now temporarily closed because of the
"asbestos scare" - again because of union and community pressure.

Researcher's reflection:

It is clear from Dr. March's comments that there is a degree of
conflict between devolution and Ministerial accountability (as I have considered in Section 1-2 of this thesis). Also, it is interesting to consider how the educational level of communities could affect devolution. If devolution is to be carried out effectively, it is essential that both well-educated and less well-educated parents be able to participate. The key difference between these groups of parents would be that one group would need little facilitation to participate in a devolved structure and the other would need facilitation. Clearly there is a need for an advocacy role in relation to participation by the poorly educated. It is also important to consider ways of facilitating new approaches to participatory-based involvement (compared with representative involvement). For example, it might be appropriate to consider such approaches as "Search" conferences which can involve large numbers of people considering policy options. "Search" approaches can be compared with traditional approaches to considering technological change, which only involve elite decision-makers.

6-1-3. Participation.

Interviewer's comments:

Parents, teachers, students, and other citizens can participate in School Boards (school governing bodies) in the A.C.T.

Dr March indicated that the majority of non-teacher or non-student members of School Boards tend to be either parents of students, or ex-students. It is rare for a Board to ever have its full quota of community representatives nominate for positions. For example, at Narrabundah College elections for School Boards are held only occasionally.
Dr March indicated that teachers can participate through school boards, faculty meetings, executive planning meetings and so on. The extent to which this results in real participation varies from school to school. To some people a staff meeting is a meeting where the Principal tells the staff what they will do. Other schools have staff meetings which allow all staff members to contribute.

Participation by teachers also occurs in the promotion process. Dr March felt that this is important if teachers are to be "professionals" in the true sense of the word. The ideal of peer involvement in the measurement of professionalism is a key feature of this concept. However, there are difficulties. It is hard for a teacher's peers to tell him or her that he or she should not be considered eligible for promotion (even after perhaps twenty years of teaching).

Dr March indicated that most secondary schools have student councils. However, Narrabundah College has experienced various lengthy periods when, because of a lack of student support, there was no student council. A council has recently been re-established.

Generally, popular students are elected to the School Board. There is a danger that the students on the School Board will eventually come to be seen as part of the establishment. There needs to be a mechanism for student representatives on School Boards to report back to fellow students. Without a student council this is difficult; however, newsletters can assist.
Researchers\' reflections:

These comments show that a key feature of professionalism is the determination of standards by the professionals themselves. Certainly in relation to teacher promotions it is clear that there is a heavy emphasis on professionalism in the A.C.T. However, it could be argued that the extensive involvement of other groups (such as parents, students, and other community groups) in educational decision-making limits the professional autonomy of teachers. This is an increasingly common feature of all professions (for example, there is increasing emphasis on disadvantaged groups having more control over medical processes, and government control over accounting standards).

It is also clear from Dr March's comments that it is much more difficult to establish a participatory, compared with a representative, model for community participation in school governance.

6-1-4. Decentralisation.

Interviewer's comments:

Dr March stated that there has always been a limit to freedom, and that there always will be.

In relation to the A.C.T. schools system this means that only well thought-out decisions can "survive". There are so many checks and balances that a radical decision will need to be very good to be accepted. Regrettably, some quite good decisions never get off the ground because of the excessive difficulty in decision-making.
Dr March felt that there is a general conservatism of both parents and students in a time of economic recession. This makes change more difficult, even though it is possible under the formal rules. Students are particularly conservative; they are less adventurous than they were in the middle 1970s. Some students seem to see education as a race to gain marks. They worry about employment and the competitive nature of entry to tertiary studies. In 1975, when Narrabundah College surveyed students about the subjects they wanted to study, there was a great diversity of subjects requested (in such things as life skills), but few students ever actually took these subjects when they were eventually offered as part of the curriculum.

Conservatism in curriculum choice also results from external pressures. Dr March indicted that the subjects which are accepted as part of a tertiary package are becoming more rigourously scrutinised. The Australian National University is exerting more pressure on the content of subjects for tertiary entrance and has complete freedom in either accepting or rejecting College syllabi.

In 1982 the Economics faculty at A.N.U. had a very poor pass rate in first year courses. They responded by blaming the Colleges, and by laying down strict criteria on the content of College Economics courses (if they are to count for A.N.U. admissions purposes), even though there is no close relationship between studying Economics at College and at University.

**Researcher's reflections:**

It is clear from Dr March's comments that there are a number of limits to the impact of a decentralised structure on a particular
College. These factors include the review procedures through which all decisions need to pass, the conservative nature of students and parents (particularly in times of economic constraint), and external factors (such as tertiary institutions). It could also be argued that a structure which only allows for "good" (that is universally accepted) decisions to survive will tend to be one which is not able to respond quickly to social changes, or to give encouragement to innovators.

6-1-5. Consultation.

**Interviewer's comments:**

Dr. March indicated that if a Principal is to involve himself in radical change, he will generally have meetings with staff, parents, and students. At present Narrabundah College is examining its aims and objectives. It has brought in consultants to structure such meetings. The consultation process in this case has not extended to the whole community.

Narrabundah College recently organised a day for students to consider the aims and objectives of the school. Attendance was not compulsory, and only twenty students attended.

**Researcher's reflections:**

It is clear that consultation is particularly important if a Principal wishes to introduce changes. However, the offer of consultation will not always result in participation (particularly when more attractive alternative uses of time are available). This is highlighted by the lack of student interest
until recently in having a Student Council (as outlined in Section 6-1-3).

Technology and computer-based procedures may facilitate consultation and participation, in that they can allow for student input at times convenient to them, and in ways which are non-threatening. Interpersonal interaction must be retained as being of primary importance; the technology should be seen as a supplement to other approaches to consultation, not as a replacement for them.

6-1-6. Networks.

Interviewer's comments:

Dr March outlined various types of education networks in the A.C.T. which influence Narrabundah College.

There is a local education network. This involves the High Schools and Primary Schools in a College's immediate region. The problem is that the student population of most Colleges comes from across the A.C.T. (and also from other States and even overseas).

Regional meetings of School Boards are held occasionally so that if a primary school is planning a new curriculum innovation (for example, the introduction of a new language course) it can liaise with other schools (for example, secondary schools) which might be interested in developing a co-ordinated approach between different levels of education in the region.

The College is involved in a network of international schools through the International Baccalaureate Program (this is a year 12
program acceptable for tertiary entrance purposes in a number of countries). The College also has close links with Senior Colleges in Tasmania.

Principals nationally have close linkages; for example, a High School Principals' conference was held recently in Canberra, and the National Conference of Principals of Independent Schools was held in Brisbane early in 1983.

Teachers tend to network through professional Teachers' Associations (for example, in Mathematics) which are organised locally, and are part of national bodies.

Many educational administrators in the A.C.T. are involved in the Australian Council of Educational Administrators. Senior educational professionals often are members of the Australian College of Education.

At the Year 12 level the A.C.T. Schools Authority is linked with a number of examining bodies. The Australian Conference of Examining Bodies meets two times a year. Representatives from the agencies are involved in the meetings, and there is generally a teacher representative from each agency (usually a College Principal in the case of the A.C.T.).

Dr March felt that there is not as much networking as there ought to be. For example, it is rare for all the staff development funds to ever be completely expended in the A.C.T. Also, sometimes it is very difficult to get staff to investigate educational projects elsewhere in Australia.
Researcher's reflections:

It is clear from the above comments that there are extensive networks of all aspects of education in the A.C.T. These networks are organised along both functional (for example, subject area) and project (for example, the International Baccalaureat Program) lines. However, it could also be argued that information on networking opportunities is not as widely available as it should be, given the fact that all the money available for staff development purposes is rarely expended.

Further, the increasing costs associated with actual attendance at National conferences, or with national data collection for research, are becoming prohibitive for many potential delegates and researchers. It is clear that the new computer-based technologies will have the potential to permit greater national involvement without actual attendance, and in these ways, educators of all types should be significantly assisted with this type of networking.

6-2. SCENARIO

This section of the discussion focused on Narrabundah College and the relevance of certain aspects of the scenario to possible futures for Narrabundah College up to 1995.

6-2-1. Computer packages.

Interviewer's comments:

Dr March argued that many people deplore the fact that, partly because of the influence of the modern calculator, some students cannot perform routine mathematical processes such as the long-
division algorithm. He indicated that the advantage of the calculator, if properly used, is that examples of real-life mathematics can be looked at without the arithmetic obscuring the logic of the problems. Once one gets to the stage of being able to program as well, the ability to explore ideas, structures, and logic by numerical analysis is extended tremendously. This can be done without being detrimental (according to many people) to the individual's ability to calculate. However, some balance must be drawn between understanding concepts and technical skills.

Mathematicians have been the first to use computers. This is not surprising, taking into account the logical processes involved. However, computers are now spreading into other subject areas. For example, at Narrabundah College a computer has been installed to teach students word processing techniques. It is essential that typists learn these techniques, for it will not be long before all businesses have simple word processors. The science department at the College has requested that mini computers be made available for use in physics courses. The design technology teachers are investigating computer graphics package usage. These can be used in the technical drawing component of courses. They can assist with giving students a clearer understanding of perspective, and general design principals. A synthesiser is used in the music department - this is based on microchip technology.

In the College students are free to choose the subjects they wish to study. Thus, there is no way that typing can be made part of a "core curriculum". There are no compulsory subjects at all. Nevertheless, Dr March indicated that in future there will need to be an increased emphasis on keyboard skills. Students will also tend to learn to type at home using home computers.
He feels that packages will be used extensively by 1990 and almost universally in Australian education by 1995.

Packages will also be used in educational administration. Narrabundah College has been using computer systems since the early 1970s. Many reports are generated. However, this is not necessarily a good thing, because the reports produced do not necessarily focus on the information need of the educational administrator. The current administration computer system at Narrabundah College is batch-based rather than real-time via terminals. In such an environment it is possible to print-out the academic status of every student but not to have a terminal in the principal's office which he could use to gain customised reports quickly.

Dr March believed that by 1995 senior teachers and educational administrators would have terminals on their desks, and would obtain reports via "user-friendly" query languages.

Researcher's reflections:

I agree that real-time systems will enable educational administrators to access information in a more focused fashion. However, such systems will only be used efficiently if administrators are trained to use the systems to gain the information they require. With interactive query-based languages becoming generally available (designed to allow information systems users to request customised reports using English language-like commands), this training should emphasise report design rather than computer programming. As is clear from the scenario in this thesis, I also agree with Dr March's vision of
the extensive use of computer packages in all subject areas and their expanded use in the home. For example, extremely effective economical interactive packages are already available to teach skills such as typing.

6-2-2. The role of school and public libraries.

Interviewer's comments:

Dr March argued that broadening the role of libraries and allowing students to learn from home would produce individualised learning and a lack of control and standardisation. He felt that this would worry many educators. From a cynical point of view, it could be argued that many educators and community members would not care what people know, as long as everyone knew the same thing. It is the fact that different people know different things that causes concern.

He felt that the use of mastery learning packages is not related to the way people learn. They tend to create boredom and force people to go through learning steps unnecessarily. They do not take account of the enormous capacity of the human mind. This learning facility needs to be built into packages. Dr March doubted that the problems with mastery learning packages will be solved by 1995. The combined effect of many people "out to make a quick quid" and many teachers being lazy in their teaching and software-selection process means that much software will be of a very poor quality. Schools will need to have a rigorous ADP strategic plan, and all proposed software purchases will need to be thoroughly tested.

Dr March felt that the actual role of the teacher as an
intervener in the learning process would have to be developed if students were to learn from home. Teachers would need to have a considerable amount of training to play this new role, and teachers at present have not always had the necessary training. However, once this sort of learning becomes more common, teachers will want to learn about it. Conservative forces will need to be overcome. People will need to be conditioned to think of this learning as acceptable.

One approach to this would be to have pilot programs: The "School without Walls" (an innovative Government school in Canberra which emphasises the use of community resources) could be such a pilot. This school was designed to use community resources, with students spending much of their time outside the school building learning in the community (using such organisations as the National Library as learning resources). In the pilot program, students would learn on their own at home with the aid of computer terminals much of the time, and the school would act purely as a co-ordinating body.

As regards a more conventional community education approach mentioned in the scenario, Dr March indicated that most schools in the A.C.T. do not have community libraries (libraries available outside school hours). He felt that it could be a very effective use of a school resource, and would be a positive goal to work towards.

**Researcher's reflections:**

As regards the last point mentioned above, I feel that the cost of allowing for the duplication of such resources as libraries
will ensure that school and community libraries are combined or closely coordinated, and accessible to all.

Dr March's comments on mastery learning software are based on approaches to computer assisted instruction which are out of date, but which are regrettably still reflected in some commercially available software. Good mastery learning software now has a testing component which allows students to "jump" modules of a learning program which they already understand to a predefined level of competence. The software can also be designed to allow for customisation to the learning style which best suits the individual learner (for example, strongly graphically or prose-oriented, depending on the student's success in learning earlier material based on alternative presentation approaches). As with all types of packages, it is essential that the software be tested before purchase, and fit in with an overall ADP plan for the school. However, this does not mean that computerised mastery learning approaches as such are inappropriate as Dr March's comments would seem to suggest.

Both pre-service and in-service training of teachers will need to reflect rapid changes in technology and their applications in education. If this is not done, teachers will not cope, and by default, will become increasingly redundant.

6-2-3. Innovative approaches to education.

Interviewer's comments:

On the issue of parents playing a key role in the education of the young, Dr March indicated that schools were established to meet a particular need in society. Certain skills were needed to
survive in the late nineteenth century, which the average parent
did not have. Consequently it was necessary to provide "elders"
(teachers) to children in an isolated environment (the school).
Dr March wondered whether in the future parents would have the
skills needed to impart knowledge. Even if parents were to play a
role, Dr March felt that teacher the would still be essential for
isolating and packaging information in an accessible way. He felt
that teachers will need less specialised knowledge, and more
skills in facilitating learning and accessing information.

Dr March did not feel that the full vision of the scenario will
have been achieved by 1995. He cited as evidence for this his
view that in the last decade in the A.C.T., changes have not been
as dramatic as envisaged in the scenario. Instead, the progress
which has occurred has tended to be of "a few steps forward and a
few steps back" nature. However, he did feel that there will be a
growing call for data base and networking access. There will be
less emphasis on textbook learning and more on using data bases
and networks generally (if these are readily available). He felt
that people may have some difficulty in adjusting to involvement
in extensive international liaison via networks.

Dr March indicated that lifelong learning could be very costly if
current approaches are used. However, the use of new technologies
may make it cheaper to allow for this type of education.

Researcher's reflections:

I feel that there is real potential for parents to play a key
role in the education of the young. Where they do not have the
basic necessary skills, it is the responsibility of the education
system to provide programs to assist them in gaining these
skills. It is regrettable that with Australia's low participation rates in education (for persons over fifteen years of age) many parents (unless there are significant changes) will continue to lack the higher level conceptual skills necessary for them to assist the young in learning. This does not change the desirability of the vision - it means that more resources must be put into assisting adults learn the necessary skills.

The rate of change in the last decade in the A.C.T. may have been relatively slow; however, inexpensive and powerful communications and computing technologies were not available at that time. The development of inexpensive computer networks and related technologies needs to be recognised as being potentially as significant as the development of the printing press for learning. If these technologies are not applied quickly, human potential will be wasted. This must be seen as the crime which it is, rather than as "a continuation of past trends". Adult education will also need to increase people's awareness of the potential uses of the new technologies, if significant numbers of community members are to become involved in such things as international networks.

6-2-4. Approaches to career education.

Interviewer's comments:

Dr March posed the question of whether we will be talking much about careers in 1995. Unemployment could be as high as 30 or 40%. He felt that people will have to be educated to forego the ideal of having a conventional career, and that there would be a need to break down the rewards associated with having careers.
He felt that mentors (which were considered in section 5-5 of the scenario) could be paid to assist other people in learning broad skills (not purely as a career education device as envisaged in the scenario).

In relation to the "Adopt-a-School" concept, he indicated that businesses do not adopt local schools in Canberra, although some businesses offer prizes for school competitions. Work experience goes some of the way towards this concept.

Researcher's reflections:

I agree that unemployment will continue to rise, and that there is a need to broaden one's vision in relation to career education. I would agree that mentors could be used to assist young people in gaining an appreciation of such diverse activities as how to participate in handicrafts or in social change processes. I do not agree with Dr March's view that the rewards associated with having a conventional career need to be broken down. What is needed instead is for much of the potential satisfaction from having a career (such as the feeling of contributing, and being able to have a reasonable standard of living) to be offered to the unemployed, through involvement in non-career based activities.

6-2-5. Communicative competence.

Interviewer's comments:

Dr March felt that a broader concept of communicative competence is an ideal goal. However, this assumes a basic level of intellectual competence. For some people this level may be too
high, and may be undesirable even if it could be attained. From a cynical point of view, it may be better to keep people ignorant. The only people who start revolutions are those who know they are badly off.

He indicated that a significant part of schooling (he preferred not to use the word "education" in this context) is for strong socialising. Fundamental survival skills are taught with an emphasis on the need to obey rules (in relation to such things as physical violence). He wondered if such socialisation could occur if students learnt from home. He indicated that schools keep children together and form them into a society. If they learn at home they may become more individualistic (even if well taught) and interpersonal skills may suffer.

By 1995 people will be using the new technologies but, if they are too mechanically complex, some people will feel discouraged from using them. It is therefore essential that the equipment be "user-friendly", simple, and developmental. There must be a structure which will assist people to learn broader communicative skills, but which will also allow them to proceed at their own pace. It will take at least 12 years to achieve this.

**Researcher's reflections:**

I would agree with Dr March that it is important for children to learn basic social values. This can be achieved through them being at school with other young people some of the time. Also, students who behave in deviant fashions could be required to attend schools in a way similar to that in which deviant young people at present are required to attend remand centres. However, I do not feel it should be necessary for all young people to
attend school 100% of the time in order to learn how to behave in society. In fact, it could be argued that more deviants are created by schools than are reformed by them (in that schools give disadvantaged children a feeling of inadequacy and failure which may result in them seeking rewards in socially undesirable ways). I would also argue that Australian society needs more creative individuals if it is to remain internationally competitive in a global economy increasingly based on the creation, storage, and communication of knowledge rather than on the production of goods and services in tightly defined hierarchical organisations. If this is the case education should encourage, rather than stifle, individualism.

6-2-6. National educational data base.

**Interviewer’s comments:**

Dr March agreed with Bennett that there is conflict between freedom of information and privacy ([1980, p. 3] as outlined in section 4-3-3 of this thesis).

He felt that it is desirable for people to have strong information-accessing rights. However, it is also critical that bad information not "follow people" forever. People should be able to "shrug-off" a negative label, and not be permanently classified as deviants. Data needs to be edited regularly, so that people know what information is held about them (they would be given copies of their records as a part of this process), and records relating to childrens' court offences should not be held for long periods.
Researcher's reflections:

I feel that Dr March's specific proposals in regards to privacy protection could play an important part in ensuring that a degree of privacy is maintained in a "Network Nation". The concept of keeping only negative information on persons for a specified time would be worthy of further exploration, but it should not apply to more major crimes.

6-2-7. Distance education.

Interviewer's comments:

Dr March agreed that a national educational data base on itinerant students would, if established, prove very helpful, but felt the logistics could be overwhelming.

He predicted that satellites will have as big an impact as the pedal-radio did for education in isolated areas. Such technologies will also assist with teachers' conferences. National conferences are becoming very difficult to arrange at present, partly because of the increasing cost of travel. At the same time, the desire for national conferences is growing. Dr March felt that educators need to look for new ways of exchanging information. It may not be as enjoyable to sit in front of a terminal to participate in an international conference as to attend a conference in person (for example, in Miami); however, many international conferences could be organised more efficiently on a regional basis with interchange of information via computer networks between regions.
Researcher's reflections:

I agree with Dr March that there is real potential for new technologies to be used in facilitating the interchange of information between educators as a supplement to other approaches. It would be appropriate for the Australian College of Education to approach the Overseas Telecommunications Authority to fund a pilot linkage of regional conferences between professional educational associations in different parts of the world.

6-2-8. Adult education.

Interviewer's comments:

Dr March doubted that continuing education would be required of large numbers of professionals in order to maintain their status by 1995. However, he did indicate that the Teachers Federation in the A.C.T. has accepted involvement in continuing education as a criteria for promotion. Compulsory attendance at courses to maintain status industrially is not, however, required.

He indicated that compulsory continuing education may be more likely to come in the para-professional areas. For example, doctors may apply pressure to require continuing education for nurses, rather than for themselves. The people at the "top of the tree" generally see themselves as fairly competent and not requiring continuing upgrading, but they see a need for this for "the minions". Dr March felt that, similarly, the Principal of the school is more likely to require continuing professional development of his staff rather than for himself. Yet intuitively it may be that the administrators are the ones who are most in
need of continuing education, and are possibly the ones least likely to receive it.

Researcher's reflections:

I would agree with Dr March that it is likely that para-professionals will have pressure put upon them to accept compulsory continuing education (if only to up-grade their status). However, I also feel that professionals will feel increasing pressures to define compulsory continuing education requirements for themselves, as the public becomes less deferential towards them. If professions do not define these requirements for themselves it is likely that governments will do it for them. The need for continuing professional development is likely to grow exponentially, as will technological change.


Interviewer's comments:

Dr March felt that there is a need to break down the distinction between work and leisure in peoples' conceptual frameworks. By 1995 we may need to think about all human activity not necessarily being categorised in as value-laden a way as at present. For example, some people currently talk about leisure as being less valuable than work.

Researcher's reflections:

I would agree with Dr March that there is a need to break down distinctions between work and leisure. I feel that technologies such as computer networking could facilitate this by allowing people to work from home, to search for information in their
leisure time, and to work in team situations. One would hope that such approaches would tend to make work less alienating, and allow for the incorporation of some of the positive aspects of work in leisure activities. Also, such technologies could assist with the development of new leisure pursuits which are more socially developmental than the often non-participatory sporting activities which many Australians currently watch on television most weekends, and increasingly during the week as well.

Governments will increasingly be called upon to provide and financially support such gainful social activity.

We need to redefine work and leisure and ensure that people are gainfully engaged in some activity for the 30 hour working week. These activities may not be "work" according to our present conceptions of employment. It is clear that many future employment opportunities will often be in the information and human development areas, and educators must be trained to convey this to students and the entire community. Notions of unemployment must be re-conceived to refer to those who are not gainfully engaged in productive activity.

6-2-10. School buildings.

Interviewer's comments:

Dr March believed that school buildings will still exist in 1995. They will be used partly as central agencies for organising educational experiences. He found it difficult to see how practical subjects such as science, art, and physical education could be taught efficiently at home. Art may become more terminal-oriented; but computers cannot produce quality paintings
as conventionally interpreted. Also, learning practical skills like motor maintenance (psycho-motor skills) requires hands-on experience with a teacher observing. It is too costly for everyone to have his own backyard laboratory.

He commented that it is interesting to note that the subjects which many people see at present as the "raison d'être" of the educational process could be taught at home for a large percentage of the time (for example, mathematics and English).

Researcher's reflections:

I agree with Dr March that the role of schools will change, and that many psycho-motor skills will still need to be taught in a group environment in 1995. However, this does not affect the viability of the broad thrust of my scenario, which does not propose that students learn at home 100% of the time. Also, Dr March does not appear to appreciate the potential for students to develop "masterpieces" on terminals with sophisticated graphics/artistic packages. Computer systems can simulate such things as chemistry experiments, and motor maintenance activities, often saving money and not exposing students to dangers from explosions (effectively this could allow every student to have a "backyard laboratory"). My own view is that students will learn aspects of all subjects at home, and other aspects at school.

I would agree that the school will continue to play a role in 1995, but that it will be significantly changed, and very likely specialise in particular activities. It is virtually certain that the school will generally be an all-age community education centre, rather than restricted to children and young people as is
often the case at present. There will be a particular emphasis on the school providing a venue for socialisation.

6-2-11. Terminal addiction.

Interviewer’s comments:

Dr March indicated that already some students are "hooked" on computer terminals. These are usually not the best students; rather, students who are less successful in a conventional learning environment seem to gain some measure of success and satisfaction in being able to use computer systems.

Researcher’s reflections:

I would comment that it is regrettable that schools have not been designed so that "average" students can receive from normal education the sort of feedback and re-inforcement they gain from computers. There is a need for educators to recognise that the features which computers offer (such as immediate feedback of results and the ability to study at one's own pace) are essential if average students are to find educational experiences as positive as possible.

6-2-12. International task forces.

Interviewer’s comments:

Dr March was unsure whether young people could be involved in international task forces. As an ideal he felt that it would be a positive thing; however, he indicated that there is a limit to educators’ imagination. Where values are concerned, most people are innately conservative. For example, some educators would
reject the use of international task forces as a learning mode because it is not possible to test international task force participation. Skills and knowledge which can be more easily tested tend to be taught.

Researcher's reflections:

I would agree with Dr March on this last point. However, this does not make it any less important for educational programs to be broadened to include such things as international task force participation by young people. Educators with an interest in the use of such techniques could start working now on new approaches to evaluating such activities, so that they can be introduced more easily into conventional school programs.

As educators, we should be more careful that we do not shy away from difficult decisions. If educators are to have an influence in the curriculum content of the future, then issues such as the one above must be confronted and pursued.

6-2-13. Multi-purpose social institutions.

Interviewer's comments:

Dr March indicated that we tend to be a very specialised society. He felt that the development of multi-purpose institutions would be one approach to overcoming this. Another would be to have greater interchange between institutions. Dr March was unsure which approach he favoured, but felt that the motivation of the individuals involved could be a problem in implementing such approaches (for example, in the context of a Youth Remand Centre).
Researchers' reflections:

My own feeling is that there needs to be more interchange between institutions (in the short term) but that institutions should also aim to be more fluid and multi-purpose in the longer term.

Economic and technological costs will prohibit all institutions from providing all services. However, it will become an economic and social necessity for institutions to be flexible whilst developing strong networks with other institutions, and to be specialised in certain areas. Society is pluralistic, and practice would tend to indicate the multi-purpose pluralistic institutions are the more stable politically.

6-2-14. Matrix structures.

Interviewer's comments:

Dr March felt that expertise will become more important than position in hierarchies. He felt the thesis that devolution will mean less emphasis being placed on formal position power, was a supportable one, since more information would be distributed. However, he also indicated that many people gain their rewards from their personal position and status, and that it is part of a basic human tendency to evaluate people using a hierarchical approach.

Researchers' reflections:

I would agree that position power will become less important in a devolved computerised structure. However, I disagree that it is part of basic human nature to evaluate people according to their position in a hierarchy. In Western cultures this is certainly
part of current business cultures; however, person-centred value systems are gradually becoming more generally held. These will become more pervasive as there is less need to motivate people to aspire to senior formal positions in tightly structured hierarchical organisations, which diminish much of a person's individuality in return for a high income and social esteem.

6-2-15. New approaches to planning.

*Interviewer’s comments:*

Dr March indicated that planning approaches are being continually developed in education. People are becoming more experienced with them in the A.C.T. Schools Authority (for example, in relation to assisting schools update their aims and objectives). He felt that new technologies could facilitate more efficient consultation with the community in relation to these processes (assuming citizens are receptive to being involved).

*Researcher’s reflections:*

I agree with Dr March that planning approaches are continually being developed, and that new technologies could facilitate more broad-based consultation with wider community groups in educational planning.

The concepts of co-ordination, devolution, participation, consultation, and networking are inter-related and will each have a significant role in the planning approaches to be used to best accommodate and gain from the new technologies.
6-3. CONCLUSIONS

I found my discussion with Dr. March very useful in terms of considering both the relevance of the key themes to an educational administrator's experience in a particular education system, and also how the scenario might be implemented in a particular school.

In relation to the implementation of the scenario Dr. March made me particularly aware of the following:

* The need for in-service education for both teachers and educational administrators if new technologies are to be used effectively. This in-service should include components dealing with the use of mastery learning computer packages, the use of computers in non-traditional subject areas, and the use of real-time computer systems in educational administration (as compared with batch-based systems).

* The need for schools to be careful in their selection of computer software. I would argue that all schools should have an overall ADP strategic plan (as do Commonwealth Departments) and that software should only be purchased if it can be shown to fit within this plan, and has been properly tendered for and fully tested.

* The need for research to be undertaken into what senior educational policy makers perceive as the goals of education. If it is desired that a significant proportion of young people should remain relatively ignorant and come away from school with a feeling of powerlessness, then it would be most inappropriate for many of the technologies considered in this thesis to be used
in education. My own feeling is that such an appreciation of the purpose of education would be held by virtually no present day education policy-makers (although it could be argued that this is the result of current approaches to education in many cases, even if it is not the intended purpose).

* There needs to be further research undertaken into how parents could assist with the education of their own children. In particular, it needs to be determined whether more educational resources should be directed to new approaches to adult education so that parents can gain the necessary conceptual and teaching skills that will assist them in participating in the education of their children.

* More research needs to be undertaken into approaches to participative consultative processes in education (as compared with representative approaches), which do not require senior educational administrators (in this case Principals) to give unreasonably of their time and effort.

* Further research needs to be undertaken into the question of what skills will be needed in order for people to be defined as "communicatively competent" in the twenty-first century. Particular consideration needs to be given to new types of information acquisition, processing, and dissemination, skills.

* Consideration needs to be given to the question of how core social values can be taught to young people using computer networks as an aid.

* Research needs to be undertaken into how regional conferences based on the use of communications networks could be made more
attractive for participants (as compared with, for example, attending an international conference in person).  

* It would be useful to know why students can become "terminal addicts" but very rarely become "addicts" to learning in conventional learning environments.

* Consideration will need to be given to how educational administrators who gain their satisfaction from their position and status could be kept satisfied in an organisation which values expertise rather than formal authority.

More generally, Dr. March has made me aware of how detached one can become, when dealing with possible futures, from the actual every-day considerations faced by senior educational administrators.

There is real value for persons attempting to develop possible and preferable futures to have regular discussions with pragmatic senior administrators working in the system they are studying. This will not necessarily change the researcher's vision. What it will do is make him or her aware of issues which need to be faced if the vision is to be "sold" to senior practitioners in the field of interest."
CONCLUSIONS.

Specific conclusions relating to Chapter 6 of this thesis are included in sub-section 6-3.

In this thesis I have considered how a number of key themes are currently interacting in public administration and education (in chapter 4) and how they could affect them in the future (in chapter 5). This is followed by a case study which includes consideration of the limitations to the effective implementation of the key themes, as seen by one educational administrator, currently working in the A.C.T. school's system, together with his views on the positive and negative features which he saw in the scenario. The case study was particularly useful in highlighting one senior educational administrator's view of a probable future for education in the A.C.T. in relation to technological change.

In general terms, my key conclusion, based on the evidence I have analysed in this thesis, is that computer conferencing, data processing, and other new technologies (including new approaches to organisational design) have great potential to assist with the restructuring of educational and general public administrative systems in the 1980s and 90s.

They could be used to:-

* Make educational opportunities more universally available throughout people's lifetimes. This is an essential attribute of an educational system which is designed to assist people in coping with a rapid rate of change. It is also essential if the economy is to respond rapidly to changes in demand for goods and
services (both domestically and internationally).

* Increase flexibility of working arrangements. This will have real potential to assist previously disadvantaged groups to be involved in the workforce (for example, married women with young children). It will also allow people to have greater choices in their lifestyles.

* Allow for increased involvement of persons in societal governance. This is particularly important if democratic decision-making is to result in decisions which are based on correct information.

* Improve evaluative procedures both in education and general public administration. In a society which is increasingly questioning the effectiveness and efficiency of governmental programs, it is essential that all techniques (particularly relatively low-cost techniques) which could assist with the focusing of resources in areas where they will have the most impact be used.

* Reduce the gap which currently exists between work and education. In a society in which there is a need for regular retraining, it is important that this gap be diminished.

* Reduce the current gap between work and leisure. This would partly result from the increased flexibility which workers would have in determining their work patterns. It would also partly result from the multiple uses to which such technologies as computer terminals and networks could be put (for example, they could be used for both personal and business communications).
* Provide massive support of an information accessing, processing, and presentation type to both workers and students. This information will be able to be provided much more inexpensively and efficiently than at present. Also, the emphasis will be on assisting both workers and students focusing-in on the exact type of information they need (with the aid of technology) to avoid information overload (that is, there will be an emphasis on exception reporting in business and tight problem-definition in education).

* Improve understanding between nations, and reduce the need to travel in order to communicate with people of different cultures. This would both reduce the use of non-renewable resources, and reduce the potential for warfare resulting from misunderstandings between persons from different cultures (in the longer term).

* Facilitate new approaches to governance, with more types of linkages between citizens and their representatives in Parliament. This is particularly useful when one considers the very limited time which parliamentarians have in which to meet personally with their constituents.

Some dangers, which need to be considered before these technologies are introduced on a wide scale include:

* That "...the technology is more portable than people often realize and those countries that offer the best [in this context meaning the least controlled] regulatory environment could easily become world information centers." (Hiltz and Turoff, 1978, p. 459).

* The need to involve citizens and unions in planning for their
introduction. The non-involvement of unions in technological change has resulted in industrial disputation. It has also resulted in the inefficient selection and use of the technology in question. It is essential that workers be able to have an input into the selection of new technologies, since they often have a different perspective from management on the "non-formalised" aspects of the system with which they work.

* The need to ensure that privacy is maintained. It is particularly important to ensure that international data enclaves are not allowed to develop which could process Australian data without the need for the protections which Australian law specifies.

* In relation to privacy "...it would cost little to intercept, screen, and automatically analyze all the computer-stored communications that a person sends [via a computer conferencing system]." (Hiltz and Turoff, 1978, p. 488).

* The need to avoid burn-out and other occupational health problems resulting from the over-stimulation which such systems can provide. This is particularly important when one takes into account the high rate of burn-out which already occurs with executives using manual systems and the almost addictive nature of many computer games.

* The need to ensure that, where such systems are used for evaluation (of either students or workers), the emphasis is on providing ways of improving rather than on purely negative evaluation. The dangers in using the equipment purely to control operators is reflected in the sophisticated monitoring packages which are already in use for computer input personnel; these will
no doubt become more sophisticated in future (and include components which will allow them to do higher level evaluative work).

* That such systems do not restrict social intercourse of other kinds. This danger is not as great as it might first appear, particularly when one takes into account the reduced need for travel which these systems could facilitate (the time saved in travel could be used for socialising).

The major limitations are not with the technologies themselves - they are with the flexibility which is allowed policy developers in education and general public administration. Until organisation structures are redesigned to allow for greater responsiveness, it will be difficult for such systems to respond to the challenges posed by these new technologies.
8. RECOMMENDATIONS

8-1. GENERAL PUBLIC ADMINISTRATION

* It is obvious that as a result of technological and social change the APS needs a systems-disturbing component (this may be sections or individuals within the APS). As Corbett has indicated, "Public services need to be creative as change-agents, or at least some parts of them need to have that sort of capacity, the capacity to respond to, and even generate system-modifying ideas and policy proposals; for if such capacities exist nowhere in the public service our political social and economic systems may well suffer the fate of the dinosaur." (1978, p. 68).

* In view of the fact that "Creativity and invention may...be influenced within policymaking organizations by institutionally protecting innovative thinkers from organizational conformity pressures" (Dror, 1971, p. 19), I would recommend that the PSB investigate ways in which such innovative thinkers could be identified and protected from conformity pressures.

* That the Commonwealth Public Service Board establish a unit similar to the Congressional Clearinghouse on the Future (but on a much smaller scale) with a responsibility to keep the Commonwealth bureaucracy up to date on possible long term futures. This Clearinghouse would also have an educative function for public servants, and a consultative role in such activities as liaison with unions on technological change, and in considering Commonwealth usage of new technologies (such as Videotex) in the early planning stages.
* That the Australian Institute of Public Administration, together with Telecom, investigate innovative approaches for the use of telecommunications technologies in general public administration and report the results of these studies in the Journal of the Institute. Particular emphasis could be given to such questions as:

  * how telecommunications could be used to improve client servicing and involvement in planning;

  * how computer conferencing could facilitate the development of innovative organisational structures in the public sector; and

  * how telecommunications technologies (in particular Videotex) could be used to communicate information to the public on public sector programs of relevance to the general community. The issue of who should fund the allocation of space for community-type information in such systems could also be investigated.

8-2. EDUCATION

It is recommended that in relation to education:

* The Australian College of Education, together with Telecom, experiment with the use of such technologies as computer conferencing, videotex, loud-speaking telephones, and conf Ravision, in various instructional and educational administrative contexts - and report the results in Unicorns.

* That educators with an interest in the use of such learning approaches as international task forces of young persons begin working on student evaluation techniques for these innovative approaches in order to facilitate their more ready acceptance into conventional educational environments (whereas Dr March
points out in his comments on the scenario [in section 6-2-11], those things which can most easily be tested tend to be taught).

* That the Australian College of Education liaise with the Overseas Telecommunications Commission in an attempt to develop a pilot network of regional educational conferences ("Technology and Education" would be an ideal theme for such a pilot).

* A number of educators co-operate in the development of schools to act as "beacons" in each State in the area of technology and education. A particular emphasis might be on the need for both community participation in the school, and the use of new technologies for social development.

I agree with Dr March that the "School without Walls" could be an ideal potential "beacon" in the A.C.T. if funding could be obtained for it to be structured so that students could learn from home a significant amount of the time, using computer terminals.

* State Education Departments and general Government Departments explore not just the use of computers for dissemination of information (as with Data Base systems) but for two-way dialogue (as with computer conferencing).

* Foundations consider funding task forces of young people to investigate social problems, with the assistance of data processing and telecommunications technologies. There would be a particular emphasis on the young people using computer packages (such as word processing and statistical packages) rather than on having them develop customised computer systems.
* The Federal Government, in consultation with the States, establish a unit specifically responsible for considering and publicising long-term issues in education—in particular in relation to technological change.

8.3. GENERAL ASPECTS

* There is a need for research to be undertaken dealing with innovative applications of satellite technology in education and general public administration. The emphasis should be on exploring new approaches which satellites could facilitate (such as national in-service education activities with participants remaining in their home States) rather than purely on exploring new ways of delivering traditional programs (such as distance education programs).

* There is a need for research to be undertaken into how artificial intelligence based systems may affect education and public administration in the future.

This area has been relatively neglected up to this point in time, partly as a result of most government and education systems only recently coming to grips with the potential impact of micro-computer systems and computer packages on themselves.

Once artificial intelligence based systems become more widely available they could potentially have a massive impact (as is reflected in the scenario). There is a need for unions, educators, and public administrators to define new "preferable" futures in relation to their use if their introduction is to not result in massive social conflict.

* There is a need for further research into how language
Translation computer systems might be used in such areas as ethnic education, and international liaison.

* There is a need for the Australian Law Reform Commission to investigate ways in which criminal databases could be structured so that information on minor illegal acts does not "stick" with a person for the whole of his or her life.
2. REFERENCES

Arthur Andersen and Co., "Joint Management Review of ADP Management Issues in the Australian Public Service"

Bennett, John M., "Computers and Citizen Participation in Politics and Government"

Botkin, James W., Elmandjra, Mahdi, and Malitza, Mircea, "No Limits to Learning"

Brennan, Frank, "Decentralisation in Australia - A Task for the Commonwealth"

Buchinski, Edwin J. and Islam, Mazharul, "The Context of Interconnection for a Nation-wide Bibliographic Network"
ED 211 078, June 1980.

Chamberlain, Neil W., "Social Strategy and Corporate Structure"
Chapman, R. J. K., "Implementation: Some Lessons from Overseas" in Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"

Chapman, R. J. K., "Regionalism, National Development and Governmental Institutional Arrangements: Regions as Moderating Influences"

Coombs, H. C. (Chairman), "Royal Commission on Australian Government Administration - Report"

Corbett, David, "Putting It Together and Keeping It Together" in Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"

Craven, Paul and Wellman, Barry, "The Network City"

Crousaz, Dione, Davies, Carolyn and Weston, Andrea, "Towards Participation: A Study of Self-Management in a Neighbourhood Community Centre"
Dede, Christopher J. and Bowman, Jim R.
"Two Views of Educational Technology in the Future"
in Kierstead, Fred D., Schiller, Sherry L., and Avery, Dennis Van
(Editors), Special topic edition of the

Domnel, Paul R. and Associates, "Decentralizing Urban Policy"

Dror, Yehezkel, "Public Policymaking Re-examined"

Dror, Yehezkel, "Ventures in Policy Sciences"

Dye, Thomas R., "Understanding Public Policy"

Elliot, David and Elliot, Ruth, "The Control of Technology"

Etzioni, Amitai, "The Fallacy of Decentralization"
in Cook, Terrence E. (Editor), "Participatory Democracy"

Fantini, Mario and Gittell, Marilyn, "Decentralization: Achieving Reform"


Jones, Charles O., "An Introduction to the Study of Public Policy"  

Joyce, Bruce R., "The Magic Lantern: Metaphor for Humanistic Education" in Gerbner, George; Gross, Larry P.; and Melody, William H., (Editors) "Communications Technology and Social Policy"  

Kimbell, Dieter, "An Assessment of the Computer-Telecommunications Complex in Europe, Japan, and North America" in Gerbner, George; Gross, Larry P.; and Melody, William H., (Editors) "Communications Technology and Social Policy"  
John Wiley and Sons., Inc., 1973, pp. 147 - 164.

Lasswell, Harold D., "A Preview of Policy Sciences"  

Lilienthal, David E., "Decentralization: Antidote for Remote Control"  
in Cook, Terrence E. (Editor), "Participatory Democracy"  

MacBride, Robert, "The Automated State"  


Murray, D. H., "Community Education: A Blueprint for Education in the 80's"

Neesham, H. "Worker Participation in Management: A Report on the Public Sector"

Nyerere, Julius K., "Decentralisation"
United Republic of Tanzania, 1972.

OECD, "Strategies for Change and Reform in Public Management"
OECD, 1980.

Painter, Martin J. "Access: The Public Service and the Public" in Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"

Parkum, Kurt H. and Parkum, Virginia Cohn, "Citizen Participation Community Planning and Decision Making"
in Smith, David Horton and Macaulay, Jacqueline and Associates (Editors)
"Participation in Social and Political Activities"
Reid, J. B. (Chairman), "Review of Commonwealth Administration"

Salaman, Graeme, "Work Organisations"


Scott, R. D., "Towards a Professional Bureaucracy" in Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"

Sharpe, L. J., "Decentralist Trends in Western Democracies: A First Appraisal" in Sharpe, L. J. (Editor)
"Decentralist Trends in Western Democracies: A First Appraisal"

Skinner, B. F., "Beyond Freedom and Dignity"
Jonathon Cape, 1972.

Smith, David Horton, "General Activity Model" in Smith, David Horton and Macaulay, Jacqueline and Associates (Editors), "Participation in Social and Political Activities"
Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"

Advisory Commission on Intergovernmental Relations, 1972.

Toffler, Alvin, "The Third Wave"
1981, Pan Books Ltd. (First published in 1980).

UNESCO, "Intergovernmental Conference on Strategies and Policies for Informatics"

Victoria, "White Paper on Strategies and Structures for Education in Victorian Government Schools"

Webber, Melvin M., "Urbanization and Communications"
In Gerbner, George, Gross, Larry P. and Melody, William H., "Communications Technology and Social Policy"

Wettenhall, R. L., "A Brief History of Public Service Inquiries"
in Smith, R. F. I. and Weller, Patrick (Editors), "Public Service Inquiries in Australia"
10. BIBLIOGRAPHY

Chamberlain, Neil W., "Social Strategy and Corporate Structure"

Cook, Terrence E. (Editor), "Participatory Democracy"

Gerbner, George, Gross, Larry P. and Melody, William H.,
"Communications Technology and Social Policy"

Hadley, Roger and Hatch, Stephen
"Social Welfare and the Failure of the State:
Centralised Social Services and Participatory Alternatives"
George Allen and Unwin, 1981.

Jones, Barry, "Sleepers, Wake! Technology and the Future of Work"
Oxford University Press, 1982.

Kierstead, Fred D., Schiller, Sherry L. and Avery, Dennis Van
(Editors), Special topic edition on "The Future of Education" of

Marien, Michael (Editor), Future Survey Annual 1981 - 1982

Masuda, Yoneji, "The Information Society"
Institute for the Information Society, 1980.
Sharpe, L. J. (Editor), "Decentralist Trends in Western Democracies"
Sage Publications Ltd, 1979, pp. 119 - 156.

Smith, David Horton and Macaulay, Jacqueline and Associates (Editors)
"Participation in Social and Political Activities"

Thrall, Charles A. and Starr, Jerold M. (Editors),
"Technology, Power, and Social Change"

Wiltshire, Kenneth, "The Career Service and Public Policy" in
Smith, R. F. I. and Weller, Patrick (Editors), Public Service Inquiries in Australia
11. RELATED READING BY MYSELF

For people who are interested in reading articles by myself related to this thesis I give the following references.


"Uses of Future Studies Techniques by Educational Administrators". ED_207_134.

"Innovative Approaches to Career Guidance". ED_203_855

"Community Information Systems". ED_206_284.

"Communications Options - The Need for Increased Awareness of These Amongst Policy Developers". ED_205_138.


"The Use of Role Play in Assisting Students Cope With the Future". *New Horizons in Education*, No. 61, Spring 1979, pp. 24 - 25.


"The Line to Learning". *Quest*, No. 28, October 1979, p. 18.

"The Use of Future Studies Techniques in Assisting Students to Cope with Change". *Pione*, Vol. 6, No. 1, 1979, pp. 76 - 78.


ED numbers refer to documents available on microfiche through the ERIC system.
12-APPENDIX

12-1. ERIC DESCRIPTORS AND IDENTIFIERS FOR THESIS.

ERIC DESCRIPTORS:
(key descriptors have a * before them)

Accessibility (for disabled); Adult Education; Artificial Intelligence; Career Education; Change; Change Strategies; Community; Conflict; *Co-ordination; Curriculum Development; Demonstrations (Civil); Disabilities; Disadvantaged; Educational Media; Educational Trends; *Efficiency; *Evaluation; Exceptional Persons; Extention Education; *Futures (of Society); Governance; Governing Boards; Individual Power; *Information Systems; Innovation; International Educational Exchange; Leisure Time; Motivation; Management Systems; Man Machine Systems; Meetings; Motivation; Multilingualism; *Networks; Nonprint Media; Objectives; Open-Plan Schools; Organisational Effectiveness; Outcomes of Education; Parent Associations; *Participation; Planning; Policy; Political Power; Productivity; Redundancy; Schools; Self Determination; Social Action; Socialisation; Specialisation; Standards; Teaching Methods; *Technology; Tokenism; Totalitarianism; Training; Transition.

IDENTIFIERS:

Australia; Automatic Data Processing; Australian Public Service; Commonwealth Public Service; Communicative Competence; Computer Conferencing; *Consultation; Coombs, H. C.; *Data Processing; *Decentralisation; *Devolution; Educational Paradigm; Feedback; Freedom of Information; Hierarchies; International Task Forces;
Joint Management Review On ADP Management Issues In The Australian Public Service; Libraries; Multipurpose Social Institutions; Public Administration; Public Policy; Public Service Board; Reid, J. B.; Review of Commonwealth Administration; Royal Commission on Australian Government Administration; Scenario; Self-correction; Telecommunications; Victoria; Victorian Education Department; White Paper on Strategies and Structure for Education in Victorian Government Schools.
Author/s: Freeman, Andrew R.

Title: The network nation: the relevance of this for possible educational and general public administrative structures and strategies in the 1980s and 90s

Date: 1983


Publication Status: Unpublished

Persistent Link: http://hdl.handle.net/11343/39445

File Description: p.101-191

Terms and Conditions: Copyright in works deposited in Minerva Access is retained by the copyright owner. The work may not be altered without permission from the copyright owner. Readers may only download, print and save electronic copies of whole works for their own personal non-commercial use. Any use that exceeds these limits requires permission from the copyright owner. Attribution is essential when quoting or paraphrasing from these works.