

AN EXPLORATORY STUDY ON THE USE OF AUTOMATIC DATA
PROCESSING IN SCHOOL ADMINISTRATION AND ITS
APPLICABILITY FOR USE IN THE ADMINISTRATION
OF CHARNWOOD PRIMARY SCHOOL

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ABSTRACT OF THE STUDY

The study examines the use of automatic data processing in educational organisations for the purpose of determining the feasibility of using some ADP applications in the administration of a large urban ACT primary school.

Educational managers working in primary schools are required to make decisions which draw upon information concerning the student population, school curriculum, school personnel and general school administration. An analysis of the decision making areas of Charnwood Primary School is undertaken and the information required for making each decision is identified. The concept of using a database to provide some of this information is explored and suggested as being an effective means of managing student data.

Some equipment options which would enable a primary school to implement a database and provide word processing facilities are examined within a context of limited resources. The capacities and advantages of using computer equipment which is presently accessible to schools are outlined, along with the feasibility of employing the services of a data processing agency.

The conclusion is reached that there are a number of ADP applications applicable for use at Charnwood Primary School, as well as a number of other computer based facilities, such as word processing and plant management.

The downward price spiral of computer equipment will enable most primary schools to use computer facilities for school administration within the next five years.

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CHAPTER I INTRODUCTION

While the word "computer" still strikes awe in the hearts of some school administrators, one of the most burning issues in education today is the impact and likely outcome of computers on the process of education. Whereas much has been written concerning the use of computers for classroom instruction the potential for computer applications in the field of school management and decision making is yet to be realised.

In the U.S.A. computers have been used since the 1950's when some school districts and universities began replacing their cumbersome bookkeeping machines with massive new computers. Gradually, as costs permitted the larger systems slowly acquired their own equipment to perform inhouse accounting, purchasing and payroll functions. School usage, at least in the U.S.A., has become widespread and sophisticated as computer capability and support services have been miniaturised and streamlined.

All educational organisations have some form of information system whether it is a haphazard collection of unrelated files or a collection of computer programs. A major challenge in the 1980's will be to develop the means of providing relevant educational information that will meet the needs of school managers. During

this decade there will be significant technological advances in the computer field with further application of diversity, widespread expansion of systems and lower cost hardware. Educational managers can be supported in their decision making roles by employing the concept of a database to provide the relevant information they require. This process will also facilitate rapid educational change as managers will be able to assess properly the consequences of alternative courses of action.

Educational environments are constantly changing and thus for a system to remain effective it will need to be responsive and adapt to changes both from its own impact upon school management as well as the wider environment. School administrators are confronted with more information than they can readily use and must be able to sift worthwhile information from useless material. They need the facility to manipulate and disseminate that information which is germane to the decision making process.

PURPOSE OF THE STUDY

The study was undertaken in an attempt to explore the use of automatic data processing (ADP) in educational institutions and to determine the feasibility of using some applications of ADP in a large ACT primary school.

The study has been written to communicate with primary school personnel who are largely computer illiterate and sometimes resistant to change. The study attempts to assist school managers to identify their information needs and illustrates how in one school a database can be used to record student data and thereby provide a wealth of student information as may be requested by school personnel.

The issues concerning the selection of suitable computer equipment are discussed in the context of the rationale which educational managers must present to school boards for funding. The study does not recommend that school managers attempt the role of either a computer programmer or consultant and suggests that appropriate expertise be engaged in areas of design, program and implementation of ADP.

STATEMENT OF THE PROBLEM

Educational managers working in primary schools are continually required to make decisions with regard to their student population, school curriculum programs, school personnel and general school administration. For a group of school managers to make decisions effectively in the above areas a wealth of pertinent information is required. In practice this information

is not readily available. For example, information may be stored in various files throughout a school and gathering processes may be so time consuming as to prevent school managers obtaining access to the information they require. W. L. Mellor (1977, p.92) suggests that because school executives have relied upon intuition and experience rather than knowledge produced from refined observation, many contemporary schools are unchanged from those of a hundred years ago.

Many existing record keeping systems in primary schools tend to be unplanned, time consuming, frequently decentralised, inefficient and largely ineffective. There is a pressing need to examine the management of data in primary schools to see if it can be improved through the use of ADP techniques which can now be implemented cheaply and efficiently using the new generation of microcomputers.

DELIMITATION

The study is related specifically to Charnwood Primary School which is a large ACT urban primary school with an enrolment in excess of 450 students. The school opened in 1975 and is a fully open space configuration. Under the ACT Schools Authority Ordinance, 1976, primary schools in the ACT are governed by a school board

whose membership comprises three parent representatives, the school principal, two staff nominees and an officer from the ACT Schools Office. Charnwood School Board is responsible for the overall policy of Charnwood School, the day to day operation being the responsibility of the Principal and staff.

While the study considers the decision making events that occur at Charnwood Primary School, there is some similarity between this schools and primary schools in general which will make the principles discussed in this study relevant to most primary schools.

A significant limitation of the study is its discussion concerning certain brands of microcomputers and their specifications. Developments in this area are happening so rapidly that information and rationale relating to the selection of microcomputer hardware and software may soon be outdated.

APPROACH AND ORGANISATION OF THE STUDY

The study is primarily an exploratory work designed to investigate the use of ADP in schools, to analyse the decision making areas in a specific primary school and to identify and illustrate the potential of using ADP to provide an information source for school

decision makers.

Following the background and introductory statements made in this chapter, a survey of the literature dealing with data processing was completed. In view of the fact that there is almost no literature dealing with the use of data processing in primary schools, the review of literature concentrates on examining closely related areas such as secondary schools where it is feasible that some transfer of applications might be appropriate.

In chapter 3, a detailed analysis of the decision making areas at Charnwood Primary School is reported. A survey to determine the range of decisions made by all persons employed at Charnwood was carried out, and this data was processed to generate an extensive list of topics about which decisions are made. The information required to make decisions on each of these topics was identified, along with the school personnel responsible for decisions on each topic and the type of decisions they were required to make.

The concept of a database is outlined and presented as an appropriate means of organising a significant portion of the information required in decision making by school personnel. A proposal for creating a database to assist the management of student administ-

ration is outlined.

In chapter 5, the practical issues of selecting appropriate computer hardware and software environments are discussed within the context of the funding limitations which apply to an ACT primary school. Options other than the purchase of school based equipment are also considered.

The final chapter briefly summarises the range of options which face Charnwood Primary School in making a decision to employ the facilities of ADP.

DEFINITION OF TERMS

- ADP/EDP Automatic Data Processing (ADP) and Electronic Data Processing (EDP) refer to the system of automatic/electronic processing of data as defined under "Data Processing".
- BAND 1,2,3,4, refers to the system of promotion levels used in the Commonwealth Teaching Service, Band 4 being the highest level.
- BIT The basic unit of information in a digital computer is known as a bit. 1024 bits go to make up a kilobit or K. Thus a 64K RAM device contains 64 x 1024 or 65,536 bits of information.

- BYTE A byte is a group of bits taken together and treated as a unit.
- C.A.I. Computer Aided Instruction refers to the use of computer programs for the purpose of assisting a certain learning program.
- CENTRAL PROCESSING UNIT. A unit of a computer that includes the circuits controlling the interpretation and execution of instructions.
- COMPUTER A computer is a system for electronic data processing.
- DATA The term data in the context of a database refers to a collection of data elements which when related in a logical manner provides meaningful information.
- DATA PROCESSING Data processing refers to all the activities included in the treatment of data as they flow from a source of origin to end users. Data processing activities may include: capture or recording on some medium; preparation for processor input; transformation, treatment or processing in the central processing unit; output from the central unit via devices that format data or information for use in another

processing stage; and the use of information.

- DESIGN AND DEVELOPMENT Design and development refers to the practice of preparing strategies for the implementation of policy strategies.
- FILE A collection of related records treated as a unit.
- FLOPPY DISC A flexible magnetic disc resembling a 45 RPM record on which information is stored is commonly called a floppy disc.
- FLOW CHART A graphical representation for the definition, analysis, or solution of a problem, in which symbols are used to represent operations, data, flow, and equipment.
- HARDCOPY Hardcopy most frequently refers to the printing of information displayed on a VDU.
- HARDWARE Physical equipment, as opposed to the computer program or method of use: by contrast with software.
- INFORMATION Information refers to the meaning that a human assigns to data via means of the known conventions used in their representation.
- INPUT Input pertains to a device, process or

channel involved in the insertion of data or states, or to the data or states involved.

- K K refers to 1024 bits, see "bit".
- MATRIX In computers, matrix refers to a logic network in the form of an array of input leads and output leads with logic elements connected at some of their intersections.
- MEGABYTES A megabyte is a thousand K, see "bit".
- MEMORY Memory is a device which stores data used by a computer. Memory can be immediately accessible or it can be in back-up form such as magnetic floppy discs.
- MONITORING AND COORDINATION Monitoring and coordination refers to those activities which oversight the implementation of policy strategies.
- NETWORKING Networking refers to the linking of a number of terminals to a central computer program, commonly used in teaching.
- OPERATION An operation is a defined action, namely the act of obtaining a result from one or more operands in accordance with a rule that completely specifies

the result for any permissible combination of operands.

OPTICAL SCANNER An optical scanner is a device that optically scans printed or written data and generates their digital representations.

OUTPUT DATA Output data refers to the data to be delivered from a device or program, usually after some processing. Synonymous with output.

POLICY DECISION A policy decision is a decision made by school management with respect to the overall mode of operation of school functions.

PROGRAM A program is a series of actions proposed in order to achieve a certain result.

SOFTWARE Software is a set of computer programs, procedures and possible associated documentation concerned with the operation of the data processing system.

STORAGE Storage pertains to a device into which data can be entered, in which it can be held, and from which it can be retrieved at a later time.

SYSTEM A system can be defined as a group of devices or objects serving a common

purpose. A system is designed to perform a series of functions which result in accomplishment of the system's purpose.

RAM Random Access Memory is a memory device into which information can be entered or retrieved from any storage position, rather like a pigeon hole system.

ROM Read Only Memory is a memory device into which information is written during the manufacturing process and which thereafter cannot be altered.

TERMINAL A terminal is a station for inputting or retrieving information from a computer system. It usually takes the form of a keyboard and VDU and often has a printer. An intelligent terminal is a terminal which also has computer facilities.

VDU The Visual Display Unit is a television like terminal, consisting of a cathode ray tube on which may be displayed script or line diagrams generated by computer.

SIGNIFICANCE OF THE STUDY

The use of ADP in primary school administration is presently very limited and almost non-existent in literature reporting on the use of ADP in primary schools. The use of ADP programs in primary school administration has been limited in that :

- a. in primary schools the comparatively small size and limited staffing and funding have precluded the acquisition of expensive computing equipment;
- b. school personnel possess limited expertise in the use of computers as primary teachers who gain experience in computing studies frequently transfer to high schools and secondary colleges, where there has been a strong demand to establish computing study courses.
- c. the potential of ADP processes is not recognised by many primary school teachers. The use of ADP systems has historically been linked with large centralist and bureaucratic organisations, the rationale of which is the antithesis of primary school ethos.

There are a wide variety of tasks presently undertaken at Charnwood Primary School which could be more effectively performed using electronic data processing.

The analysis of priorities and the recognition of ADP potential will lead to an examination of old relationships and undoubtedly the discovery of new and more effective ways of achieving the school's educational objectives.

It is intended that this study will provide a starting point for the introduction of ADP and a basis for other primary schools to consider as the problems facing most schools are similar. As schools begin to use ADP an increasing range of options for the technology will emerge and consequently change the processes of education throughout the 1980's.

CHAPTER 2 REVIEW OF THE LITERATURE

A literature search was initiated using the descriptors "Data Processing in Education" in the Educational Index for the period 1962 - 1982. Examination of these entries revealed that while there were no examples of data processing in primary or elementary schools in particular, and few at the secondary school level, there were many entries relating to data processing at the college, university and board of education levels. The following is an analysis of this material based upon the assumption that it may be feasible to transfer some of the applications used in these institutions to the field of primary or elementary education.

A number of common uses for data processing by computers were evident from studies relating to the use of computers in tertiary institutions. In summary, the most widely reported applications as listed by D. E. Hurley (1981, p. 171) are:

1. course catalogue and class schedule maintenance;
2. registration of students enrolled at an institution;
3. class enrolment procedures including student billing;
4. student record maintenance, both

- biographic and academic;
5. transcript maintenance and production;
 6. institutional data gathering and reporting,
and
 7. support services for other administrative
units within the institution.

Other writers such as W. Mellor (1977, p. 82) and R. Robison (1976, p. 36) include in their applications of data processing for tertiary institutions the areas of:

1. staff data, which includes demographic characteristics, training and experience, ratings and effectiveness measures and salary, and
2. a finance data file which includes all cost elements relative to the educational program.

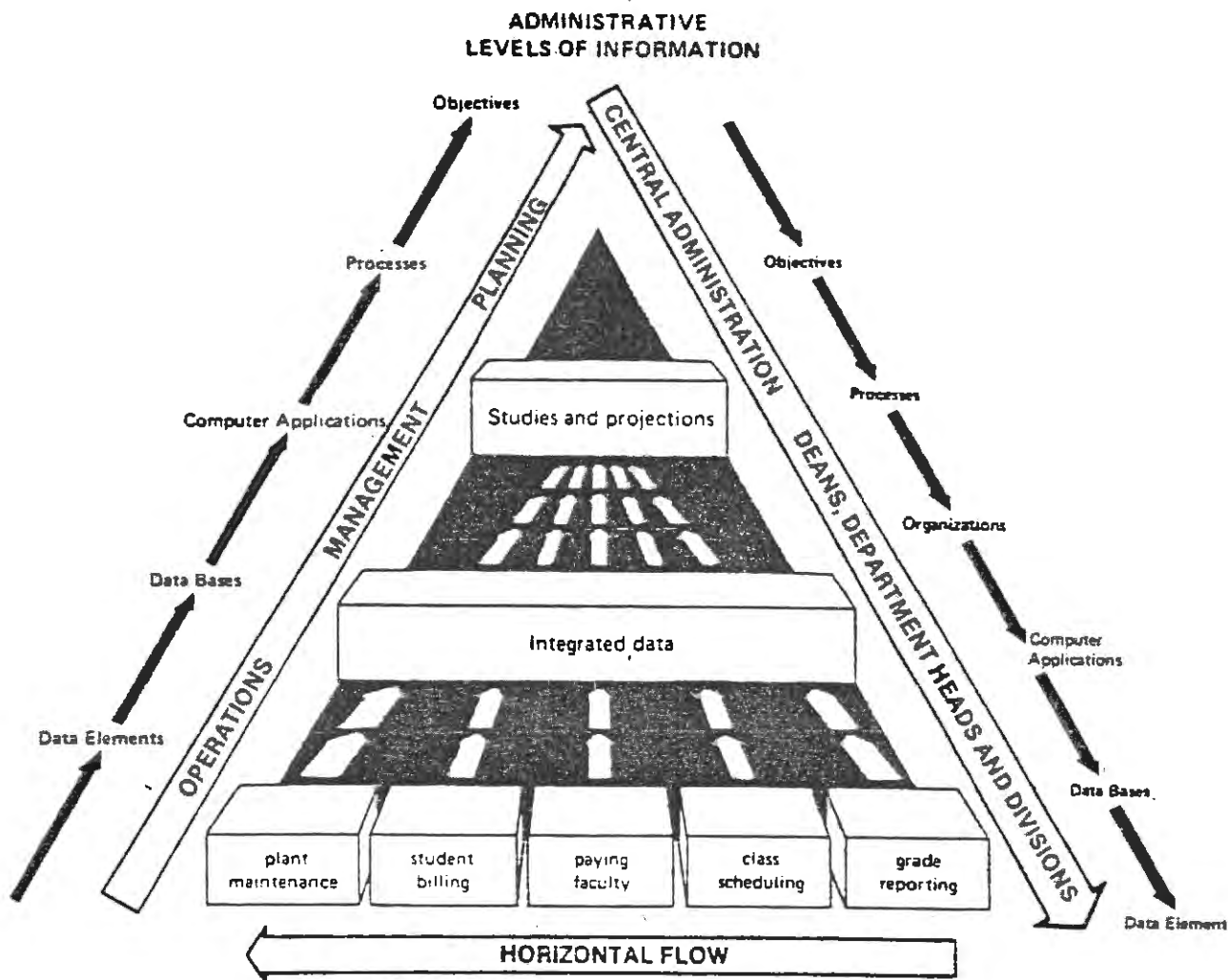
From the above data elements an integrated database can be generated and using computer applications the management is able to plan and make projections in relation to its objectives. In large institutions there is often an inadequate flow of information compounded by data provincialism from department to department. Redundancy of data and inefficient procedures result in data errors which can be overcome by developing an overall data strategy beginning with

a student data system, followed by a financial system. A good student information system is able to solve many horizontal flow problems while a good financial system will solve many vertical information flow problems. An information hierarchy for a large institution may be diagrammatically represented as illustrated in Figure 2.1 (Robison, 1976, p. 36).

In addition to the applications illustrated in Figure 2.1, a computer at Smith College (O'Connell, 1981, p. 48) code named "SOPHIA" (Smith's Omniscient Paraphernalia for Helpful Information Activities) has been used to provide a much wider range of facilities for students and the college administration. In this example, "Sophia" is being used to help students find compatible room-mates, manage dormitory food supplies, report on community relations and alumnae club activities, and has been programmed to assist as a garden caretaker by providing information on location, propagation and care instruction.

Operating at a school system level, the Atlanta School District's computer centre managed system wide functions such as payment of salaries, operating budgets, purchase of equipment, building maintenance and some limited student test records. However the acquisition of an optical mark reader system broadened substantially the ADP functions of the system to include:

Figure 2.1 INFORMATION HIERARCHY



The figure illustrates that given a total integration of information throughout an institution, strategic level decision making can be generated from all the institution's data elements.

- * purchase and accessioning of library books;
- * buying most of the school system's school supplies;
- * managing a wide range of student-related tasks such as student profiles, grade reports, attendance records, class schedules and student test scoring;
- * preparation of full operating budgets at the system and school levels;
- * administrative functions such as equipment borrowing, payrolls, reimbursement of employees for mileage, crime records, school inventories, telephone charges, student injuries, and scores of other tasks.

The system uses custom design forms for each specific need. Completed forms zip through the scanner in a fraction of a second and thereby eliminate the very time consuming task of using keyboard entries or keypunch cards. Prior to the introduction of the optical scanner the process of transcribing information on to punch cards meant errors, which undetected, created more errors. As the new system used the scan forms, information was transcribed electronically thereby eliminating all errors except for those occurring on the source documents. Costs were substantially reduced and the scope of application at the

school system level was broadened to cover many functions, which enabled the Atlanta School System to develop management planning and perform student related tasks rather than simply react to crises. (McConnell, 1976 pp. 24-30)

In secondary schools the complexity of class schedules has focussed administrators' attention upon computer based timetabling techniques particularly in schools which employ innovations that require alternative time patterns and a wider variety of school experiences. (Heller, 1974, p. 64)

As secondary schools are much smaller than universities and colleges, data processing of plant information, staffing and student registration data, and finance data are not as complex or are managed at a school system level. However, student data including record of courses completed, grade assignment, attendance, and other longitudinal information is voluminous. D. Shaw (1972, p. 40) states that where files of student data and information are maintained manually in various offices or school departments, rarely, if ever, are central files kept in which pertinent student information is to be found. Manual information systems suffer from lack of specific data required for certain decision-making, redundancy of data located in several places, lack of proper management to update files and

lack of timely information retrieved and manipulated from the files.

Many high schools are already producing personalised computer generated letters detailing student progress. Figure 2.2 (Williams, 1981, p. 49) illustrates a sample letter that could be written to parents using data stored in a data analyzer file. Information retrieved from the file is in small upper-case type. It would appear without upper-case type in the actual copy generated by the data analyzer.

The translation of various scoring schemes into letter grades has been the source of controversy and debate but it can be systematised so as to guarantee that grades from an institution will represent achievement in a reliable and meaningful way. Johnson and Van Osdol (1974, pp. 11-17) have written a fortran program to perform grade assignments according to the procedure they developed which overcomes the problems caused by teachers who assign grades inconsistently. The system combines the best techniques of normative, statistical and criterion referenced procedures which together guarantee consistent and uniform marking procedures. These conditions need to be satisfied if the assignment of letter grades for assessing academic performance is to be used as an important indicator of student accomplishment.

FIGURE 2.2 SAMPLE COMPUTER GENERATED LETTER

MR. AND MRS. DAVID JONES
21000 SOUTH UNIVERSITY DRIVE
ANN ARBOR, MICHIGAN 48109

Dear MR. AND MRS. JONES:

Earlier this year we promised you a summary of the results of the test your SON MICHAEL took as part of our TITLE I Program. This letter summarizes HIS test score.

At the beginning of the year, MICHAEL already was able to demonstrate 6 of the 21 READING skills we usually teach FOURTH graders. This is SLIGHTLY BETTER THAN AVERAGE for children who participate in this program. On MAY 4, when MICHAEL was again tested, HE had 18 of those 21 skills. However, MICHAEL still needs additional work with the following THREE skills:

- GETTING THE MAIN IDEA OF A STORY.
- SELECTING AN APPROPRIATE TITLE FOR A STORY.
- PREDICTING WHAT WILL HAPPEN NEXT IN A STORY.

We plan to emphasize these skills in MICHAEL'S reading program next year.

MR. AND MRS. JONES, we hope you share our satisfaction with the results of this year's program. We look forward to meeting you again at our annual FALL conference THIS SEPTEMBER.

Yours truly,

Mr. G. Smith, Ed. D.
Director, State and Federal Programs

Some high schools have adapted their mini-computers used in computer assisted learning programs for administrative purposes. At Briarcrest High School (Williams, 1980, pp. 109-110) a 1500 student school, successful results have been obtained using a mini-computer for registration and scheduling. The study claims that:

- * master schedule changes can be made with a simple entry;
- * class rolls and student schedules can be mass produced with total accuracy and legibility;
- * normal human errors (wrong name or room number etc.) are identified by the computer and marked for correction;
- * major savings in time and money have been made.

The registration process at Briarcrest involved the following steps:

- * students received a program of studies booklet containing a brief course description and pre-requisites;
- * guidance and counselling sessions were held during homerooms and study halls;
- * course selection sheets were given to students who complete their selections and have them signed by a parent;

- * an arena-type scheduling function was organised in which students were free to sign up only for those classes which appear on course selection sheets.

To meet the scheduling needs a number of computer applications were devised:

- * Registration Request Tally - Each course was assigned a number which provides information about recommended grade levels, instructional level and sequence with other courses. Data from the course selection sheets were fed into the computer, and a single program was run which produced totals of course requests. From this information, decisions can be made regarding courses to be offered and the allocation of faculty and plant resources.
- * Blind Class Scheduling - Students only know that a course is being offered at a given period and as information regarding the course teachers is not given, students do not expend time attempting to avoid certain teachers.
- * Verification of Scheduling Data - The computer is programmed only to accept authorised codes and class period assignments. Coding errors are identified and notified on the printout sheet for correction.

New students can easily be added and changes made without endangering overall accuracy.

- * Tallies can be produced to help administer the ordering of books for courses, laboratory supplies and other functions where class enrolment figures are important.
- * Complete Schedules can be printed including student name, home room, academic courses, teachers, room numbers, activity assignments and other data.
- * Data Input for student scheduling can be used to produce totally accurate class rolls for teachers and office uses. (Williams, 1980, pp. 109-110)

To perform these functions a mini-computer needs adequate file capacity, random access mass storage and relatively rapid printing capabilities. These qualities are further elaborated in chapter 4, where the concept of a database is outlined.

W. L. Mellor (1977, p. 92) suggests that one possible reason for contemporary schools being essentially unchanged from those 100 years ago is that their executives have had to rely upon intuition and experience rather than having available to them knowledge produced from refined observation and testing, accessible in a form that can be utilized effectively.

A responsive and adaptive educational information system can support a school's administrative function and facilitate educational change by providing information on alternative courses of action and their consequences. This rationale applies no less to primary schools than to other educational organisations.

In primary or elementary schools the creation of a database can provide information needed for decision making and problem solving. Primary schools are very small by comparison to universities, colleges and some high schools and thus their need to generate data on plant facilities, staffing, scheduling and finance is somewhat limited and often unnecessary. By contrast however, students remain in primary schools on average for seven years during which time very little data concerning their educational progress are readily available to administrators in a useable form. Raw data often remain with class and subject teachers and are lost over a number of years. These data are able to be easily retrieved or manipulated. Likewise, data filed centrally such as enrolment information, present a formidable task when administrators attempt to organise or manipulate the data manually.

Table 2.3 lists a sample of enrolment data and student record information that may be included on a student

file, depending on the needs of the individual school. (Overholt, 1968, p. 659) The table has been modified by using the equivalent Australian terminology.

Thus the concept of using databases commencing with a file of student data could provide administrators with information they need for planning and evaluating programs in the light of school objectives. D. C. Shaw (1972, p. 44) suggests that ultimately systems will be most successful if they evolve from a system that was deliberately limited to the provision of a few high priority educational services in the commencement stages. When a building block approach is used educational managers and systems personnel define the system in correlation with high priority educational requirements. In this fashion system testing and integration can be accomplished so as to assure necessary computer readiness.

The literature deals at some length with the advantages and disadvantages of data processing, the analysis of the institution's decision making requirements, characteristics of data and its manipulation, training of staff and system implementation. West (1977, p. 700) summarizes the advantages of database systems as being largely associated with their independence and computing efficiency. Procedures necessary for their development and implementation require the organisation to analyse its environment and operating procedures in a disci-

plined fashion which results in a positive improvement in the office methods as well. (Hurley, 1981, p. 173) Robison (1976, p. 36) claims that given a no-growth situation in an institution the necessity for relocation of existing resources creates a real need for more and better information which can justify the implementation of automatic data processing. All literature consulted claims that there is cost effectiveness of computerised management facilities in most educational organisations, even in an environment where computer costs are on average declining by as much as 35% per year. (Even-Tov, 1981, p. 14) By contrast to file management systems, computer systems are responsive and flexible and are capable of supplying non-standard outputs by data manipulation in a very short space of time. Thus by using the concept of a database, data can be manipulated as new requirements are identified by the user.

The disadvantages of database systems are connected with the design of such systems, the interdependency between users of similar data and the expense in establishment. Database systems are more difficult to design than file management systems as they must be tailored to meet the whole organisation's information needs rather than a collection of independent parts. Consequently the correction of design errors tends to be more difficult while undetected errors in data

input can be more quickly compounded throughout the system through considerable coupling between different data sets, there being less redundancy. The integration of databases requires a higher level of computer technology and thus costs are higher. While the computer can now do almost anything it is told to do, it can only do what it is told. If redundancy of data is to be avoided system integration and cooperation has to be achieved. The problems of security, back up and recovery are often more difficult to manage in a database system than a file management system. (West, 1977, p. 701) While the reliability of computers is ever increasing, good service and back up are sometimes difficult to guarantee. Administrators and programmers must work with the greatest possible clarity and explicitness to achieve the desired objectives and avoid the inclusion of spurious information.

To develop a database effectively several major tasks must be accomplished. In 1964, Dearden (Mellor, 1977, p. 97) identified the following functions that have since become widely accepted as a basis for developing databased systems:

- * strategic planning: determining institutional policies and objectives, changes required and resources available;
- * management control: dividing the strategic plans into logical subdivisions, funding

and assigning the tasks;

- * operational control: determining the specific staff, material, equipment and information necessary to accomplish the plan in the most efficient manner, and comparing results with plans and implementing corrective action where necessary.

Database systems should be dynamic and open systems that can absorb from their environment in an effort to retard the natural tendency to run down or disintegrate. They are rarely static. In practice this means that databases depend for their viability on continuing phases of design and adaptation, for they must be constantly re-developed in terms of the changing needs of its user environment. (Mellor; 1977, p. 97) Adaptation may be defined as the process of providing the services and changes needed to meet changing needs, thus a system's adaptability is a function of its ability to learn and perform according to changing environmental contingencies. When a database becomes a closed operation functioning independently, without due regard to the information needs of the organisation as a whole and unable to change, it rapidly becomes bankrupt. While it may continue to operate efficiently for a time its organisational vigour will be diminished. Thus to survive in the longer term a database system must be

designed to take account of its environment and the continually changing needs of decision making users.

To retrieve information from a database, efficient procedures are needed for handling different kinds of user requests. While requests for routine and regularly scheduled decisions can be provided from files of relatively homogeneous data, enquiries arising from unscheduled decisions necessitate that data be drawn from several files and submitted to some form of computation. To achieve this the user must know how to frame his enquiry in such a way that the system can respond effectively to it. It is this inquiry capacity which is at the heart of the system and upon which success ultimately depends. (Mellor, 1977, p. 97)

The training of institutional personnel in the use of computers is a major task. Training causes loss of productivity while in progress and when completed the institution is vulnerable to the market place as computing professionals are very marketable.

While it is over three decades since the first computers were manufactured, their impact on schools is now beginning to be recognised. Market research has predicted that in 1983, 13% of the 998,000 micro-computers sold in the U.S.A. will be used by schools. (Even-Tov, 1981, p. 10) This figure represents a

threefold increase in two years. It is further claimed that the availability of inexpensive microcomputers is profoundly affecting educational administration. (Even-Tov, 1981, p. 10) In 1970 a study conducted for the National Institute of Education disclosed that 78% of all secondary schools in the U.S.A. were using computers to perform tasks in student accounting, educational resource management, testing, research, guidance, and library applications. The extent of usage in primary and middle schools, while somewhat lower, is destined for marked increase and sales of microcomputers have doubled in the two years since the survey was undertaken. Given that the computing capacity which cost twenty million dollars fifteen years ago, costs a thousand dollars now, (1981) and will cost as little as a hundred dollars in a few years, (Even-Tov, 1981, p. 16) their use in the administrative decision making process, routine record keeping and office procedures, and as an agency facilitating the process of educational change is assured.

CHAPTER 3 THE DEVELOPMENT OF A DECISION MAKING
MATRIX FOR CHARNWOOD PRIMARY SCHOOL

As educational managers work toward achieving their school goals, they are required to make decisions which depend on relevant accurate information. Thus decision making processes in a school require that educational managers have the necessary information to provide the supporting rationale for their action. Databases have been developed to support the decision making process of an institution by providing the relevant information in a useable form. The purpose of this chapter is to document the decisions which are made in the administration of Charnwood Primary School, to determine the persons in the school's administration who are responsible for making certain decisions, and finally to detail the data sources and information that is required for decision making.

To determine the range of decisions made at Charnwood Primary School, all school records were examined and staff at all levels were interviewed.¹ Interviews were held with Band 1 teachers, all Band 2 Senior Teachers, Band 3 Assistant Principals, the Band 4 Principal,

1 The writer having worked at the school in a senior administrative position from the time the school opened in 1975 was responsible for the development of many procedures used to facilitate school decision making.

the Secretary, ancilliary staff and parent members of the School Board including the School Board Chairman. The focus question for each interview was, "In relation to your work or involvement with Charnwood Primary School, what do you make decisions about?" Interview data was then compiled into extensive lists of decision making areas and was further supplemented by an analysis of all the school records and files. For example, the record of all incoming and outgoing mail for the past five years was examined as a means of checking that information received or required by outside organisations was included in the decision making areas.

This procedure generated an extensive list of topics about which decisions were made at all levels of the school. Using the examples cited in the literature reporting on automatic data processing in high schools and colleges, four mutually exclusive categories appropriate to Charnwood Primary School were identified.

These major categories were:

- A. Student Administration, which includes the areas of decision making related to the school organisation of students and those activities which require the use of specific student data for decision making.
- b. School Programs and Curriculum, refers to those areas of decision making which deal with the development and implementation of the school's stated curriculum.

c. School Personnel, covers those matters relating to the employment of the school's casual, temporary and permanent employees.

d. School Management, refers to the administrative decisions made by the school with respect to its buildings, budget, equipment and other operations.

The following is a Functional Analysis Chart for each of the above categories. Common to each chart is its code indicating the type of decision being made and the person or organisation responsible for actioning the decision.

The code used for each of the above categories is defined below.

- P - Policy Decisions, refers to those courses of action to be implemented.
- D - Design and Development, refers to those processes which prepare policy decisions for implementation.
- M - Monitoring and Co-ordination may be defined as those activities which facilitate policy implementation by the most effective and efficient processes.
- I - Implementation, refers to the act of materialising organisational policy.
- R - Review and Evaluation, refers to the process of assessing the extent to which decisions which are being developed and implemented fulfil the policy decisions.
- C - Consultation, refers to the process of receiving

advice from other persons within the organisation.

The school personnel or organisation responsible for making decisions are defined as follows.

The Authority, refers to the ACT Schools Authority which is responsible to government for the conduct of public education in the ACT.

The School Board, refers to the local Board at Charnwood Primary School. The Board is responsible to the Schools Authority for the conduct of education at Charnwood Primary School.

The Principal is the chief executive officer of the School Board and is responsible to the Board for the implementation of all Board policy.

The Assistant Principals, Senior Teachers and Teachers constitute the hierarchical levels of professional staffing at Charnwood Primary School. All staff are responsible to the Principal.

The Secretary is a member of the school's ancilliary staff and is directly responsible to the Principal. A school secretary performs many of the non-teaching administrative tasks in a school.

FUNCTIONAL ANALYSIS CHARTCATEGORY A STUDENT ADMINISTRATION

<u>CODE</u>	<u>SCHOOL PERSONNEL/ORGANISATION</u>						
P - Policy Decision	SCHOOLS AUTHORITY	SCHOOL BOARD	PRINCIPAL	ASST. PRINCIPAL	SENIOR TEACHER	TEACHER	SECRETARY
D - Design and Development							
M - Monitoring and Co-ordination							
I - Implementation							
R - Review and Evaluation							
C - Consultation							
Student Enrolment		P					I
Admission Register		P					I
Student Class Allocation		P		I	I/C		
Student Record Cards		P	C	D	M	I	
Reporting to Parents		P	C	M	I	I	
Student Accidents	P		C	M			I
Circulars to Parents		P	C/I	M/C	C	C	I
Collection of Money (student)		P	C	D/C	M/C	I/C	I
Student Excursions		P	C	D	M/I	I	
School Buses		P		D	M/C	C	I
School Interpreters		P		I	I	I	
Age/Grade Return	P			M/I			I

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>STUDENT ENROLMENT</u> refers to those procedures which take place when a new student is enrolled at Charnwood Primary School. Enrolment Policy is determined by the School Board and implemented by the School Secretary.
STORAGE: School File - Enrolment Cards
INFORMATION SOURCE: The student's parent or guardian who is required to complete the enrolment form.
DATA GATHERED: <ul style="list-style-type: none"> - Surname, Given Names - Address - Date of Birth, and Enrolment Date - Admission No. (Given by the School) - Emergency Contact - Name and Phone No. - Father's Name, Occupation, Nationality, Wk. Ph. No. - Mother's Name, Occupation, Nationality, Wk. Ph. No. - Serious Illnesses - Special Disabilities - Children in Family, Name and Age - Particulars of Doctor, Phone No. - Other information relevant - Signature
WHEN: On or before every student starts school
NEED: The provision of basic statistical data for every student enrolled.
ASSESSMENT OF NEED: The request for enrolment by a new Student.
ACTIONING BY: The School Secretary

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>School Admission Register</u> , is a record of all students who have been enrolled at the School, and shows the date and destination of those students who have left the school.
STORAGE: The School Files - Admission Register
INFORMATION SOURCE: Student Enrolment Card and Student Transfer Certificate.
DATA GATHERED: <ul style="list-style-type: none"> ON ARRIVAL - Enrolment Number Allocated <ul style="list-style-type: none"> - Name - Date of Birth - Address ON DEPARTURE - Forwarding Address <ul style="list-style-type: none"> - Date of Departure - Anticipated New School
WHEN: On enrolment or departure of students.
NEED: A Record of Admissions and Departures
ASSESSMENT OF NEED: A School Records Policy Requirement
ACTIONING BY: The School Secretary

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>Student Class Allocation</u> refers to the allocation of all students to a home class group of approximately thirty students. Student class allocation may also refer to the sub-grouping of students for Maths, Spelling and Reading.
STORAGE: School File, Master Roll Lists, Subject Group Lists.
INFORMATION SOURCE: - Previous Class Lists - Enrolment Data and Reports from another School
DATA GATHERED: - Name of Student - Date of Birth - Previous Reading Level - Previous Spelling Levels - Previous Maths Level - Relevant comment if applicable from previous class teacher.
WHEN: Whenever classes are organised, usually annually in December for following year, or when a Student enrolls.
NEED: The formation of class groups of 30 students according to policy determined by the School Board, and the grouping of students for specialist subjects.
ASSESSMENT OF NEED: - The placement of students not allocated - The reformation of class groups
ACTIONING BY: The Assistant Principals and Senior Teachers.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>STUDENT RECORDS CARDS</u> refer to individual and official record cards maintained for all students enrolled at the school. Two sections of the card are currently maintained. A confidential section, which is only accessible to teachers, and a non-confidential section which holds most of the student data.
STORAGE: School Files located throughout the School, the Confidential Section is held in the School File, Record Cards.
INFORMATION SOURCE: - Enrolment Card - Teachers - School Counsellor
DATA GATHERED: - Name and Date of Birth, Photo if available - Address - Telephone, Home and Work - Admission No. - Previous Schools - Pre-School Attendance - Record of Attendance at present School - Siblings - Emergency Contact, Name and Phone No. - Teachers Chronological Comments - Standardised Tests - Reading } Date Spelling } Test Maths } Results
Confidential } Counsellor Section } Administered Tests
WHEN: Used throughout the year Updated Bi-Annually in July and December
NEED: School Board requirement for student record keeping.
ASSESSMENT OF NEED: Information needing entry to Cards by Secretary, Teachers, Counsellor.
ACTIONING BY: The School Counsellor, School Secretary, Class Teachers, Asst. Principals.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>REPORTING TO PARENTS</u> , refers to the formal program of advising parents about their student's progress at school. The process involves a combination of written and oral reporting by class teachers.
STORAGE: Individual Student Files, and Teacher Records located throughout the School.
INFORMATION SOURCE: Student Report Card and/or Teacher Interview Notes
DATA GATHERED: <ul style="list-style-type: none"> - Name - Year and Class - Attendance Record - Period of Reporting, Date of Report - Social Development and Behaviour - Work Habits and Study Skills - Academic Progress - Language <ul style="list-style-type: none"> - Reading - Maths - The Sciences - Physical Development
WHEN: Usually in June and November and as requested.
NEED: A School Board Policy requirement for reporting to parents.
ASSESSMENT OF NEED: When reporting to parents in June and November, on student departure and when specifically requested.
ACTIONING BY: Implementation by each student's class teacher.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>STUDENT ACCIDENTS</u> refers to those occasions when a child is injured at school, either in the playground or during classes.
STORAGE: School File on Accident Reports.
INFORMATION SOURCE: The Teacher on Duty in the vicinity of Accident. Students witnessing the accident.
DATA GATHERED: Using the prescribed Accident Form: <p>FROM TEACHERS - Students Name</p> <ul style="list-style-type: none"> - Address - Phone No. - Date, Place and Time of Accident - Circumstances causing the Accident - Account from witness - Action Taken - Parent/Emergency Contact <ul style="list-style-type: none"> - Medical - Hospital <p>PRINCIPAL'S ADVICE</p>
WHEN: On the occurrence of an Accident.
NEED: Requirement by the ACT Schools Authority, Information used by school for research on safety.
ASSESSMENT OF NEED: Advice from injured student or witnesses and teachers.
ACTIONING BY: Secretary/First Aid Officer and the Teacher who is responsible for completing the accident form.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>CIRCULARS TO PARENTS</u> refers to non-personal written communication to some or all of the school's parent clientele, for example, the school's Newsletter or an excursion advice.
STORAGE: School File holding copies of circulars to Parents.
INFORMATION SOURCE: All staff, School Board Canteen and Community Association.
DATA GATHERED: Various - as relevant to the nature of the circular. eg. Newsletter - Dates to Remember - Report from the Principal - Special Events - Advice from Canteen - Board Minutes/Report - Student Work Samples - Reports on coming or past educational events
WHEN: As required, Newsletters, each fortnight.
NEED: School Record of outgoing communication.
ASSESSMENT OF NEED: Information for Parent clientele.
ACTIONING BY: Principal and Asst. Principals.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>COLLECTION OF MONEY</u> refers to the process of recording and collecting money from students for various purposes such as excursions, voluntary contributions, artistic performances etc.
STORAGE: School File holding completed Class Lists showing amounts collected.
INFORMATION SOURCE: Teacher compiled lists of students participating.
DATA GATHERED: Class list showing - Purpose for collecting Money - Name - Amount collected - Date - Total - daily and final School Tally - Used where appropriate - Total from each class - Date - Grand Total - Amount Paid to the event
WHEN: On each occasion when money is collected
NEED: School Record of Money collected Record of student Payments
ASSESSMENT OF NEED: The funding of excursions, films, and other activities requiring Student Payments.
ACTIONING BY: Class Teachers and School Secretary.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>EXCURSIONS</u> refer to those educational visits which require the students involved to leave the school grounds by some form of private or public transport.
STORAGE: School File composed of completed excursion forms.
INFORMATION SOURCE: Excursion Form completed by Class Teacher.
DATA GATHERED: The excursion forms contains the following data: <ul style="list-style-type: none"> - Date of Excursion - Place - Time of Departure - Time of Expected Return - Purpose of Excursion - No. of Students - Cost - Total, and Breakdown - Cost per Student - Mode of Transport - Authorisation by Co-ordinator
WHEN: On the occasion of a Class/School Excursion
NEED: The co-ordination and proper planning and conduct of School Excursions.
ASSESSMENT OF NEED: Advice by Class Teacher.
ACTIONING BY: The officer responsible for the oversight of School Excursions,

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>SCHOOL BUSES</u> refers to the planning, ordering and usage of Government Buses for school purposes other than the daily transport of students to or from school.
STORAGE: School File on School Buses
INFORMATION SOURCE: Form Requesting School Buses
DATA Gathered: Information supplied by the class teacher requesting a school bus: <ul style="list-style-type: none"> - Date - Time of Departures - From School - Excursion Point - Place/Destinations - No. of Students - No. of buses required - Type of bus required
WHEN: As required for student transport on excursions.
NEED: Procedure for ordering Government Buses
ASSESSMENT OF NEED: Advice by teacher through the completion of an excursion form.
ACTIONING BY: Authorisation by excursion co-ordinator Implementation by School Secretary

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>INTERPRETERS</u> refers to those persons or professional services which are available to a school for the purpose of assisting the school to communicate to those parents who do not speak English.
STORAGE: School File on Interpreters
INFORMATION SOURCE: Interpreter Services, and Individuals available to assist the School.
DATA GATHERED: Interpreters - Language - Name of Interpreter - Telephone No. - Times available - Fee if applicable
WHEN: Reporting to Parents, or as required.
NEED: Communicating with non-English speaking parents.
ASSESSMENT OF NEED: As requested by a class teacher who needs to communicate through an interpreter.
ACTIONING BY: Class teacher or counsellor.

CATEGORY: STUDENT ADMINISTRATION
DECISION AREA: <u>AGE/GRADE RETURN</u> refers to the yearly return of information on the age and year level of every student in the school. This information is required by the Schools Office and is gathered by the Dept. of Education nationally.
STORAGE: School File
INFORMATION SOURCE: Age of Student and Year Level at School.
DATA GATHERED: 1. The age of each Student 2. Sex 3. Year Level 4. Total Enrolment - boys - girls 5. Total in each grade - boys - girls
WHEN: Annually in August
NEED: Requirement by ACT Schools Office
ASSESSMENT OF NEED: Request by Schools Office
ACTIONING BY: Asst. Principal and Secretary

FUNCTIONAL ANALYSIS CHART

CATEGORY B SCHOOL CURRICULUM/PROGRAMS

<u>CODE</u>	<u>SCHOOL PERSONNEL/ORGANISATION</u>						
	SCHOOLS AUTHORITY	SCHOOL BOARD	PRINCIPAL	ASST. PRINCIPAL	SENIOR TEACHER	TEACHER	SECRETARY
P - Policy Decision							
D - Design and Development							
M - Monitoring and Co-ordination							
I - Implementation							
R - Review and Evaluation							
C - Consultation							
School Curriculum Development		P	C	D/R	M	I	
Support Services - E.S.L.	P		C	D/R	M	I	
- Remedial Reading	P		C	D/R	M	I	
Evaluation/ Standardised Testing		P	C	D/R	M	I	
School Profile	P	D	D	M/I	C		
Submissions for Special Programs							
- Curriculum Grants							
- Disadvantaged Schools		P	C	D/R	M/C	I/C	
- Special Needs etc.							
Staff Meeting Policy			P	I/C	I/C	I/C	

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>SCHOOL CURRICULUM DEVELOPMENT</u> may be defined as the process of developing the school's set of curriculum documents. The major curriculum areas are Language, Mathematics, The Sciences, The Arts and Physical and Social Education.
STORAGE: A Master File of School Curriculum Documents.
INFORMATION SOURCE: The School's Curriculum Co-ordinators
DATA GATHERED: Specific data gathered for the preparation of each curriculum document is the responsibility of the Co-ordinator and staff responsible for each area of the curriculum. Such data would include a wide variety of materials from other schools and states, individual teacher's programs and evaluative comments by teachers, parents and students on the existing documents. Professional curriculum consultants would also contribute to this process.
WHEN: A continuous and ongoing program
NEED: School Board requirement for the teaching of school programs.
ASSESSMENT OF NEED: The need to develop curriculum under School Board Policy guidelines.
ACTIONING BY: Curriculum Co-ordinators

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>SUPPORT SERVICES - E.S.L.</u> refers to the program of English as a Second Language given to all students who meet certain entry criteria set by the ACT Schools Authority.
STORAGE: The School File on E.S.L. Students.
INFORMATION SOURCE: Enrolment Data Information/Referral from Class Teacher
DATA GATHERED: <ol style="list-style-type: none"> 1. Selection of Students: <ul style="list-style-type: none"> Student Data: - Name - Age - Enrolment Date - Language spoken at home - Counsellor administered test results 2. Class Establishment: - No. of Students indentified - No. of classes generated
WHEN: Before census returns in July and February each year.
NEED: The establishment of an E.S.L. Class under the ACT Schools Authority Guidelines.
ASSESSMENT OF NEED: New Enrolments and Class Teacher Advice
ACTIONING BY: The School Counsellor and E.S.L. Teacher

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>SUPPORT SERVICES - REMEDIAL READING</u> refers to the program of additional and specialist instruction given to students whose progress in Reading has not been satisfactory.
STORAGE: School File on Remedial Reading Students
INFORMATION SOURCE: Information from Class Teacher and School Counsellor.
DATA GATHERED: Selection of Students, lists showing: <ul style="list-style-type: none"> - Name - Age - Class Group - Test results in Reading given over a period of time. - Specialised Reading Tests - Reading Scheme level - Teacher recommendations
WHEN: As required depending on spaces available in the program.
NEED: The selection of students most needy of the program.
ASSESSMENT OF NEED: Advice by class Teacher and Counsellor
ACTIONING BY: The Remedial Reading Teacher

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>STANDARDISED TESTING</u> refers to the program of teacher administered tests which are prepared externally to the school and may from time to time be administered to assist in the evaluation of school programs and in assisting the assessment of individual student achievement.
STORAGE: Student Record Cards, compiled from class lists showing results.
INFORMATION SOURCE: Standardised test Results.
DATA GATHERED: <ul style="list-style-type: none"> Name of Test Date of Test Student Name - D.O.B. <ul style="list-style-type: none"> - Raw Score - Interpreted Score - Chronological age at test date Student Population Analysis <ul style="list-style-type: none"> - by Age/Grade - Data Manipulation Results
WHEN: As required, usually March and November
NEED: Diagnosis of Student Achievement Evaluation of School Programs
ASSESSMENT OF NEED: Request by Class Teacher, Asst. Principals, Principal, Counsellor, Parents and Board.
ACTIONING BY: Class Teacher, Asst. Principals and School Counsellor.

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>SCHOOL PROFILE</u> refers to an outline of philosophy, aims, curriculum and facilities at Charnwood Primary School, prepared for publication by the ACT Schools Authority.
STORAGE: School File on Charnwood School Profile.
INFORMATION SOURCE: School Board
DATA GATHERED: School Philosophy School Aims and Objectives Outlines of School Curriculum Summary of Facilities available at the school. Details from the Parent Handbook containing a variety of data on items such as school hours, after school care, hire of facilities, school canteen, school uniforms and school policies.
WHEN: Updated Annually in September
NEED: A Requirement by ACT Schools Office
ASSESSMENT OF NEED: Request by Schoolg Office for publication.
ACTIONING BY: Asst. Principals and Principal

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>SCHOOL SUBMISSIONS</u> refers to the preparation of submissions to establish grounds for additional funding in the areas of: - Curriculum Grants for Innovative Projects - Disadvantaged Schools - Resource Teachers for Special Needs
STORAGE: School File on Submissions for various purposes.
INFORMATION SOURCE: School Wide input, Board and Subcommittees
DATA GATHERED: A wide variety of data is gathered by persons responsible for preparing submissions on behalf of the School Board. Data frequently sought includes: - Academic Achievement of students (Record Cards) - Students in Special Programs eg. E.S.L. - Community and Parent information eg. occupations, pensions, unemployed - No. of single parent families - Family size and mobility - Health
WHEN: Usually second Semester, or at times when certain submissions are due.
NEED: To meet requirements for funding as determined by the School Board and ACT Schools Authority.
ASSESSMENT OF NEED: As determined by the School Board
ACTIONING BY: The School Board or its nominees.

CATEGORY: SCHOOL PROGRAMS AND CURRICULUM
DECISION AREA: <u>STAFF MEETING POLICY</u> refers to the development of school procedures through the process of school staff meetings.
STORAGE: School File on School Policy
INFORMATION SOURCE: Policy extracted from School Staff Meetings
DATA GATHERED: Extracts from Staff Meeting Minutes
WHEN: Continuous according to need
NEED: The co-ordination of all school procedures.
ASSESSMENT OF NEED: As determined by school staff.
ACTIONING BY: The Asst. Principals

FUNCTIONAL ANALYSIS CHARTCATEGORY C SCHOOL PERSONNEL

<u>CODE</u>	<u>SCHOOL PERSONNEL/ORGANISATION</u>						
	SCHOOLS AUTHORITY	SCHOOL BOARD	PRINCIPAL	ASST. PRINCIPAL	SENIOR TEACHER	TEACHER	SECRETARY
P - Policy Decision							
D - Design and Development							
M - Monitoring and Co-ordination							
I - Implementation							
R - Review and Evaluation							
C - Consultation							
Staff Returns - Yearly	P		M				I
- Weekly							
Leave Application Forms	P		M				I
Staff Development Allocation			P	M	C	C	I
Relief Teachers			P	M	C	C	I
Timetable (Related to Relief Staff needs)				P/I	C	C	

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>STAFF RETURN - YEARLY</u> refers to the submission of detailed information concerning all school teaching staff to the Schools Authority.
STORAGE: School File on Yearly Staff Return
INFORMATION SOURCE: All school Teaching Staff
DATA GATHERED: <ul style="list-style-type: none"> - Name of Staff Member - Address - Phone No. - Years of Training - Years of Teaching - Sex - Grade/subject taught - Special Interests - Position on staff - Full time/Part time
WHEN: February each year, updated as staffing changes occur.
NEED: Request by Schools Office
ASSESSMENT OF NEED: Request by Schools Office
ACTIONING BY: The School Secretary

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>STAFF RETURN - WEEKLY</u> - This return refers to the weekly return of information concerning the attendance of all personnel over the past week, and includes information relating to the employment of additional staff employed on a relief basis.
STORAGE: School File on Weekly Staff Return
INFORMATION SOURCE: Personnel Leave Forms
DATA GATHERED: <ul style="list-style-type: none"> Name of Teacher Name of Relief Teacher (if employed) Days Absent Nature of Absence Source of Allocation - Relief <ul style="list-style-type: none"> - Staff Development - Systems Needs Pool etc. No. of hours worked by each relief teacher
WHEN: Weekly
NEED: Requirement by Schools Office
ASSESSMENT OF NEED: Absence of School Personnel
ACTIONING BY: School Secretary

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>LEAVE FORM</u> - Whenever Staff are absent from duty a leave form must be completed.
STORAGE: ACT Schools Office
INFORMATION SOURCE: The absent Staff member
DATA GATHERED: <ul style="list-style-type: none"> - Name of Staff Member - Address - Phone No. - Nature of Leave - Reason For Leave - Receipt of Higher Duties Allowance - Full Pay/Half Pay - Time and Date of absence - Doctor's Certificate obtained - Principal's Recommendation
WHEN: Whenever a staff member is absent
NEED: Requirement by School's Office
ASSESSMENT OF NEED: A staff member taking leave
ACTIONING BY: The person on leave and the School Principal.

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>STAFF DEVELOPMENT ALLOCATION</u> refers to the allocation of relief days for the purpose of releasing teachers from class teaching duties for the purpose of attending some form of staff inservice activity.
STORAGE: School File on Staff Development Allocation
INFORMATION SOURCE: Development days used by Staff
DATA GATHERED: <ul style="list-style-type: none"> - Days available - notified by Schools Office - Days consumed, advice given by the Assistant Principal responsible for Staff Development <ul style="list-style-type: none"> Advice shows: - Teacher's name - Date and Duration of Leave - Description of development - Number of days allocated from the school's allowance.
WHEN: On the occasions that Teacher Development Days are required.
NEED: Leave to attend inservice courses.
ASSESSMENT OF NEED: Request by teacher or advice by Asst. Principal
ACTIONING BY: School Secretary

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>RELIEF TEACHERS</u> refers to teachers who are employed on a short term basis to replace a teacher who is on leave.
STORAGE: School File on Relief Teachers
INFORMATION SOURCE: Schools Office, and School File
DATA GATHERED: <ul style="list-style-type: none"> - Name of Relief Teacher - Phone Number - Teaching Level/Subject - Days available - Special interests or abilities
WHEN: Updating continually
NEED: The employment of a relief teacher
ASSESSMENT OF NEED: Teacher absence
ACTIONING BY: School Secretary on advice from school staff.

CATEGORY: SCHOOL PERSONNEL
DECISION AREA: <u>TIMETABLES</u> refer to the scheduling of times for the use of school facilities and release from face to face teaching duties for class teachers.
STORAGE: Master Timetable, Asst. Principal's Office.
INFORMATION SOURCE: The Asst. Principals in consultation with school personnel.
DATA GATHERED: <ul style="list-style-type: none"> - Requests for use of school facilities such as: <ul style="list-style-type: none"> - Craft Room - Audio-Visual Room - School Hall/Gymnasium - School Library - Specialised equipment such as projectors and computers. - The allocation of resource and support staff available to the school.
WHEN: Designed in February, and regularly adjusted.
NEED: The provision of a fair share of available resources to all staff.
ASSESSMENT OF NEED: Request by class teachers, and Relief Staff
ACTIONING BY: Asst. Principals in conjunction with Class Teachers.

FUNCTIONAL ANALYSIS CHARTCATEGORY D SCHOOL MANAGEMENT

<u>CODE</u>	<u>SCHOOL PERSONNEL/ORGANISATION</u>						
	<u>SCHOOLS AUTHORITY</u>	<u>SCHOOL BOARD</u>	<u>PRINCIPAL</u>	<u>ASST. PRINCIPAL</u>	<u>SENIOR TEACHER</u>	<u>TEACHER</u>	<u>SECRETARY</u>
P - Policy Decision							
D - Design and Development							
M - Monitoring and Co-ordination							
I - Implementation							
R - Review and Evaluation							
C - Consultation							
<u>SCHOOL BUILDINGS</u>							
Maintenance	P	M	C	C	C		I
Vandalism			C				I
Hire of Facility	P		M				I
<u>SCHOOL BUDGET/FINANCE</u>							
The School Budget		P	D	M	C	C	I
Financial Records	P	M					I
<u>SCHOOL EQUIPMENT</u>							
Purchase Orders		P	D	M	C	C	I
Consumable Supplies			P	D	C	C	I
School Furniture	P			M	C	C	I
Equipment Inventory	P			C			I
<u>SCHOOL OPERATIONS</u>							
Use of Private Vehicle	P		C	C	C	C	I
Variation of Location			P	I	I	I	
Mail - Incoming			P				I
Outgoing			P				I

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL BUILDINGS - MAINTENANCE</u> refers to the repair and upkeep of Charnwood School building by the school letting contracts to the appropriate tradesmen. Only work costing less than \$250 per job may be managed by the school.
STORAGE: School File on Maintenance.
INFORMATION SOURCE: Records of work completed.
DATA GATHERED: <ul style="list-style-type: none"> - Description of maintenance carried out - Date - Name of Contractor and Telephone No. - Amount
WHEN: As required throughout the year
NEED: To effect repairs/maintenance with an upper limit of \$250
ASSESSMENT OF NEED: <ul style="list-style-type: none"> - Damage by vandalism - Plant breakdown - Maintenance
ACTIONING BY: Advice to Secretary by <ul style="list-style-type: none"> - Janitor - Principal - Asst. Principal

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL BUILDINGS - VANDALISM</u> refers to the procedures that are implemented following the discovery of vandalism at the school.
STORAGE: School File on Vandalism
INFORMATION SOURCE: <ul style="list-style-type: none"> - School Janitor - Police
DATA GATHERED: <ul style="list-style-type: none"> - Date and approximate time - Place of entry/damage - Damage to plant and/or property stolen - Other circumstances relating to the offence, eg. Witnesses - Name and address of persons reporting the incident - Action initiated - Approximate cost of repairs
WHEN: Whenever vandalism occurs.
NEED: Requirement by Police Dept. and Schools Office File kept for future reference and research.
ASSESSMENT OF NEED : Report from Police/Janitor
ACTIONING BY: Asst. Principal/Principal/Secretary

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL BUILDINGS - HIRE OF FACILITIES</u> refers to the use of school facilities by outside agencies such as Scouts or Church Groups.
STORAGE: School file on Hire of Facilities.
INFORMATION SOURCE: Data from Tenants.
DATA GATHERED: <ul style="list-style-type: none"> - Name of Agency - Date(s) of hire - Time required - Type of facility requested - Cost - Principal's Recommendation
WHEN: As required by prospective Tenants
NEED: To co-ordinate the use of the School's Facilities
ASSESSMENT OF NEED: Application by prospective Tenant
ACTIONING BY: Principal/Secretary

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL BUDGET/SELF MANAGEMENT FUNDS</u> refers to the process of allocation of government funds by the Charnwood School Board.
STORAGE: School File on Self Management Funds
INFORMATION SOURCE: School Board Allocations
DATA GATHERED: <ul style="list-style-type: none"> - Statement of funds allocated by government - Decisions by the Board with respect to the allocation of funds in the following areas: <ol style="list-style-type: none"> 1. Curriculum Materials 2. Maintenance 3. Administration 4. School Library 5. Travelling (School Buses) 6. Special Projects such as purchasing computers, canteen equipment etc.
WHEN: <ol style="list-style-type: none"> 1. Interim allocation in July 2. Full allocation in November
NEED: Requirement by Schools Office for the operation of management funds by School Board.
ASSESSMENT OF NEED: The receipt of government funds
ACTIONING BY: The School Board

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL BUDGET - FINANCIAL RECORDS</u> refers to the maintenance of school financial records under the guidelines laid down by the ACT Schools Authority.
STORAGE: Account Book for the School Funds
INFORMATION SOURCE: School Board Allocations and accounts received for expenditure.
DATA GATHERED: <ul style="list-style-type: none"> - School Board Allocations for each of the following categories: Curriculum Areas Maintenance Administration School Library Travelling Special Projects - Accounts for expenditure in each of the above categories. Showing data as listed on School Orders.
WHEN: Monthly balance check is maintained
NEED: Requirement by Schools Office, for the orderly record of the school's expenditure.
ASSESSMENT OF NEED: Transactions required
ACTIONING BY: School Secretary

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL EQUIPMENT - PURCHASE ORDERS</u> refer to the standardised procedure used by Charnwood School for the procurement of all goods and services.
STORAGE: School File on Purchase Orders
INFORMATION SOURCE: The Purchaser
DATA GATHERED: <ul style="list-style-type: none"> - Suppliers Name and Address - School Order Number - Item Description Code - Quantity and Rate - Price and Discount - Total - Date - Principal's signature for approval and Taxation exemption.
WHEN: As required throughout the year
NEED: A requirement of the Schools Office for the maintenance of orderly records.
ASSESSMENT OF NEED: Request for goods and/or services by a member of the School Staff.
ACTIONING BY: The School Secretary and Principal

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL EQUIPMENT - CONSUMABLE SUPPLIES</u> refers to the procurement of consumable supplies from the ACT Schools' Warehouse.
STORAGE: School File on Warehouse Orders.
INFORMATION SOURCE: Request by school staff.
DATA GATHERED: Warehouse Order Form showing: <ul style="list-style-type: none"> - Date - Item Code - Item Description - Rate - Quantity - Cost - Total Cost of Order
WHEN: As required throughout the year.
NEED: System required by Warehouse and School Procedures.
ASSESSMENT OF NEED: The ordering of consumables by staff.
ACTIONING BY: School Secretary and Principal

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL EQUIPMENT - SCHOOL FURNITURE</u> refers to the equipment valued over \$50 and furniture allocated to the school.
STORAGE: School File on - Equipment - Furniture
INFORMATION SOURCE: Schools Office Inventory of Equipment and Furniture.
DATA GATHERED: Equipment - Date of Purchase - Description of item - Serial Number - Purchase Cost - Condition of item Furniture - Description of item - Size - Number in total
WHEN: 1. On receipt of new Equipment valued > \$50 2. On receipt of new furniture -
NEED: 1. Information required when Break & Enter Occurs. 2. Schools Office Audit every two years. 3. Planning for enrolment increases.
ASSESSMENT OF NEED: 1. Theft 2. Request for additional different furniture by teachers
ACTIONING BY: Asst. Principal and Audit Clerk

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL OPERATIONS - USE OF PRIVATE MOTOR VEHICLE</u> refers to the use of a private vehicle by a teacher for school purposes.
STORAGE: School File on Use of Private Motor Vehicle.
INFORMATION SOURCE: Teachers' Claims
DATA GATHERED: <ul style="list-style-type: none"> - Name of Staff Member - Reason for use of vehicle - Distance Travelled - Rate per kilometer - Amount due - Authorisation by Asst. Principal or Principal
WHEN: As required.
NEED: The use of a private vehicle for school purposes.
ASSESSMENT OF NEED: Request by a teacher
ACTIONING BY: The Teacher and School Secretary.

CATEGORY: SCHOOL MANAGEMENT
DECISION AREA: <u>SCHOOL OPERATIONS - VARIATION OF LOCATION</u> refers to the variation of location outside the school by staff in the course of duty.
STORAGE; School File on Variation of Location.
INFORMATION SOURCE: The Teacher concerned
DATA GATHERED: <ul style="list-style-type: none"> - Date - Name - Location - Time - departure <li style="padding-left: 20px;">- expected return
WHEN: Whenever a teacher leaves the school.
NEED: Requirement by Schools Office
ASSESSMENT OF NEED: Advice by the teacher who is varying location of duty.
ACTIONING BY: The Teacher concerned.

CHAPTER 4 THE CONCEPTUAL ASPECTS OF A DATABASE AND
ITS APPLICATION TO STUDENT ADMINISTRATION
AT CHARNWOOD PRIMARY SCHOOL

The purpose of this chapter is to present the concept of a database as it is used in the context of automatic data processing. This concept is then applied to the problem of student administration at Charnwood Primary School which was analysed as part of the decision making matrix outlined in Chapter 3. The example of student administration serves to illustrate how the use of a database could dramatically improve the present system of student records and provide the potential for educational change and innovation in the longer term.

A database or databank may be described as a collection of structured data supporting the operation of the whole, or major areas of, an organisation. (Anderson, 1977, p. 88) It may take the form of a centrally located data file which can provide the foundations of computer-based management information system but while a database may form the heart of an organisation's information system, it is not the entire system and carries no decision making or policy making function. (Brightman, 1971, p. 121)

The concept of a database means something very specific

and the collection of data must have certain qualities. (Anderson, 1977, p. 88) An essential requirement of a database is that it not merely store data efficiently but also provide an effective means of retrieval. While the centralisation of information itself serves no purpose the data structure of an organisation may be rationalised if information can be more efficiently retrieved. The objective of a database is to provide updated, reliable and unambiguous information on demand.

Traditionally most educational organisations have developed their own files to support their specific operations. Such files are used for reference purposes or are updated with new data to provide the latest changes in areas such as student enrolments, grade assignments, timetables, school budgets, stock control and management. Frequently these files consist of records containing common data elements which are duplicated in several functional files. This situation creates redundancy and inefficiency as the same data elements in each of the files are updated or added to, separately. The School Secretary, for instance maintains a student enrolment card containing data elements in respect of the student's name, address, phone number, age, date of enrolment, names of parents and siblings and so on. Similar data elements are also recorded on sections of the student record card, class rolls, and other records frequently made by teachers and school

counsellors. An input such as a change in address or guardian status is required for each application to update relevant data elements. A database system aims at eliminating such duplication of storage and updating, and should provide the means for retrieving data elements for each of the application requirements in the form requested. Data relating to a specific subject such as student data in the above example, could be consolidated onto an integrated file structure using a database concept instead of being duplicated through a fragmented functional file system.

In ideal situations one database file serving the whole organisation is preferred, however in large institutions the complexity of defining data relationships may make it practicable to implement several small databases serving the needs of several small integrated systems in respect of functions which have direct relationships with each other. (Anderson, 1977, p. 90) However, in the application of the database concept to a primary school a central database file serving the needs of the whole school would be appropriate as this educational institution is by comparison to higher level educational institutions and large corporations, relatively small and is less complex.

In summary, Anderson (1977, p. 91) lists some important characteristics which a good database should possess.

These are:

- * data should be only input once;
- * redundant data should be eliminated;
- * data should be capable of being speedily retrieved;
- * files should be easy to maintain;
- * access to files should be capable of being restricted to authorised users by the use of passwords;
- * restart and recovery procedures are needed;
- * selective printouts should be provided for the requirements of specific users;
- * provision should be made for batch and on-line processing;
- * new data structures should be capable of being incorporated into the database;
- * distinction should be made between the logical and physical storage of data;
- * it should be capable of contending with changing circumstances within school administration needs;
- * storage costs should be optimised; and
- * the database should be self monitoring and include the provision of audit trails.

In Chapter 3, a decision making matrix for Charnwood Primary School was developed. This matrix generated

four major categories of administrative decisions covering an extensive list of topics where information is required by school personnel at all levels in the school. Using these major categories of Student Administration, School Programs and Curriculum, School Personnel and School Management it is possible to create a database that can provide selected information to assist school personnel in their decision making tasks.

To illustrate the concept of a database the following example relating to the category of Student Administration is outlined. At this point, it should be stated that the design and implementation of a database is the task of a specialist consultant and computer programmer. The illustration serves to identify how a database can be used to provide selected information.

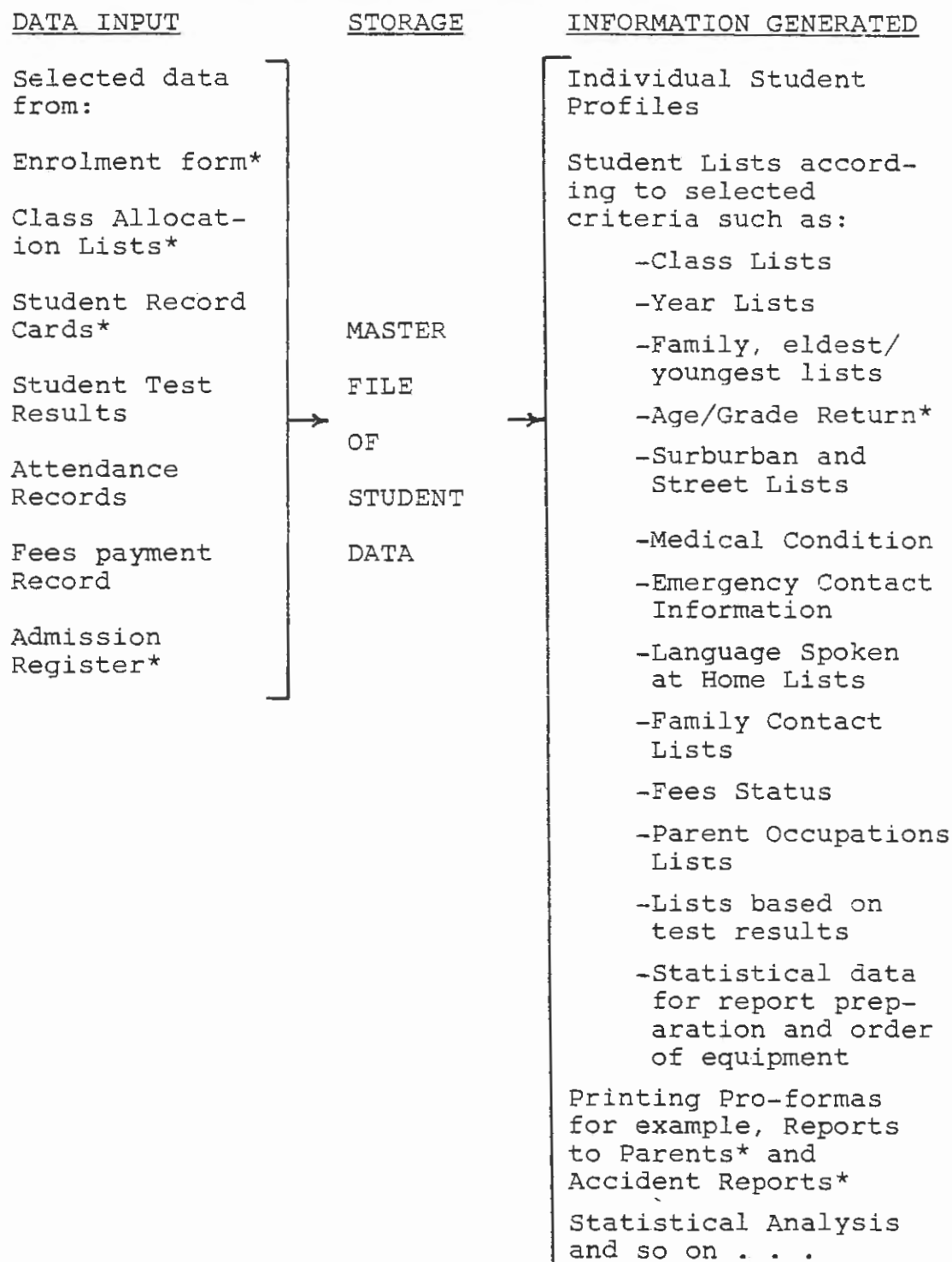
The establishment of a database for Student Administration at Charnwood Primary School would involve the creation of a master file for each student. The input data required for the creation of this file is mostly held on a variety of school records such as the Student Enrolment Card, the Admission Register and Student Record Cards. By the creation of a master file for each student a database is formed which will provide most student information required by school personnel. For example, a complete student profile for each

student showing all the student's input data, an age by grade analysis for the entire school, a medical conditions list, and an infinite range of other information could be produced.

Figure 4.1 illustrates how the existing student data at Charnwood Primary School could be used to create a database from which specific information can be generated using selected search criteria.

In establishing a database it is the responsibility of school administrators to clearly define the school's objectives and determine the type of information required to make informed decisions to achieve these objectives. It is not desirable that school personnel who do not have specific training in designing a database and computer programming attempt to implement their own system. Although many software packages such as PFS:File (Seal, 1982) have been written for use by managers without a knowledge of computers, they are not a substitute for experience in designing a database, nor the adoption of certain techniques which need to be tailored for each specific user. While recognising their limitations in this process school administrators must not be content to accept specifications and programs which have been transferred with little modification from other systems.

Figure 4.1 STUDENT ADMINISTRATION DATABASE FOR
CHARNWOOD PRIMARY SCHOOL



*The information provided or required for each of these forms is outlined under Student Administration, Chapter 3, pages 38 to 44.

The establishment of a database facility at Charnwood Primary School would overcome a number of problems presently being experienced in providing school personnel with the information they require for decision making. Again, using the example of Student Administration, the existing array of student records take a number of different forms and illustrates many of the features that a well designed database is intended to eliminate.

The following analysis is a comparison between the features of what a good database for Charnwood Primary School should exhibit and the situation which presently operates with regard to the creation and maintenance of student records at the school.

File Location:

- . A database is located centrally.
- . The present network of files is located in the School Secretary's office, (Enrolment Card, Admission Register, the confidential portion of the Pupil Record Card) Teacher's Aide workroom (master class lists and duplicates, fees payment records) Teachers' offices located throughout the school (Student Record Cards and various records of student performance and test results) and archives (old class rolls showing term absences and attendance information.)

File Creation:

- . A database would require one non-redundant input of

student data from an enrolment form designed to mirror the cursor pattern used for each student's master file.

. On receipt of enrolment information the Secretary prepares an Enrolment Card, the Admission Register and two sections of the Student Record Card all using different and time consuming formats and exhibiting a high level of data redundancy.

In both systems existing master lists for classes, medical data and emergency contact would need manual updating until new lists were printed. When new lists are prepared the database automatically incorporates new additions while present manual lists have to be mostly retyped.

Information Retrieval:

. A database properly designed and implemented can provide information in printed format at short notice. Through the coordination and centralisation of data, a database enables all student data to be interrelated and manipulated to generate numerous sets of information as may be requested by school personnel. Figure 4.1 indicates some of the selected information that can be retrieved.

. Information retrieved in the school's present manual system is often very time consuming: the relevant files have to be located, copied or removed for further reference; there is a risk that files may be lost, not returned and overlooked when updating; manual sorting methods have to be used to find information,

and statistical information required for such computations as the Age/Grade Return have to be manually calculated at enormous cost in time - often by senior management; manual retrieving methods are subject to human error in sorting and copying and may need to be typed, photocopying is indiscriminate and frequently needs editing for presentation; consequently data stored on files is underutilised because of its inaccessibility and thus in turn can lead to some files being maintained at less than acceptable standards. For example, the maintenance of Student Record Cards varies widely both within and between many A.C.T. primary schools.

File Updating:

. Using a database the relevant student master files may be quickly called and updated.

. New data such as a change of address or phone number may have to be entered on two or three records for each child in the family. The inaccuracy of this process is realised when changes to emergency or work phone numbers are made for only one member of a family when there may be two or three siblings attending the school.

File Access and Security:

. While computer discs may be securely locked away in a similar fashion to all files in the school, it is without doubt that confidentiality and security is more efficiently ensured when records are kept and

used in one location. Confidential information may be restricted to persons with password knowledge. The likely effects of privacy legislation need to be considered as it is possible that future legislation will place controls on the disclosure of information including accidental disclosure and right of inspection. (Salvas, 1983, p. 18)

. While school records can easily be locked away, when being used they can often be read by unauthorised persons passing by. The location of records throughout the school increases their risk of being lost and unsecured on some occasions.

The process of design and implementation of a database requires that an organisation review its objectives and identify the information it requires for the decision making needed to achieve these objectives. Hurley, (1981, p. 173) claims that as a result of organisations analysing their environments and operating procedures in a disciplined manner, positive improvements in office and administrative methods are also achieved. However the effectiveness and efficiency of a database cannot be measured only by the improved performance of existing administrative functions. The potential of a responsive and flexible database as compared to a file management system, to manipulate its data and supply non-standard outputs in a very short space of time must be considered. Mellor

(1977, p. 92) suggests that as school managers have available to them knowledge in a form that can be utilised effectively, educational change will be facilitated. When decision makers have information on alternative courses of action and the consequences, they will be better equipped and more able to effectively achieve their objectives. Information facilitates educational change: a good database can make a profound contribution to the access of relevant information.

CHAPTER 5 SOME ALTERNATIVES FOR THE SELECTION OF
DATA PROCESSING FACILITIES AT CHARNWOOD
PRIMARY SCHOOL

The purpose in this chapter is to explore some of the options which may be considered by Charnwood Primary School for the provision of data processing facilities. The feasibility of using hardware environments commonly used for computer assisted instruction (C.A.I.) is examined and alternatives including the use of a professional data processing service and the proposed ACT Schools Authority computer are described. The resources available in most schools are limited and this reality is an important consideration in determining the options available.

To purchase any equipment or service an ACT government school must have the agreement of its School Board which is responsible for the allocation of both government funds and all non-government funds such as school fees, canteen and Parents' and Citizens' Association contributions. In practice this means that if it can be demonstrated that the implementation of a database will assist the school to achieve its educational objectives it can be funded at the school level within the context of other commitments and priorities. At Charnwood over the past three years the implementation of curriculum projects such as a new maths scheme costing approximately \$2,500, the upgrading of reading

materials costing \$2,000 and the purchase of two Apple II computers for use with C.A.I. has been achieved by a combination of school initiated fund raising activities, non-government and government funds. If it can be demonstrated to the School Board that there is a cost justification and demonstrable benefit to be gained from the use of computer equipment in school administration it is not unreasonable to expect that an expenditure of up to \$5,000 would be feasible. If it is possible to use the equipment needed to run a database also to facilitate the existing computer equipment used in C.A.I. programs, by purchasing hardware which is compatible with that used in C.A.I. then the rationale for purchasing computer equipment is strengthened. In considering the possible options open to Charnwood School Board for the purchase of equipment to implement a database, the expenditure of up to \$5,000 is used as a guide to the packages examined in this chapter.

While it is beyond the scope of this study to provide a detailed analysis of all the microcomputers now available in Canberra it is appropriate to consider the potential of using the Apple IIe for school administration as Apple hardware is already being used by Charnwood Primary School for C.A.I. programs. In addition, comparison of Apple IIe with the BBC Model B, and Tandy TRS 80 Model III is also included. Like the Apple IIe, the BBC Model B and Tandy TRS 80

Model III are distinguished from other microcomputers by the fact that there is a large quantity of educational software available and being developed for these environments. It should be noted that in primary schools the use of computers by students is primarily for the purpose of C.A.I. rather than the acquisition of computer skills, and thus the choice of hardware is governed largely by the suitability of educational software available for a particular hardware environment. In this respect, the Apple II microcomputer has had clear market leadership in Canberra, though this supremacy is being strongly challenged by the new BBC microcomputer which is now recommended for primary schools by three Australian States with more expected to follow. Consequently an abundance of Australian software for the BBC is becoming available and it is likely that schools such as Charnwood may in the longer term standardise on BBC hardware.

To use an Apple IIe microcomputer to create a database for student administration and provide other administrative facilities such as word processing, stock inventory and school accounting/budgeting, the following basic hardware items would be required.

1x Apple IIe Microcomputer	\$1795
1x Video monitor	\$ 260
1x Disc Drive 13.35cm (Max 140K)	\$ 690
1x Printer	allow \$ 800

Interface and cables	allow	\$ 250
	TOTAL	<u>\$3795</u>

(All prices quoted are ex-tax as at 1st May 1983.)

Software packages needed to implement a database for student administration and provide the school with word processing facilities are:

Personal Filing System (PFS)	\$150
PFS:Report	\$124
Zardex (word processing)	\$295
	TOTAL <u>\$569</u>

The Personal Filing System (PFS) is a computer program which stores information on forms. The user designs the forms to suit the information to be stored. A blank form is then recalled on each occasion a new file is created while existing files may be recalled in any order for updating or entering new information. Files can be retrieved in a variety of different ways, by stating the required retrieval specifications. For example, it would be possible to recall all the students who have a certain address, age or language spoken at home. The requested files may be displayed on the screen one by one or printed entirely or part thereof for a more permanent record. Thus for example, sets of mailing labels may be generated.

Using the software program PFS Charnwood School could create up to 1000 student files each holding up to

128 characters. As student enrolment is not expected to exceed 500 pupils, it would be possible to create up to 500 student files each holding up to 256 characters on one 13.3cm floppy disc. The amount of information held on each file is proportionate to the number of files that can be created. With PFS it is not possible to increase storage by adding a second disc drive. To increase file capacity beyond 256 characters per student the school would need to divide its student population into two approximately equal groups and store the data separately on two discs. This would destroy the sorting and manipulation of data on a school wide basis and thereby limit the effectiveness of the database. Using the existing school enrolment information card as a guide, and allowance of 256 character spaces will allow this information to be stored. However, a separate file would need to be created to include extensive details of student performance data. A new file can be created using the change design function of PFS which eliminates duplication of any basic data such as student name when establishing another file.

The PFS program may be coupled with PFS Report which is a computer program that enables the production of reports in the form of tables from existing PFS files. The PFS Report is a table consisting of up to nine vertical columns each of which corresponds to an item from the PFS file while each row of the report contains

information from a single PFS File. Calculations may also be performed on numerical information stored in PFS files. While it is possible to use PFS Report in a limited way with one disc drive, it is preferable to use two disc drives. At Charnwood it is not necessary to purchase a second disc drive as the school has two other Apple II computers with disc drives which may easily be utilised on those occasions when PFS Report is required.

D.C. Shaw (1972 p. 44) suggests that the implementation of computers will be most successful if their use evolves from the provision of a few high priority educational services. Once a computer is in use managers and users quickly recognise additional applications for the computer. (Shaw, 1972, p. 42043) If these findings are applied to the implementation of a database at Charnwood Primary School, the introduction of data processing for the administrative areas of School Programs and Curriculum, School Personnel and School Management ought to be delayed until the priority area of Student Administration is well established. At this point the purchase of software programs to progressively implement word processing facilities, school bookkeeping and financial management services, and school supplies and stock control may be considered. Software programs available for the provision of these services using the Apple IIe are:

Zardex Word Processing

\$295

VisiCalc (accounts)	\$360
Inventory (equipment/supplies)	\$275

PFS Report may be used in conjunction with the above programs while PFS has a number of uses in addition to its use for Student Administration. For example, PFS would be used for creating a database for school staff and school relief teachers.

Software programs such as Zardex and PFS also have a wide number of applications in C.A.I. programs and in teacher program planning using the Apple computers located in the teaching areas. For example, the Zardex word processing program could be used with the process approach to teaching writing to enable students to quickly edit and correct their final copy. By transferring a disc containing student work from the Apple computers in the classroom to the Apple IIe with printer used for administration, hardcopy of students' work could be made thus eliminating the need for teams of voluntary parent helpers to perform routine typing tasks. Examples of this kind are legion but illustrate an advantage of standardising on hardware when purchasing computer equipment, particularly as primary school funds are limited and do not allow for the unnecessary duplication of equipment.

The Apple IIe may also be used with the Rana series of disc drives to increase storage capacity markedly.

Using two Elite II disc drives storage capacity may be increased to 652K at a cost of \$1445 while two Elite III disc drives costing \$1816 will provide a storage capacity of 1.3 megabytes. The software program Visi-file costing \$350 would be used in place of PFS. The use of Rana disc drives still allows the hardware to be compatible with all Apple software, while the marginal increase in the cost of disc drives and the database program allows storage capacity to be expanded almost ten times that of the Apple II disc drives and PFS program.

A relatively new microcomputer which is gaining market leadership and is now being recommended in Western Australia, South Australia and Tasmania as the standard school computer is the BBC Model B microcomputer. By comparison with the Apple IIe microcomputer the BBC microcomputer is cheaper, more powerful, and more efficient. It uses a well structured language, provides excellent graphics which are important in C.A.I. usage and possess new design technology. As large amounts of C.A.I. software are being developed in Australia it is likely that schools purchasing their first computer will select the BBC while schools with Apple II, such as Charnwood Primary School may decide to standardise on the BBC hardware and therefore would select the BBC microcomputer for administration as well.

To use a BBC microcomputer to create a database for Student Administration and provide other administrative facilities such as word processing, the following basic hardware items would be required:

1x BBC Model B Microcomputer		\$1395
1x Video Monitor		\$ 260
1x Disc Drive (double-sided 400K)		\$ 770
1x Printer	allow	\$ 800
Interface and cables	allow	\$ 250
	TOTAL	<u>\$3475</u>

A double unit disc drive is also available at a cost of \$1450 and provides a storage capacity of 800K.

The distributor of the BBC microcomputer in the ACT, Jacaranda Electronics Pty Ltd does not have at this stage a software package suitable for creating a database for use with Student Administration. An appropriate software package is likely to be available soon but a school wishing to use the BBC computer now would have to write its own program. At commercial rates for computer programmers the cost would be prohibitive. Voluntary help by staff or parents to write and implement a suitable program is not recommended as the introduction of new procedures needs to occur without bugs or breakdown to hamper user acceptance.

A word processing package titled "View" costing \$180 is now available and could be implemented to facilitate

school administration particularly in the areas of curriculum documentation, report presentation and the preparation of school profiles and handbooks. The use of word processing facilities for C.A.I. and teacher program planning would enable school management to demonstrate the potential use of computers and thereby develop attitudes which will be supportive of data processing.

The Tandy TRS 80 series of microcomputers has also been purchased by a number of ACT schools and could be considered as a possible selection for use in school administration. While the amount of software packages available for C.A.I. is considerably less than that available for the Apple II or BBC, the Tandy TRS series have been used for teaching computer programming and writing the school's own personalised C.A.I. programs.

To use a Tandy TRS 80 Model III microcomputer to create a database for Student Administration and provide other administrative facilities such as word processing, budgeting and stock management the following basic hardware items would be required;

1x Tandy TRS-80 Model Microcomputer
with built-in monitor and two double
density 13.3cm disc drives (180K es.) \$3299¹

1 Occasionally on sale to schools for \$2480

1x Printer	allow	\$ 800
Interface and Cables	allow	\$ 200
	TOTAL	<u>\$4299</u>

Software packages suitable for implementing a student database and providing word processing facilities are:

Profile III Plus	\$300
Scripsit	\$200

The Profile III Plus program in a similar manner to the Apple II PFS may be designed to mirror the school's database requirements. The program stores information on two discs and is more powerful than the PFS. Profile III Plus combines most features of PFS and PFS Report and when combined with Scripsit allows the composition of personalised form letters similar to that illustrated in Figure 2.2. The program offers limited access to parts of the database and provides password protection.

Storage capacity by comparison with PFS is greater, though two discs are used by Profile III Plus thus requiring double the number of backup discs used to ensure against accidental loss of data. Table 5.1 compares the record capacity of PFS and Profile III Plus. The table assumes a form length of 256 characters for PFS and 255 Characters for Profile III Plus.

Table 5.1 RECORD CAPACITY OF PFS AND PROFILE III PLUS

<u>No. of Forms</u>	<u>PFS</u>	<u>Profile III Plus</u>
1	500	700
2	250	350

Thus it is possible to hold 500 student files each of 256 characters in length using PFS or 700 student files, 255 characters in length using Profile III Plus.

If Charnwood Primary School wished to create up to 500 files using PFS the number of characters per file would be limited to 256, compared with 357 using Profile III Plus. If more than 500 files were needed, each of 255 characters in length, PFS would be unsuitable, whereas Profile III Plus could hold up to 700 files.

The potential for using a word processing package such as "Scripsit" has been outlined. However if the TRS-80 was only used for school administrative purposes at Charnwood there would be no opportunity for using this equipment to supplement C.A.I. programs using Apple or BBC hardware.

If the choice of microcomputer for school administration can be made without consideration of its advantages for interchange, backup and support from other school microcomputers used in C.A.I., selection from a multitude of microcomputers exhibiting a wide range of specifica-

tions is possible. Microcomputers most suited for use with administrative functions have large storage facilities for data. Sirius I Microcomputer (\$4500) using two 13.3cm discs has a storage capacity of 1.2 megabytes. An optional double density extension costing approximately \$1000 will double the storage capacity to 2.4 megabytes using only two discs.

This illustration serves to highlight the need for careful long term planning which is very difficult in a rapidly changing market. The selection of microcomputer hardware and software which is compatible with the equipment used for C.A.I. does allow a school to incorporate the equipment used for school administration into the equipment used for C.A.I. if in the longer term the school wishes to expand or update its administration facilities. Another option which may assist the school in making its decision could be to second for a trial period one of its microcomputers used with C.A.I. programs. A printer and software would still need to be purchased but could be used effectively in C.A.I. if the school selected non-compatible hardware.

The choice of software is an important decision as once a program is implemented it is costly to change as large amounts of personal time and money are invested. The benefits of new technology on hardware may have

to be forgone if it is not possible to transfer the software environment. Using the UCSD p-System and UCSD Pascal, Cox and Lawrence (1982, pp. 1-21) describe how it is possible to develop efficient software that is hardware independent and is therefore portable to the future being also useable on tomorrow's hardware. CPM standards (Control Program for Microcomputers) are now used by many software manufacturers to achieve software transportability on CPM standard hardware. A CPM card may be added to many microcomputers. An Apple Logo card may be fitted to some microcomputers to achieve software transportability for Apple software. There are many developments taking place in the area of software independence which will lessen the restrictions imposed by hardware environments.

An alternative to purchasing any computer equipment for data processing at the school base is that of employing a data preparation or processing bureau. The Atlanta School System (described briefly in Chapter 2) provides for its schools with over 80,000 students the services of a computer centre which performs a wide range of student related processing, budgeting, library accessioning, and system management functions. Using its own I.B.M. 370 computer the system leases two Sentry scanners from National Computer Systems which according to McConnell (1976, pp. 24-25) have enabled the centre to turn out twenty

times as much work at less cost than the previous keypunch operation. Besides reducing the school districts overall operating costs the scanner/computer services recoup over 25% of their operating costs by processing data for other governmental organisations and interstate school districts.

In the ACT, Macreadie and Associates Computer Bureau Services at Fyshwick is used by the Catholic Education Office to provide data processing services for its five high schools and nine of its primary schools. During 1984-5 an additional 10 Catholic primary schools will be serviced by the Computer Bureau. Presently the service provides for the processing of certain student data which enables the Bureau to provide each school with a master file for each student and a wide range of statistical information. For example, the Bureau can provide schools with its class lists, year lists, subject lists, suburban lists, student mode of travel AM or PM, medical conditions lists, age/grade/sex breakdown, English background and language spoken at home analysis, family contact information for despatching reports and school fees, preparation of fee statements on a family basis giving individual student and subject costs, preparation of student reports, religious denomination by sex and year and other information as requested by the Catholic Information Office or individual schools. The Bureau

employs the services of a professional computer programmer to develop and fine tune its software which costs approximately \$15,000 for this program. Schools pay approximately a dollar per student to join the service and about 20¢ per month to participate. Data sheets are prepared by the Bureau for completion by each school. Information is despatched to schools as scheduled or at the request of a school. A courier service can usually deliver the information within a day at a cost of \$2.50 per delivery.

While there are some disadvantages in this approach there are clearly many distinct advantages for the individual schools using this service. Apart from the benefits of having their student data processed, the schools have achieved these benefits without allocating their personnel time to the operation of the system; school requirements for the data base have been designed and programmed professionally with costs being shared by the whole school system; management of the computer hardware and software are not the schools' concern; the costs of purchase, maintenance and replacement of outdated equipment are not borne by the schools and the Catholic Education Office has access to the uniform and relevant information needs for system planning and decision making.

However, there are some disadvantages in this operation:

As schools do not have their own printers or keyboards they need to make manual requests for the information they require which takes a day to be processed and delivered; all the schools participating in the program need to achieve consensus with regard to their requirements from the database as the cost of developing individualised programs is prohibitive; the facility presently only services the task of student administration and cannot provide for some individualised school needs such as word processing. To achieve this facility a school would need to purchase its own equipment which would also necessitate a re-appraisal of cost effectiveness and system design.

While the contracting of a data processing agency is an efficient means of managing student data it can remove from the teaching staff at all levels the experience they presently need in understanding and experimenting with computer facilities. School teachers and administrators are still largely computer illiterate and sometimes resist change. The provision of services through a school secretary or school registrar from an outside agency can isolate end users from gaining an appreciation of the potential power and facility available to them. The manager of Macreadie and Associates Data Processing Services commented that he was able to provide a wealth of information to schools and the system, which presently was not being

sought. For example, at the high school level it was possible to identify in advance those students who were not meeting course requirements in relation to the careers they planned to enter. Statistical analysis of results, curriculum trends and enrolment patterns, are not requested by teachers because they are largely unaware that information of this kind is now available. Inservice education and the passage of time will change this situation, meanwhile the lack of direct contact between end users and the process will shield schools from making a more creative use of their database.

The ACT Schools Authority is planning to update and expand its centralised computer facilities which are currently used to service the ACT Secondary Colleges. In 1984 the new facilities will service all colleges, five high schools and two large primary schools. These schools will be on-line to the central computer and will each be supplied with a microcomputer terminal and printer. The system will provide a student database and will require schools to enter a number of mandatory items. Facilities for entering optional student data will also be available, however the system will only provide student data facilities. Schools wishing to develop word processing facilities and provide other administrative facilities will have to purchase their own hardware and software for use with the microcomputer terminal and printer. In the longer term it is proposed

to link progressively larger primary schools to the central computer using a dial-up system for connection to the central database.

A program for the implementation of a database for school administration needs to be undertaken with careful planning and foresight. Long term software and hardware environments need to be considered along with the desired storage capacity of the hardware and its cost. For some ACT schools the proposed Schools Authority computer will provide an excellent database facility for Student Administration. Before purchasing any computer equipment for use in school administration Charnwood Primary School would first need to consult with the ACT Schools Office to ensure that school plans for the purchase of computer equipment were compatible with proposed system developments.

CONCLUDING STATEMENT

The study has illustrated a number of ADP applications applicable for use at Charnwood Primary School. The use of a database to record and manipulate student data has been outlined as an appropriate area for the initial development of ADP. Other facilities such as word processing hold considerable potential for use by school personnel who wish to improve their effectiveness, efficiency and promote innovation and change.

The benefits from these applications will depend on the quality of software, the sophistication of the hardware and user acceptance and initiative. The cost of purchasing equipment is presently a major obstacle for most primary schools to overcome. If after careful planning and specification the equipment required exceeds the budget allowed a school would be unwise to proceed with the possible purchase of cheaper and perhaps inadequate equipment. Failure to achieve user acceptance in the initial stages will make it difficult for management to justify additional funds to improve or replace equipment.

The downward price spiral of computer hardware coupled with the dramatic advances being made in computer technology will bring the facilities of ADP to almost every primary school this decade.

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