

ESTABLISHING AND USING A
STUDENT DEMOGRAPHIC DATA BASE:
THE SEVEN PERSONS SCHOOL PROJECT

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ABSTRACT

This report outlines the establishment of a computerized data base in Seven Persons School using the Appleworks program. This data base is used primarily by the school office staff to store basic demographic data for each student. The review of literature examines the use of microcomputers in a variety of data management tasks, specifically those related to the storage and processing of demographic data in a small to medium-sized school. The project involves the training of school staff in the operation of Appleworks, and the compilation of various lists of demographic data into one computerized data base. Staff members are surveyed to determine the use being made of the data base and to determine if a data base containing academic records might also be warranted. The results indicate that the principal and teaching staff are very much in favour of a student demographic data base, but do not use the data base themselves. Rather, they rely on the school secretary to use this tool to access student information in an increasingly efficient manner. The prospect of a larger data base which would include both demographic and academic information requires further study, and a major financial commitment by the local school board.

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INTRODUCTION

This project is a description of a change taking place in a school. It is an attempt to document the transition from a manual system of storing and preparing student lists in the school office to a more automated approach, making use of a computerized data base.

The project itself grew out of success with another school-based data base, and the desire to make office filing, searching, organizing, and listing of student data more streamlined. A second goal was to establish an experiment with a data base that might lead to a much wider use of data bases in the future for academic records and cumulative files.

Gauging the success of such a project is difficult. The very nature of the major functions performed by the data base lends it much more readily to the realm of the school office than to the classroom. Consequently, to judge its success by the amount of teacher usage is misleading. Successes are more aptly realized in a diversity of ways, ranging from increased usage in the school office, to an increased staff knowledge of data base functions, to an increased quantity of school computers devoted to data base functions, to increased staff enthusiasm about the idea of computerizing student academic data.

Rationale

In any school setting, there are constant demands by teachers, parent advisory groups, administrators, secretarial staff, and central office personnel for up-to-date information of various types about the student body. This might include examples such as the classroom teacher wanting to know which students have birthdays in the month of January, or the physical education instructor wanting to know a particular student's locker number, or perhaps the principal wanting an up-to-date list of students on a particular bus route, or of students who are billeted at a certain home in case of inclement weather. The currently-used means of student data storage and retrieval is generally adequate, but has several drawbacks.

Firstly, the means of information storage used by most small to intermediate-sized schools consists of a series of files or lists of various types, often kept in an assortment of places, and updated only periodically (usually annually) by teachers or secretarial staff. Those responsible for compiling these lists in a conventional manner are often reluctant to make changes to prepared student lists when to do so might mean retyping, recollating, or revising an entire file. An example of this occurs whenever a new student arrives, or a current student leaves, necessitating the revision of class lists and individual files.

Secondly, the system of searching student data to find information on a particular student or group of students with some common characteristic (i.e. all students with allergies to bee stings) is made difficult, particularly on short notice, if every student's file must be searched manually to determine this information. It is granted that, in small schools, this information may be common knowledge among experienced staff members. However, as the size of the school increases, so does the quantity of data which must be at the fingertips of teachers, secretarial staff, and administrators. Very large schools, in many instances, have taken steps to establish a student data base on large minicomputers or mainframe computers. It is the small to intermediate-sized school which would most benefit from a microcomputer based student data base.

Background

The hamlet of Seven Persons is located on Highway 3, some twenty kilometres west of Medicine Hat, Alberta. Seven Persons School has a student population of approximately 215, drawn primarily from the farms, ranches, and acreages south and west of Medicine Hat. The school staff is comprised of twelve full-time teachers (including one librarian and one resource room teacher), and the principal. In addition to the instructional staff, there is a full-time secretary who looks after the school office.

Prior to the development of a computerized data base containing student demographic data, the problems inherent in the process of dealing with student enrollment information were manifold:

1. Storage of information

a) Information lists were de-centralized. Most information was stored on individual registration forms submitted by the student upon enrollment at the beginning of each year, and kept in the main school office. Other information relating to locker assignments, intramural teams etc. was kept with the physical education instructor.

b) Certain categories of data had not been assembled. The primary example of this is a record of the oldest child in each family attending Seven Persons School; this list is most useful when large duplicated handouts are to be sent home to each family so that duplication and paper costs are kept to a minimum.

2. Retrieval of information

a) Retrieval of information could only be done on a student-by-student basis. When specific information was required, a student's entire file would have to be pulled, and the registration data sheet would have to be located, often among

other documents containing academic records, achievement test results, transfer records, etc.

b) No retrieval involving a specific category of information was possible without looking through all files manually and compiling a list from these.

c) Because of this, retrieval of information lists, particularly about a category such as parents' phone numbers or emergency medical contacts, for example, was very slow and tedious.

3. Searching and sorting

a) All sorting and compiling of lists was done manually.

b) The preparation of an alphabetical list of students in a particular grade, bus route, or intramural house, for example, became doubly complex because of the two, or sometimes three, search variables.

c) Although such lists would have been useful and convenient for classroom and administrative tasks, they were often not prepared, primarily because of the excessive time and energy required to do so.

4. Editing and Printing

- a) The correction and typing of individual student information, or of lists, was all done manually.
- b) Corrected or edited lists were often not updated during the school year because of the clerical time required to re-sort, re-alphabetize and/or re-type lists. Consequently, the names of former students still appeared on lists, while those of new students did not.
- c) All lists were assembled and typed in the school office, then refiled, to be updated the following year.

This situation seemed an ideal one in which to harness the tremendous data storage, retrieval, listing, sorting, editing, and printing functions of the microcomputer data base. Some experience with a data base had already been gained using Appleworks to catalogue and label the school's computer software collection in 1986. The ability of this data base to store the names of all software titles, to enable the location of a specific program by topic, grade level, or title, and to update records when new software was acquired, was enough to recommend it as a useful tool in the storage of student data as well.

LITERATURE REVIEW

"Everybody gets so much information all day long that they lose their common sense" (Molnar, 1986, p.64). This statement by Gertrude Stein aptly focuses on one of the major problems faced by modern educators, particularly administrators. Alex Molnar (1986) suggests in his article "Technology, Information, and Schools" that the roles of the teacher, principal, superintendent, curriculum coordinator, student, school psychologist, or parent, are all determined, in part, by which information they have access to, and when then are allowed to have it. The diversity of influence that information can have in a population or organization leads Molnar to coin the term "sociology of information" to describe the broader role of information, information technology, and the uses of information in society.

General Uses of Computers

The microcomputer, for at least the past decade, has been on the leading edge of information handling technology in schools. This machine's uses are legion, ranging from instructional functions of varying types, to less pedagogical applications such as record and account keeping, to purely entertainment purposes such as games. Although there is a great deal of discussion underway in the current

literature of how computers should be used most effectively in teaching, and frankly, of how to restore that initial burst of enthusiasm about computers in the classroom, there is no doubt that computers have a very bright present and future in facilitating administrative tasks in schools of every size.

Westrom (1982) describes four prerequisites for the development of microcomputer systems in schools. These include: a) an understanding of microcomputer hardware, b) an ability to program, c) an understanding of and skill in system analysis, and d) a thorough understanding of the problem (p. 8). This list points out how much has changed in the past five or six years. As the calibre of hardware and software has undergone such dramatic improvement in quality in recent years, there is no longer the prerequisite that administrators or teachers have any ability to program, or that they have comprehensive skills in system analysis. There is no denying, however, that some understanding of microcomputer hardware (and software) is preferable, and that a thorough understanding of the overall problem or application is still essential.

It is pointed out by Westrom that the real benefits of the microcomputer accrue from its ability to reduce the time needed to complete a task, and to enable an administrative focus on data needed for a specific problem. One of the major characteristics of a hardware/software microcomputer

system, according to Westrom, must be its ability to handle basic student demographic information as a first step (p.8).

Westrom also adds a note of caution, inviting administrators not to jump on to the computerization bandwagon unknowingly. "Just because a school application can be done on or with a microcomputer does not imply that it should be done" (p.8). Although computers generate documents which appear to be precise and well-organized, they can, he warns, turn out to be a burden.

Latta, Dunn, and Stevenson (1982) also see the microcomputer as a powerful administrative tool. They stress that the greatest potential use or value of the microcomputer, surprisingly to some, is not in the classroom, but in the school office. To that end, it is therefore essential that those in day-to-day contact with the school office, foremost of whom might be the school principal, should have a working knowledge of computers and their applications. These authors see a variety of leadership styles related to the use of microcomputers, including:

- a) the administrator who has "capitulated" and/or simply does not care what is going on with regard to the computerization of the office. This administrator can take the credit for the positive effects of the computer, and lay blame on others for the negative;

b) the administrator who is unaware of the momentum that computers have gained, and in some cases commits "professional suicide" by simply stepping out in the way of the movement;

c) the administrator who is aware of microcomputer development, who engages the talents of his/her staff in an organized fashion to begin a plan for change based on the expertise and interests of staff members; and

d) the administrator who has become computer literate, who sees the applications for this technology, and who has initiated computer literacy inservice programs for both instructional and support staff (Lattta, Dunn, and Stevenson, 1982, p.4).

Furthermore, Latton, Dunn and Stevenson cite a Kirkland, Washington study which concluded that principals spend one-fifth of their daily time handling paper. This includes time spent waiting for information valuable to problem-solving and decision-making processes, as well as time spent writing letters, memos, and reports. The use of a computer is an ideal way to increase the productivity of office staff and to free the principal's time to assist and support teachers as the instructional leader of the school. This can only happen, however, when the administrator is both computer literate and an effective leader. Although these authors' definition of computer literacy is never

clearly put forward, one can infer that they see the principal as having an awareness of the functions and applications of currently available software. Furthermore, they do not perceive the principal to be the expert programmer that Westrom envisages.

Marjorie Hanson and Robert Trbovich (1985) reinforce this concept of the computer literate administrator in their examination of the microcomputer's impact on school administration. In their view, the computer can collect, summarize, and manipulate data to produce reports on a more timely basis. The school's chief executive has the ability to gain an optimum picture of data appropriate to specific decisions. This availability of data is referred to as the principal's 'visibility window' of data which "improves decision making by providing meaningful data pictures of some aspect of the school system" (Hanson and Trbovich, 1985, p. 4).

The complexity with which the computer may be applied to administrative decision-making is also highlighted by Hanson and Trbovich. "Modelling" is the authors' term to describe the way in which future trends can be estimated based on data-based information, and an increasingly complex array of dependent variables. At one extreme, one might do nothing more than to use demographic data to establish trends in order to estimate future solutions. In such a situation, the computer does nothing more than to save time,

and to allow one to examine the data from different perspectives. At the other extreme, one could build a highly mathematical model to predict both demographic or financial changes. A small school, such as the one at the focus of this study, would not likely require the sophistication of the latter extreme.

Although the bulk of Hanson and Trbovich's comments are directed at larger schools and school systems, their general scenario for configuring hardware to administrative situations can be applied, in part, to much smaller schools. In terms of hardware, the authors suggest, as phase one, the acquisition of individual computers to be used in specific applications (i.e purchasing, word processing etc.). In a small school, versatility, rather than specialization, is much more cost-effective. Nevertheless, the acquisition of one or more computers designated for specific administrative tasks is essential. Phases two would encompass the networking of computers within the school, while phase three would link these with central office computers. Thus the purchase of hardware in phase one must also consider future expansion of the system with a minimum cost in terms of new hardware in phases two and three.

A recurring topic throughout these articles is the level of expertise which administrators and/or teachers must attain. As was mentioned earlier, authors such as Westrom (1982) and Hanson and Trbovich (1985) feel that effective

use can only be made of any computer system when those who reap the benefits of it are at least mildly cognizant of its operation. Stevens (1984) concurs with this, yet realizes that, although educators perceive that computers will have a strong impact on curriculum and classroom instruction, they are reluctant to incorporate computer technology in their classrooms. If this conclusion were to be expanded to non-instructional uses, it might suggest that educators feel even more reluctant about administrative applications, which are even more remote from day-to-day classroom experience. Stevens sees five barriers to the increasing application of computer technology in schools, namely:

- 1) the lack of adequate hardware and peripherals;
- 2) the lack of financial support;
- 3) the lack of financial support;
- 4) the lack of knowledgeable teachers, and
- 5) the reluctance to change (p. 266).

Her identical listing of reasons two and three stresses the importance of financing any computerized expansion.

Her recommendations to overcome these barriers are twofold:

Firstly, prospective educators must be challenged to use appropriate computer technology in the classroom..

Secondly, inservice programs should provide educators with the opportunity to acquire computer technology skills commensurate with their needs. The application of any computer technology, whether instructional or

non-instructional, must therefore overcome similar barriers. Either approach must confront the problems of lack of funding, and of lack of teacher inservice head on.

Administrative Uses of Computers

While the articles mentioned so far have given a brief overview of computer uses in the classroom and in the office, and have examined some of their limitations, the following articles look more specifically at administrative uses. In particular, they examine the use of the data base as a means of storing, arranging, searching, and retrieving school-related data.

One need not search the educational literature extensively to find references to the use of information systems in the schools. Williams and Bank (1983) highlight systems which are "constantly seeking both demographic and cost data that will allow them (administrators) to make annual budget projections" (p.1). Peterson (1983) describes the impact of computer technology on admissions and record-keeping procedures in schools of all sizes. Among his observations are several directly linked to this study.

Firstly, the costs of computer hardware have been decreasing steadily. In the late 1950's a computer with a capacity of 180,000 bits cost approximately \$250,000(U.S.). Today, a desk-top computer with three times the memory

capacity is available for less than \$2000(U.S.) (Peterson, 1983, p. 88). This makes the cost of computer hardware much less of an obstacle than it was even five or six years ago.

Secondly, there is increasing computer literacy among the general population, including students and teachers. Computer companies have made special efforts to market machines to educators, hoping to achieve a larger market share in future years as students purchase their own computers.

Thirdly, software has become much more "user friendly". Even non-technical people, previously alarmed at the complexity of programming, feel much more at ease about applying this software to their specific needs. A case in point would be the Appleworks program, which not only provides word processing, data base, and spreadsheet components, but also enables an integration of these components in a manner which is affordable and easy to learn.

Fourthly, there is a growing recognition of information as a resource. By harnessing the power of the computer as a tool to store, sort, and retrieve vast quantities of information efficiently and accurately, a user is able to manage information in such a way as to achieve maximum productivity.

Peterson also describes several restraining forces which work against computer implementation. These include:

- a) the cost of computer technology. Although computer hardware has been decreasing in price, the complex technology of software, in some instances, has made it relatively more expensive than the hardware;
- b) the traditional orientation in many offices and/or schools towards paper, rather than electronic documentation; and
- c) the reluctance to change, and a fear of the risk involved in adapting to new technology.

Peterson's conclusion is that, despite the restraining forces, we are still moving rapidly toward a greater use of computer technology. The evidence for this includes:

- a) higher emphasis on information management in long-term planning;
- b) the modification of the traditional role of the secretary to include information management;
- c) the fact that professional people are doing more of their own work on the computer; and
- d) the changing of attitudes from a "paper document mentality" to an electronic verification and maintenance process (p. 91).

Despite the fact that Peterson's work looks primarily at admissions and record-keeping applications, several of his many suggestions are appropriate, even in a small school setting such as the one used in this project. One must:

- a) recognize information as a valuable resource, and establish appropriate machinery to manage and use this information in the most effective ways;
- b) develop one's own personal computer competency;
- c) use the computer for what it does best in order to free personnel to do what they do best.
- d) make appropriate data available to those who need it (p. 91).

Another specific study which highlights the use of an information system in the school is that of Neil Webb (1984). Although this study was done at the college level, and focused on the use of student performance data for academic improvement, it nevertheless outlines the increasing variety of uses being made of school information systems in North America.

Humphreys (1985) describes the use of modern information systems for student record keeping, particularly useful in light of the demands for accountability of expenditures in public education and for the provision of a wide spectrum of programs, ranging from those for the gifted to those for the handicapped. In his words, "better decisions require better information" (p. 49).

Humphreys also explores the issue of privacy of information. Since the scope of the information collected in this study is not of a particularly private nature, this has not been addressed by the study. Nevertheless, every

effort has been made to manage this information in a responsible manner, and, in Humphreys' words, "to minimize the risk to privacy, and the risk of inappropriate decisions" (p. 50).

Information Storage and Retrieval

Edward Blackhurst (1983) looks very specifically at the use of microcomputers in the management of student records. His study, although conducted on a large scale, suggests difficulties similar to those found with information retrieval in smaller schools. When requests for information are received from any one of a host of agencies or individuals, a haphazard search for data is initiated. Unless office personnel are extremely well organized, a manual search is done through documents that were often designed for other purposes, and which are often out of date. Furthermore, Blackhurst adds, information must frequently be sought from more than one location.

The prerequisites of an efficient information system, in Blackhurst's view include an ability: to store information, to be updated easily, to retrieve quickly, and to sort information in a variety of formats. Furthermore, such a system might be capable of printing mailing lists and mailing labels. Blackhurst uses the Personal Filing System (PFS) as an example of a microcomputer data base, and illustrates how PFS, like Appleworks, is menu-driven,

enabling use of the program with a minimal amount of training.

Several other articles discuss the use of microcomputer data bases in a very familiar application -- the library. Both Leggate and Dyer (1986) and Planton and Phillips (1986) detail a variety of uses for the data base in the library's day-to-day function and administration. In both instances, there are areas of application, or similarity, to the Seven Persons project. Leggate and Dyer recognize the tremendous potential of a data base within an organization, rather than of one connected to external agencies, since decisions are most often made locally with locally obtained information. An individual school, therefore, might not find an immediate advantage to linking its database to a central office computer. These authors discuss a variety of facets of a data base, however those characteristics which relate most to this project include a data base which is:

- a) flexible enough to perform retrieval, sorting, or listing tasks;
- b) searchable according to specific fields (i.e. last name, grade, etc.), or by words or phrases that would be suitable search terms;
- c) form-filling, that is a form is presented on the screen and the operator has only to fill in the boxes, (template format) and,

d) editable by files, records, or fields of information.

Planton and Phillips' (1986) experience in using PFS for the college library suggests that some difficulty was encountered by library personnel in learning to operate the system. VISICALC, an electronic spreadsheet used in conjunction with PFS for statistical record-keeping, seems to have been difficult to master, perhaps because it is not a menu-driven program like Appleworks. Nevertheless, their article does strongly identify the need to do effective inservice training with an organization's users while a data base is being introduced.

Cohen, Hall, and Cohodes (1986) have written extensively about the use of a data base in improved evaluation planning, primarily to support decision making. Their procedure comprises an extensive description of the program for which a data base is to be used, followed by information gathering and the organization of objectives prior to the data base's construction. Their concern is that the data base be used as a tool to enable the evaluation of a program, once it has been implemented. Although the average small school does not usually plan its programs in such detail, there are still elements of these authors' work which has relevance for this project.

Firstly, the data requirements must be specified. The Seven Persons data base is structured to contain information

which is often in demand (i.e class or bus lists), which is generally available from school enrollment forms, and which is difficult or inconvenient to retrieve, search, or sort manually. Secondly, Cohen, Hall, and Cohodes emphasize the need for an aggregation of data sources so that information files are centrally available for the convenience and efficiency of the school office.

Neil Tate (1986) describes another specific data base application, that of data manipulation in the field of social research. He lists a variety of specific data management activities which, although useful in social research, are certainly not exclusive to that field. In fact, one or more of these features can be useful in a small-scale demographic data base as well:

- a) entering new or additional data records;
 - b) editing/correcting errors in stored data;
 - c) adding data to existing data;
 - d) sorting the records into a new order defined by the values of an existing data field;
 - e) aggregating or otherwise summarizing on one or more fields; and
 - f) transposing the rows and columns of a data base
- (p. 683).

To this end, Tate first looks at the option of writing one's own computer software to accomplish these purposes. He concludes, to no one's surprise, that even though it may

be possible to write a customized program to serve one's needs, it is hardly efficient to do so. He names software packages such as dBase II, dBase III, Lotus 1-2-3, and Visicalc, most of which are very similar in many respects to the Appleworks package, as likely candidates for a microcomputer data base and/or spreadsheet.

Perhaps the most concise examination of a computerized data base, which parallels the requirements of the data base in this project, is that of Foster et al. (1986) Their article examines the information an administrator might want from a computerized student data base (CSDB), how one might be used, and how much one might cost.

The primary consideration to be made in the purchase of a CSDB, in Foster's opinion, is flexibility. Each school has lists of various types containing demographic data such as students' names, addresses, parent/guardians' names, emergency phone numbers etc. The nature of the information that a particular school considers important varies a great deal from place to place. This would depend, for example, on whether the school is urban or rural, large or small. In any case, the data base must be capable of dealing with each school's unique set of circumstances.

As a secondary consideration, the authors suggest that one select a useful software package with easy-to-use, step-by-step instructions and easy-to-remember mnemonics. The Appleworks program, being "menu-driven", certainly fits

this description, and can be learned with a minimum of difficulty. For this reason, Foster suggests that after one has selected the best software for one's purposes, the hardware selection is easy.

Thirdly, it is imperative that those who will use, or who may wish to use, the data base must be trained in its use. The most likely candidates for such training are the principal, vice-principal, and office staff members. Foster goes so far as to designate a staff member as "the data base officer" so that requests for information can be channeled appropriately. In a small rural school, whose office staff consists of perhaps one secretary, the roles of "attendance clerk" and "data base officer", to name but a few, must be assumed by one and the same person. Furthermore, this person must be totally familiar with the intricacies of the data base software. To quote Foster et al., "when a school is trusting its entire day-to-day operation to the actions of one person, he or she had better be the best that can be found" (p. 65).

Summary of Literature Review

The current literature contains numerous articles on the diverse uses of computers in schools. While the majority of publications mentioned in the literature review have examined purely instructional uses of the

microcomputer, far fewer have examined the bright future of information systems in the school office.

Those authors who have examined the applications of microcomputers in non-pedagogical situations have provided a list of salient points which do have a bearing on the structure and outcomes of this particular study:

1. Planning and Implementation

- a) Any information system must rely on demographic data as a first step (Westrom, 1982).
- b) In any application, the rationale for the information system must be clearly defined (Westrom, 1982).
- c) There is a growing recognition of information as a valuable resource (Peterson, 1983).
- d) The traditional roles of office personnel must change (i.e. the secretary as "data control officer") (Peterson, 1983).
- e) A suitable data base must :
 - i) be flexible enough to perform retrieval, sorting, and listing tasks;
 - ii) be searchable according to specific fields;
 - iii) be of the form-filling type;
 - iv) be easily editable
 - v) be easily learned by the average teacher.

2. Software and Hardware

- a) It is recommended that hardware be acquired for specific applications; this can be networked later if necessary (Hanson and Trbovich ,1985).
- b) Computer software has become much more user friendly in recent years (Peterson ,1983).
- c) The costs of computer hardware have been decreasing steadily (Peterson ,1983).
- d) The relative costs of computer software have increased, but so have the levels of sophistication and performance.

3. Skills and Inservice Training

- a) No longer must administrators or teachers be programming experts in order to function effectively with an information system. Instead, it is suggested that they be "computer literate", implying a working knowledge of the computer system, its capabilities, functions, and applications, rather than an ability to program.
- b) There is an increased level of computer literacy among the general population (Peterson ,1983).
- c) A computerized information system cannot be introduced successfully without training for staff members.

4. Obstacles and Barriers

a) The major obstacles to implementing computer technology include:

- i) lack of hardware and peripherals;
 - ii) lack of financial support;
 - iii) lack of teachers knowledgeable about computers; and
 - iv) the reluctance to change (Stevens ,1984).
- b) This reluctance to change very often occurs at the administrative level, and can range from outright intransigence to grudging tolerance of new computerized information systems. (Latta, Dunn, and Stevenson, 1982).

5. Advantages/Recommendations

a) The greatest potential uses for microcomputers in the school lie in the school office (Latta et al., 1982).

b) The major advantages of the computerized information system are to:

- i) increase productivity of school personnel;
- ii) free principals' time for the major task of instructional leadership (Latta et al., 1982).

c) Teachers should be:

- i) challenged to apply appropriate computer technology, and
- ii) provided the opportunity to acquire computer technology skills commensurate with their needs (Stevens ,1984).
- d) The best decisions are informed decisions, made on the basis of soundly gathered and assembled data (Humnphreys,1985).
- e) The individual administrator must personally accept the responsibility of developing his/her own computer literacy.
- f) One must use the computer for what it does best, to free personnel to do what they do best (Peterson, 1983).
- g) Data must be made available to those in the school who need it.
- h) Data-based information storage, retrieval, and sorting eliminates the manual search of disparate sources which are not originally designed for this purpose, or which are out of date (Blackhurst, 1983).
- i) A single school need not find any immediate advantage to netwovrking its computer system with central office, since information is locally collected for the purpose of local decision-making (Leggate and Dyer, 1986).

THE STRUCTURE, CHARACTERISTICS, AND
LIMITATIONS OF DATA BASES

A General Look at Data Bases

Definition

A microcomputer data base is most easily defined as a means of creating and accessing lists of things. There are three major activities involved in working with lists:

- a) creating and entering new information into a list;
- b) rearranging the order of the list; and
- c) printing a report from the list.

Components

A data base may contain one or more files (i.e. the Seven Persons Student File). Each file consists of records, corresponding to individual items in the data base (the details of one student). Each record is made up of fields corresponding to different categories of data. For example, the record for a particular student may contain fields such as name, home phone number, etc. The entries in each field are comprised of individual symbols, called characters. Most fields, such as the parent's name, are singular, however some, like the emergency phone number category, may contain several pieces of data.

The search function of a database involves the matching of a word, phrase, prefix, number, or character string

against each record. If a match is achieved, the record is displayed; in some databases the user is informed of the number of matched records. Thus a search for a student named "Jan" might match records of student names containing "Jan", such as Jane, Janet etc., unless specifically delimited.

File, Record, and Field Sizes

File sizes may be specified in numbers of either characters or records. Record sizes may be defined in terms of characters or fields. Size restrictions may result either from the operating system or the applications software.

The Personal Filing System, or PFS (1981) program, for example, advertises that it is possible to place up to 1,000 "pages" on a single diskette. (Leggate and Dyer, 1986, p.44) Thus, if a single data form is being used, information on 1,000 students could be stored. In fact, as the number and length of the fields increases, the number of students will be much smaller. Another limitation of PFS is that it will only print nine columns in a report.

The InfoStar system (1982) has the ability to store 65,535 records per file. A maximum of 255 fields per record is permitted, and a maximum of 120 characters per field can be used. If a user needed an entry, such as a brief abstract requiring more than 120 characters, then this would

not be an appropriate data base. (Tate, 1986, p.164) Despite this program's larger capacity, one is limited not so much by the software, but by the lack of hardware available to operate it with.

Similarly, other systems such as dBase II (1982) and dBase III will permit only 32 fields per record. Each data base has unique characteristics and/or limitations which must be considered in selecting a data base. dBase II, for example, is not a system for novices, since it is a programmable data base, and therefore requires considerable study and effort to implement effectively.

Edwards (1983) has provided a useful reference that describes the physical characteristics of 128 different data base management programs. For each of these programs, Edwards lists the manufacturer, the computer hardware requirements, information about the number of records, record length, number of fields, field length, sorting options, print options, price, and several other features. (pp.42-49)

The Appleworks Data Base

The Appleworks program, which operates on the Apple IIe or IIc computer, is an integrated software package comprised of three components, a word processor, an electronic spreadsheet, and a data base. The immediate advantage of such an integrated package is that tables created on the

spreadsheet, or reports created on the data base, can easily be moved into a word processor document by means of a feature called the clipboard.

The Appleworks data base performs two main functions:

- a) the review/add/change function, and
- b) the report function.

Its structure is very similar to that of the other data bases described earlier, although the Appleworks documentation uses the terms "entry" or "category" in conjunction with the term "field" commonly used elsewhere. The term "category" refers to one kind of information within the data base (i.e. home phone numbers, intramural house etc.)

The hardware requirements for the Appleworks program vary. Either of two configurations are commonly used:

- a) an Apple IIe with 64K (kilobytes) RAM, capable of holding about 140 records (assuming an average record size of 75 characters), or
- b) an Apple IIc or IIe with 128K Ram, capable of holding about 750 records of 75 characters each.

Several other limitations of the program are as follows::

- a) a maximum of 1350 records may be stored, no matter what the record size or number of categories;
- b) a maximum of 1024 characters per record;
- c) a maximum of 76 characters per field, and

d) a maximum of 20 characters in a category name.

(Appleworks Reference Manual, 1983, p. 47)

THE SEVEN PERSONS SCHOOL DATA BASE PROJECT

Why Use a Data Base?

As was mentioned above, the idea of a Seven Persons School Data Base grew primarily out of a successful experience with a computerized data base used to catalogue the school's computer software collection. This had allowed the quick location of specific software titles by topic, or by grade level, and had illustrated to the school at large the underlying principles of a data-based system.

Several other contributing factors relative to the decision to use a computerized student data base are also worthy of mention:

- a) consultations with the school secretary revealed a keen interest on her part in pursuing the idea. Having seen the software data base, she became aware of how a data base could consolidate the various student lists she handled in the school office, and could make the editing, sorting, searching, listing, and printing of lists much more convenient;
- b) the school administration shared these feelings, and was very supportive of the idea;
- c) sufficient hardware and software to set up the data base were immediately available, although no office computer had yet been purchased; and

d) several staff members had expressed approval for the idea of computerizing report cards and cumulative records. A demographic data base seemed a logical first step toward reaching this goal.

Why Use Appleworks?

The decision to use Appleworks as the data base program for storing basic student enrollment data was dependent upon several factors:

- a) familiarity with the Appleworks program already existed;
- b) the hardware and software to operate the program were already available in the school in the form of four Apple IIc computers;
- c) the Appleworks program had sufficiently large capacity to store about 20 fields for approximately 200 students;
- d) the Appleworks program, being menu-driven, does not require a knowledge of programming, and could be learned relatively easily by office staff, teachers, and administrators;
- e) Appleworks was already available in other Cypress Division schools, and so experience gained with this database could easily be transferred elsewhere; and
- f) no plans had been made to network this database with other schools, or with central office, and so a

data base with special networking features was not deemed necessary.

Goals of the Data Base

To make general student data (excluding test scores, grades etc.) more accessible to the school administration of Seven Persons School, a variety of useful information was compiled in the form of a computerized data base, by means of the Appleworks program.

The goals of such a system are manifold, and include the ability of the system to act as:

- a) a centralized store of general student data;
- b) a backup to existing written files and documents;
- c) a supplement to more confidential files of student performance, test results, etc;
- d) a means of quick access to :
 - i) individual student information, and
 - ii) particular lists of students, including cross-referenced lists with two or three specific criteria (i.e. students whose birthdays are in July and who are in a certain intramural house and who are in a particular grade);
- e) a time and energy saving device for administrative and secretarial staff;

- f) a means of conveniently and quickly producing current, printed, alphabetical, or numerically-ordered lists of students for a wide variety of purposes;
- g) a means of quickly revising and updating student data; and
- h) a means of obtaining a broad picture of the school's student population in terms of any of the student information categories on file (i.e. by bus route, by phone numbers, by medical problems, etc.)

Structure of the Data Base

Once the decision to use a data base with Appleworks had been made, it was necessary to decide what categories of data would be available and most useful. A meeting with the school secretary and principal enabled a compilation of current lists and of new categories (i.e the oldest child in each family attending Seven Persons School).

The data base was set up to incorporate a wide variety of useful data. No data of a strictly confidential nature was to be included.

The following categories were included for each student:

1. NAME (Surname, First, Second)
2. ADDRESS
3. PHONE
4. GRADE

5. GENDER
6. DATE OF BIRTH
7. FATHER (GUARDIAN)
8. MOTHER (GUARDIAN)
9. LAND LOCATION (Sec., Twp., Rg., W4)
10. SCHOOL DISTRICT NO.
11. FAMILY PHYSICIAN
12. ALBERTA HEALTH CARE NO.
13. SPECIAL MEDICAL PROBLEMS
14. EMERGENCY PHONE NUMBER
15. BUS DRIVER
16. BILLET
17. INTRAMURAL HOUSE
18. LOCKER NUMBER/COMBINATION
19. NUMBER OF SIBLINGS IN SCHOOL
20. ELDEST IN FAMILY (Y/N)

Limitations of the Data Base

It is immediately recognized that, because of the large quantity of data entered (20 categories x 210 students), that some adjustments will have to be made as the data base is expanded. It is entirely possible, for example, that, because of the limitations of the Apple IIc's memory capacity, the data base may have to be expanded in two discrete parts, one for perhaps Grades 1-5 or 6, and one for Grades 6 or 7-9. (Elementary and Junior High students)

Furthermore, it is recognized that this data base is by no means inclusive. A great deal more data could be assembled for each student, however most other data are either too confidential or too rarely used to be included in this type of data base.

Evaluation of the Data Base

The data base described above is intended primarily to facilitate the handling and management of general student data by the teachers, secretarial staff, and the administrator of Seven Persons School. The desire to undertake such a project has arisen as a result of this writer's perception that:

- a) currently, the storage and retrieval of student data is often a cumbersome task for those involved;
- b) that revisions of both a major and minor nature are rarely undertaken by staff if such revisions involve tedious paperwork;
- c) that the microcomputer, when used in concert with a data base program such as Appleworks, can offer a wide variety of features in terms of both data storage, retrieval, and manipulation;
- d) that this data manipulation can be conducted quickly, conveniently, and neatly, thereby maximizing the teacher or administrator's time, enabling him/her

to utilize time in other, more fruitful ways in the school.

To measure the degree to which this data base would achieve some of the goals described above, an evaluation of the data base was included in this project.

The evaluation includes the following major components:

1. a qualitative description by the writer of the steps in preparing the data base, the limitations of it, as well as of the success achieved in actually reaching its goals;

2. a series of interviews (and/or written surveys) of the major users of this data base:

- a) other teachers
- b) secretarial staff and
- c) the school administrator.

The purpose of these interviews is to provide a picture of:

- i) how extensively the data base is used;
- ii) which categories were most utilized;
- iii) which additional categories are needed;
- iv) the advantages and disadvantages of this system compared with the currently used system, and
- v) whether it is feasible to expand the use of the data base to include academic and cumulative records for each student.

Implementation and Inservice

The data for some 210 students was entered into the Appleworks data base from enrollment forms and office lists in January and February of 1987. It was then ready to be made available for use by the school staff. The data base was demonstrated at the March, 1987 school staff meeting, which was attended by the Cypress Division Deputy Director, Mr. R. Carter. Firstly, this served to make the school staff aware of the potential of the data base. Secondly it served to arouse interest among teachers and administrators in the general idea of a computerized data base, and in particular with the possibility of purchasing a new computer for exclusive office use.

Before this data base could be effectively utilized, staff members would need to undergo some inservice training to become familiar with Appleworks. In April of 1987, two afterschool sessions of two and one half hours each were conducted for teachers interested in becoming familiar with the program. A total of eight staff members (1 secretary, 1 principal, 2 teacher aides, and 4 teachers) took advantage of this voluntary inservice program held on April 29 and 30, 1987. (see Appendix A for an outline of the inservice)

The inservice sessions were intended to quickly introduce staff members to the operation of all three components of Appleworks in a way that would relate to their

classroom experience in keeping grades, preparing letters, et cetera. During the discussion of the data base, the Seven

Persons School data base was used extensively as an example in the hopes that staff members, by means of firsthand contact, would become familiar enough with the data base to use it, or least be aware of how it could be used, after the inservice session.

Evaluation of the Inservice

In June of 1987, an evaluation survey of the data base was circulated to all fourteen members of staff, and was returned by all fourteen. The evaluation form (see Appendix B) was intended to find out:

- a) whether or not staff members were aware of the SPS data base;
- b) whether they had used the data base in the two months of May and June, 1987;
- c) what potential applications they saw for the data base;
- d) how comfortable they felt using the Appleworks data base program;
- e) whether the data base would be more useful at a particular time of the school year, and if so, how this would be most useful;

f) which applications of the data base were most and least useful, and to so indicate by ranking these applications;

g) staff feelings on the possibility of cumulative records and/or report cards being converted to a computerized data base.

The following is a summary of the evaluation results. Since much of this data is qualitative in nature, a selection of verbatim comments has been included in some instances.

1. Are you aware of the computerized student data base in Seven Persons School?

YES 13

NO 1

2. a) Have you used the data base to obtain school-related information within the last two months?

YES 2

NO 11

NO RESPONSE 1

b) If not, why not?

-- we don't have a computer in the office

-- I don't have a computer at my disposal at this time

-- I have had no need to use it yet

- no need to use this largely administrative information
- too busy now; intend to use it next year
- don't feel confident in computer use; lack of time to practice at the computer
- not trained on the computer
- some of these data items are listed in our registers; no immediate need for other categories

3. What are some potential applications that you might see for this data base?

- year end marks
- record keeping (tests/marks)
- listing resources (tapes, posters, filmstrips) not housed in the library but kept in individual classrooms
- efficient bookkeeping
- keeping records of former students since these are usually forwarded with cumulative folders
- making up beginning-of-year class lists
- track and field day age groupings
- library loan lists

4. For those eight staff members involved in the Appleworks inservice, the following question was asked:

On a scale of 5 to 1 (5 = very well, 1= not well), how would you rate your ability to use the Appleworks data base before and after the workshop?

BEFORE: mean rating of 1.00

AFTER: mean rating of 2.88

5. Would the SPS data base be more useful to you at specific times of the school year? If so, how?

YES 8

NO 4

MAYBE 1

NO RESPONSE 1

-- school opening; medical problems should be checked out then

-- year end lists

-- awards day; keep track of previous winners and what long-term awards are available

-- track and field day

-- school registration day

-- CTBS test results

-- entry to Resource Room

-- eye check data

-- timetables

-- school supplies inventory

-- special events i.e Science Fair results, provincial achievement test results

6. Please rank the following applications of the data base in terms of their usefulness to you at this school (1st through 8th).

Overall Rank	Application
=====	=====
1	A means of conveniently and quickly producing current, printed, alphabetical or numerically-ordered lists
2	A centralized store of general student data
3	A time and energy saving device for administrative and secretarial staff
4	A means of quick access to individual student information and particular lists of students
5	A means of quickly revising and updating student data
6	A supplement to more confidential files of student performance, tests, etc.
7	A backup to existing written files and documents
8	A means of obtaining a broad picture of the school's student population in terms of any of the information categories

7. How do you feel about the possibility of all cumulative records being stored on a computerized data base?

-- let's do it!

-- yes

-- would make it easier to get printouts of various areas

-- good idea

-- good chance

-- information would still have to be transferred to a cumulative record folder to be transferred to other schools

Summary generalizations

Several major observations can be made from the staff evaluation:

a) the level of useage of the SPS data base during the months of May and June, 1987 was very low;

b) the workshop succeeded in raising the level of awareness of the advantages of a computerized data base in terms of storing, searching, updating and retrieving student enrollment data. Those affected by this included:

i) the school's teachers and aides;

ii) the school principal and secretary; and

iii) the central offices (by virtue of communications by the principal to the

central office (see Appendix C), and the deputy Director seeing a firsthand demonstration of the data base at the school staff meeting);

- c) the workshop generally raised the staff's level of knowledge of Appleworks;
- d) there was an overwhelming awareness of the SPS data base (13 of 14 respondents so indicated);
- e) very few staff members had tried to use the data base, although most respondents listed some potential applications for it.

The low level of usage of the data base can be explained in several ways:

- a) most of the immediate applications for the lists or sorts done by the data base would be more relevant in the school office, rather than with individual teachers;
- b) the timing of the project was perhaps poor, in that teachers are generally preoccupied in May and June with end-of-year activities;
- c) there was a lack of confidence felt by:
 - i) teachers who had not used a computer for any substantial length of time, or who had not used Appleworks, or

ii) teachers who had spend some time using Appleworks in the two-session workshop, and expressed only a moderate proficiency with Appleworks;

d) teachers felt they would be able to call upon the school secretary to use the data base for them.

The combined ranking of staff opinion on the applications of the school data base shows several interesting points:

a) the three highest ranks were given to the data base as:

- i) a means of producing lists;
- ii) a centralized store of general student data, and
- iii) a time and energy-saving device.

All of these functions are ones which one might ordinarily label as "office-related", but which would be directly useful or convenient for the classroom teacher.

b) the three lowest ranks were given to the data base as :

- i) a supplement to academic records;
- ii) a backup to existing written files and comments; and

iii) a means of obtaining a broad picture of the school's student population in terms of specific categories.

Since these latter tasks are generally designated as "administrative" functions, it is understandable that most teachers and staff members would not see immediate application for these, and so would rank them low.

Usage Update: Secretary and
Administrator Questionnaires

In the fall of 1987, a new Apple IIe computer (128K RAM), monitor, and Imagewriter II printer were purchased by the school division specifically for the office of Seven Persons School. As new students were registered in September, the school secretary updated the Appleworks data base to include data from new students, and to delete data from former students. In November, 1987, both the school administrator and the secretary were questioned about their experiences with the SPS data base, which had just been updated. The following is a summary of the questions asked and their responses: (S = Secretary P = Principal)

1. How familiar would you say you are with the SPS data base in terms of:

a) the variety of information it contains?

S: familiar

P: fairly familiar

b) the way in which this information is organized?

S: somewhat familiar

P: familiar

c) the ways in which this information can be
retrieved, sorted, and/or listed?

S: familiar

P: not as familiar

2. Do you feel comfortable enough with the Appleworks
program to use the data base effectively?

a) S: yes

b) P: As I personally do not use the program, I
am not comfortable with its operation;

3. Have you used the SPS data base in the past six
months? If so, describe as many instances as you can. If
not, have you noticed applications for it? Please describe
these.

S: Yes

-- classroom lists (Grades 1-9) in
alphabetical order

-- bus driver lists (students on each
bus) by grade

-- lists of students in each grade
(male / female)

-- list of oldest student of each family
in alphabetical order

-- list of student, grade, and locker
number

-- list of students by grade and billet

-- list of students, medical data, and
health care number by grade

-- lists of students with birthdates in
a particular month (these are
announced on the intercom each day)

P: No

-- potential uses include student lists,
phone numbers, parents' names and
addresses

4. Have there been occasions when a manual retrieval,
search, or listing of student information was used instead?
If so, why?

S: Yes. To look up one emergency phone
number.

P: Yes. Before the data base we needed a
list of family names and the oldest child in
each family. This is now done using the data
base.

5. Do you think the SPS data base is an improvement over the manual approach to storing and retrieving student data? If so, why? If not, why not?

S: Yes. It is much easier to make up lists with varying information on each data sheet. i.e. class lists with student name, address and telephone number and any combination of the 20 categories on the data base.

P: Yes, very much so. Information can be accessed quickly. It is much faster to update the data base each year than manually prepare new class lists and information.

6. (Principal only) A new Apple IIe computer was purchased for the Seven Persons School office in September, 1987.

a) Why was the computer deemed necessary?

i) We wanted to make use of the data base so record keeping could be simplified from year to year.

ii) Convenience -- if we have access to a computer, we will use it.

b) Was the use of the SPS data base considered in the the decision to purchase this new computer? If so, how much of an influencing factor was it?

Yes. After the inservice, I realized the quantity of information we could access. It became obvious that the office records could be more efficiently used, as well as expanded. This was discussed with central office administrators.

c) Were any future applications of the computer considered?

Yes. It was becoming inconvenient to borrow a computer from the computer room for office use, and for students to use the Choices guidance program. It interrupted classes as well. Library use, record keeping, and teacher use were also considered.

7. (Secretary only) How much time and effort were involved in updating the data base at the beginning of this school year?

S: No effort, however it was time consuming. (approximately 1-2 days part time).

8. Do you think this amount of time spent in using and updating the data base warrants having it?

S: Yes

P: Yes. Although I didn't update the information, it was obvious that it has saved time, and will save time.

9. In your opinion, what are the advantages of using a student demographic data base like the SPS data base?

S: The ability to pick and choose information (one category i.e. billets) and combine with any number of other categories and make printouts of needed information for teachers.

P: a.) saves time -- because we need the information and it would have to be done manually.

b.) efficient -- the information is kept in one location; easy to access.

c.) space -- it takes very little space to store quantities of information.

10. What are the disadvantages?

S: none

P: It would be initially expensive if you had to purchase a computer only for use of the data base.

11. To your knowledge, have teachers used the data base, or made requests for the type of information which would be accessed through the data base? If so, please describe these.

S: Both principal and teachers have been provided with class lists, including addresses, phone numbers, etc.

P: Not that I am aware of.

12. Would you like to see this type of data base expanded in the future to include cumulative records, grades, inventory, etc.?

S: Yes, expanded to include junior high options, inventory, student grades, locker combinations etc.

P: Yes. It would be easier to add various types of information to a data base rather than to cumulative records, mark sheets, etc. At the present time if a student leaves our school, or graduates from grade nine, we have no records of

that student once their file leaves the school (except their grades).

13. In your opinion, what factors would determine whether a data base to store student academic data is developed and used in the future?

S: The school division's decision to go with a computer printout for report cards division-wide.

P: -- ease of operation

-- agreement by administrators and central office personnel to store information on the data base and replace cumulative folders by a computer printout

-- the printout could be designed to store more information such as:

- resource room files
- standardized test results
- achievement test scores
- family record
- medical record

-- it would be a complete profile of a student

Conclusions

An informal survey of Seven Persons teachers in November of 1988 has indicated that no one has used the SPS data base since May of 1987. Nevertheless, each has received updated class lists prepared on the data base this year. Thus, the predominate use of the data base continues to be in the school office.

The results of the administrator and secretary questionnaires were extremely encouraging in that both see a great deal of potential in the use of the data base, and both indicate decisively their desire to see its use both continued and expanded. The school secretary has been by far the most extensive user, and has already prepared numerous lists from the data base.

The successful use of this small data base may well serve to pave the way for future computerization and streamlining of school office procedures. In a sense the SPS data base has already begun this by directly aiding in the acquisition of a new office computer, and in the training of staff members in the use and value of a data base.

The decision to develop and/or use a data base to store student academic data will be a much more complex one to make. Firstly, the existing school computer hardware does not have the memory capacity to effectively store and

manipulate the wide variety of data necessary for some 200 students over their nine years' stay in the Seven Persons School. Secondly, central office will have to be directly involved in, and in fact, will have to spearhead, the decision to expand, as this expansion is more than likely to be made on a jurisdictional basis than on an individual school basis. The Cypress School Division board would have to be presented with the intent of such a data base, would have to be convinced of its value, and would have to be willing to underwrite its cost. Formats for data bases, cumulative records, and report cards would all have to be standardized within the division. Thirdly, the variety of data base hardware and software combinations would have to be thoroughly explored before one could be selected. Fourthly, a staff inservice program would have to be organized and conducted so that teachers and office staff are totally familiar with the data base prior to its implementation. Fifthly, new issues such as privacy and confidentiality of records would have to be addressed and resolved. Finally, such a program, once operational, would have to be monitored in order to determine if staff, administrators, and parents are satisfied with its performance.

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Appendix A:

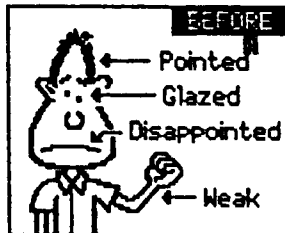
Outline of the Appleworks
Inservice, April 29-30, 1987

WELCOME to APPLEWORKSHOP

April 29-30, 1987



Appleworks can really
make a difference:

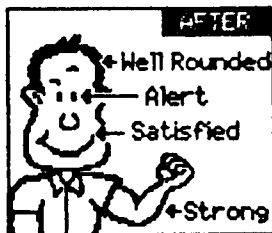


A WORD PROCESSOR
allows you to create,
edit, and print any
document easily, to
your own specifications,
on a computer video
screen.

A SPREADSHEET allows
you to work with
numerical information of
all kinds, as long as it is
expressed in rows and
columns.

A DATABASE allows
the user to easily
organize lists of
information into logical
groups.

The "Apple-wise
teacher becomes a
whole new person!"



WARNING!

The contents of this workshop
may open your eyes to new ways of
looking at typing letters and
reports, organizing data, and keeping
accounts and grades. Proceed beyond
this point at your own risk!

INTRODUCTION TO APPLEWORKS

Seven Persons School
April 29,30 1987

Wednesday

- ** Introduction to the Apple IIc
- ** Overview of Appleworks
- ** Appleworks Tutorial: Apple Presents Appleworks
 - *Side 1: Introduction
 - An Overview of Appleworks
 - Gateway
- ** The Word Processor
 - *Side 2: The Word Processor
- ** Formatting Options
- ** Printing Documents
- ** Spelling Checker (optional)

5-minute B R E A K

- ** The Data Base
 - Appleworks Tutorial:Apple Presents Appleworks
 - *Side 1:Data Base
 - A look at sample data bases
 - Software Inventory
 - SPS Student Database
 - Develop your own phone list data base
 - include last name, first name, address,
- etc.

THURSDAY

- ** The Electronic Spreadsheet
- ** Appleworks Tutorial: Apple Presents Appleworks
 - Side 2: The Electronic Spreadsheet
- ** A look at sample spreadsheets
- ** Develop a spreadsheet to display the number of students in each grade who have blue eyes, brown eyes, green eyes etc. Make up your own numbers. Use SUM and AVG functions.
- ** A look at Graphworks (Optional)

5-minute B R E A K

- ** Integrating: Using the Clipboard
- ** Appleworks Tutorial
 - Side 2: Putting It All Together
- ** Wrap-up: Questions
 - Individual Projects (i.e. Write a short letter to an optician; use the clipboard to insert the student "eye-colour" spreadsheet in your letter)

Introduction
to
AppleWorks

Necessary hardware

Apple //e or c with 80 column
1 or 2 disk drives

Software

double-sided diskette: startup and program
double sided diskette: tutorial on each side
single sided diskette: sample programs

AppleWorks is made up of a word processor, a data base manager, and a spreadsheet. The three parts of AppleWorks use similar commands, all store information on the same data diskette, and can be used together via a clipboard feature.

Program Capabilities:

Desktop

- maximum of 12 files on the desktop
- 64K system, room for 10K
- 128K system, room for 55K

Word Processor

- 64K system has room for about 8 pages of text
- 128K system has room for about 26 pages of text

Data Base

- has a 1,350 record maximum
- 64K system, average of 75 characters/record
room for 140 records
- 128K system, average of 75 characters/record
room for 750 records
- 30 categories maximum
- 1,024 characters/record maximum
- 76 characters/entry

Spreadsheet

- 64K system, has room for 1,000 filled cells
- 128K system, has room for 6,000 filled cells
- has 999 rows by 127 columns maximum

Keyword	Keystroke	Word Processor	Data Base	Spreadsheet
Arrange	⌘ - (A)	NA	Arrange or sort category	Arrange or sort rows
Blank	⌘ - (B)	NA	NA	Blank out cells
Copy	⌘ - (C)	Copy text	Copy records	Copy entries
Delete	⌘ - (D)	Delete text	Delete records or report category	Delete columns or rows
Edit, Cursor Switch	⌘ - (E)	Switch between insert and overstrike cursors	Switch between insert and overstrike cursors	Switch between insert and overstrike cursors
Find	⌘ - (F)	Find text, page, or marker	Find records	Find entries or text
Group	⌘ - (G)	NA	Add or remove group totals in a report	NA
Hard Copy	⌘ - (H)	Print hard copy of current screen display	Print hard copy of current screen display	Print hard copy of current screen display
Insert	⌘ - (I)	NA	Insert record, or previously deleted report category	Insert rows or columns
	⌘ - (J)	NA	Justify report category	Jump to other window
Calculate	⌘ - (K)	Calculate page breaks	Define a calculated report category	Recalculate values
Layout	⌘ - (L)	NA	Change record layout	Change cell layout
Move	⌘ - (M)	Move text	Move records	Move rows or columns
Name Change	⌘ - (N)	Change name of file	Change name of file, category, or report	Change name of file
* Options, Printer	⌘ - (O)	Display printer options	Display printer options	Display printer options
Print	⌘ - (P)	Print text	Go to report menu, or print report	Print worksheet
Quick Change	⌘ - (Q)	Switch to another file on the desktop	Switch to another file on the desktop	Switch to another file on the desktop
	⌘ - (R)	Replace text	Change record selection rules	NA
Save	⌘ - (S)	Save the current file to disk	Save the current file to disk	Save the current file to disk
	⌘ - (T)	Set tabs	Add or remove report category totals	Set titles
	⌘ - (U)	NA	NA	Edit cell contents
Value	⌘ - (V)	NA	Set standard values	Set standard values
Window	⌘ - (W)	NA	NA	Create windows
Clear	⌘ - (Y)	Clears to end of line	Clears to end of entry	Clears to end of cell
Zoom	⌘ - (Z)	Display format settings	Zoom to single or multi-record layout	Zoom to formula display layout
Ruler	⌘ - (1) • • ⌘ - (9)	Move within file to beginning (1), end (9), or proportionally (2-8)	Move within file to beginning (1), end (9), or proportionally (2-8)	Move within file to beginning (1), end (9), or proportionally (2-8)
Help	⌘ - (?)	Display help information	Display help information	Display help information
Cursor Move	⌘ - (→) or ⌘ - (←)	Move cursor one word right or left	Change size of category	Scroll horizontally one screen display
Cursor Move	⌘ - (↑) or ⌘ - (↓)	Scroll vertically one screen display	Scroll vertically one screen display	Scroll vertically one screen display

NA = Not applicable. The keystroke has no significance for this particular tool.

NOTE: Some of the Data Base keystrokes work for the REVIEW/ADD/CHANGE screen, others for the REPORT FORMAT screen.

Printer Options (for the Word Processor)

The options are available by holding down Open-Apple and pressing the O key (⌘-O). To set an option, type the two-letter code and press (RETURN). Then if prompted, type a number for the setting.

Options marked with an asterisk (*) affect the appearance of the text on the screen.

Printer Characteristics

CI: Chars per Inch	Set numbers of characters per inch.
LI: Lines per Inch	Set number of lines per inch.
PL: Page Length	Set length of page.
PW: Platen Width	Adjust printing to width of platen (paper width).
P1: Proportional-1	Print proportionally (type 1).
P2: Proportional-2	Print proportionally (type 2).

Printing Controls

EK: Enter Keyboard	Print directly from keyboard.
NP: New Page	Start new page.
GB: Group Begin	Begin unbroken block of text (no new page).
GE: Group End	End unbroken block of text.
PE: Pause Each Page	Pause after printing each page.
PH: Pause Here	Pause printing at current cursor position.
SK: Skip Lines	Leave specified number of blank lines.

Text Controls

LM: Left Margin	Set left margin.
RM: Right Margin*	Set right margin.
TM: Top Margin	Set top margin.
BM: Bottom Margin	Set bottom margin.
CN: Centered*	Center text between margins.
IN: Indent*	Set indentation (use for bulleting items).
JU: Justified	Align right edge of text.
UJ: Unjustified	Don't align right edge of text.
SS: Single Space	Print single spaced lines.
DS: Double Space	Print double spaced lines.
TS: Triple Space	Print triple spaced lines.
HE: Page Header	Set page header.
FO: Page Footer	Set page footer.
PN: Page Number	Set page number.
PP: Print Page No.	Print page number.
BB: Boldface Begin	Begin boldface (or use (CONTROL-B)).
BE: Boldface End	End boldface (or use (CONTROL-B)).
+ B: Superscript Beg	Begin superscript.
+ E: Superscript End	End superscript.
- B: Subscript Begin	Begin subscript.
- E: Subscript End	End subscript.
UB: Underline Begin	Begin underline (or use (CONTROL-L)).
UE: Underline End	End underline (or use (CONTROL-L)).
SM: Set a Marker	Set a marker in text (marker is not printed).

Functions in the spreadsheet perform various arithmetic, search, financial, and logical operations. A function is always preceded by the @ symbol. Some functions require an argument. Types of arguments include:

- value** A single numerical value. May be a number or an expression that evaluates to a number.
- range** A series of adjacent cells, such as (A9..A19) or (B45..H45).
- list** a list of single values or ranges separated by commas, such as (B9,H19,A1..A13).

Arithmetic Functions

- @ABS (value)** Absolute value of the argument.
- @AVG (list)** Arithmetic mean of the values in the list.
- @INT (value)** Integer portion of the argument.
- @MAX (list)** Largest value in the list.
- @MIN (list)** Smallest value in the list.
- @SQRT (value)** Square root of the argument.
- @SUM (list)** Sum of all the values in the list.

Search/Other Functions

- @CHOOSE (value, list)** Uses value as an index to list. Value may be pointer to another cell.
- @COUNT (list)** Returns number of non-blank entries in list.
- @ERROR** Displays ERROR.
- @LOOKUP (value,range)** Searches successively through range for largest entry that is less than or equal to value. Returns corresponding value from adjacent range.
- @NA** Displays NA (for "Not available").

Financial Function

- @NPV (rate, range)** Calculates Net Present Value according to the interest rate and a series (range) of even or uneven payments.

Logical Function

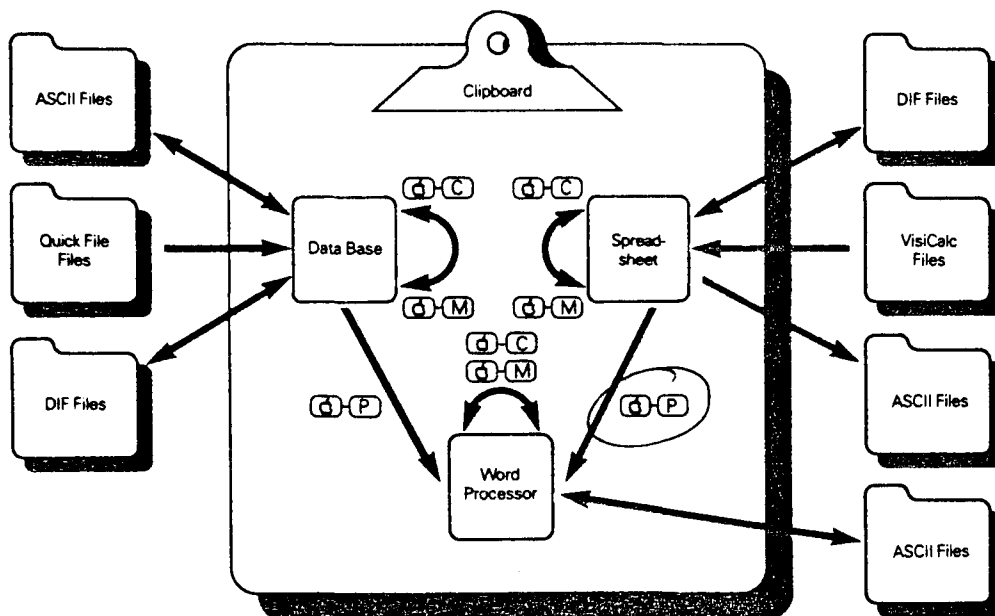
- @IF(logical value, value1, value2)**

If logical value is TRUE, returns value1. If logical value is FALSE, returns value2. Logical values are created using following operators:

- < less than
- > greater than
- = equal to
- <= less than or equal to
- >= greater than or equal to
- <> not equal to

For example: @IF(G42 >= 17,A11,B17), or @IF(G42 = G19,0,1).

Integration: Using the Clipboard



Appendix B:

Evaluation Form given to
SPS Staff Members
in June, 1987

Evaluation

PLEASE CHECK THE APPROPRIATE RESPONSE IN EACH OF THE FOLLOWING:

1. I am presently employed in this school primarily as: _____ a) an administrator;
_____ b) a teacher;
_____ c) a secretary; or
_____ d) a teacher aide.

2. _____ I am aware of the computerized student data base in Seven Persons School. (go on to question #3)
_____ I am not aware of the computerized student data base in Seven Persons School. (go on to question # 6)

3. I became aware of the computerized data base by means of (check all that apply):
_____ informal conversatton with other staff members
_____ a demonstration of the data base at staff meeting
_____ the Appleworks workshop held at our school.

4. _____ I HAVE used the data base to obtain school-related information within the last two months.
_____ I HAVE NOT used the data base to obtain school-related information within the last two months.

5. If you HAVE used the data base to obtain school-related information within the last two months, briefly describe the application(s).

6. If you HAVE NOT used the data base to obtain school-related data, what are some potential applications that you might see for the data base?

7. If you HAVE NOT used the data base, briefly explain why not.

8. Did you take part in the four-hour Appleworks workshop held at Seven Persons School on April 29/30, 1987?

Yes
 No

9. If you DID take part in this workshop, please answer the following (If you DID NOT, go directly to question 10):

a) Had you used Appleworks before? a little
 a lot
 not at all

b) How well were you able to use the Appleworks program before and after the workshop?

PLEASE CIRCLE 1,2,3,4 OR 5

		<u>B E F O R E</u>					<u>A F T E R</u>							
		A. THE WORD PROCESSOR												
Very Well	5	4	3	2	1	Not Well	*	Very Well	5	4	3	2	1	Not Well
		B. THE DATA BASE												
Very Well	5	4	3	2	1	Not Well	*	Very Well	5	4	3	2	1	Not Well
		C. THE SPREADSHEET												
Very Well	5	4	3	2	1	Not Well	*	Very Well	5	4	3	2	1	Not Well
		D. THE CLIPBOARD												
Very Well	5	4	3	2	1	Not Well	*	Very Well	5	4	3	2	1	Not Well

10. Do you think the Seven Persons School Data Base would be more useful at specific times of the school year? (i.e. school opening, track and field day etc.) _____

If so, please list some of these times

11. Please rank the following applications of the data base in terms of their usefulness to you at this school. (1st, 2nd, 3rd through 8th)

- _____ a) a centralized store of general student data;
- _____ b) a backup to existing written files and documents;
- _____ c) a supplement to more confidential files of student performance, test results, etc.
- _____ d) a means of quick access to :
 - i) individual student information, and
 - ii) particular lists of students, including cross-referenced lists with two or three specific criteria (i.e. students whose birthdays are in July and who are in a certain intramural house and who are in a particular grade)
- _____ e) a time and energy saving device for administrative and secretarial staff;
- _____ f) a means of conveniently and quickly producing current, printed, alphabetical, or numerically-ordered lists of students for a wide variety of purposes;
- _____ g) a means of quickly revising and updating student data; and
- _____ h) a means of obtaining a broad picture of the school's student population in terms of any of the student information categories on file (i.e. by bus route, by phone numbers, by medical problems, etc.)

12. Please make any general comments you have about the Seven Persons Student Enrollment data base in terms of:

a) the need for a computerized data base in our school

b) the types of categories of data which are most useful; least useful

c) the possibility of all cumulative records being stored on a computerized data base

d) who should have access to a student enrollment data base

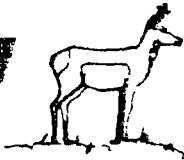
e) other

THANK YOU FOR TAKING TIME TO COMPLETE
THIS QUESTIONNAIRE!

Appendix C:

Letter from SPS Principal
to Cypress School Div.
Deputy Director
following the Appleworks
Inservice

CYPRESS



SCHOOL
DIVISION No. 4

SEVEN PERSONS SCHOOL

May 4, 1987

Mr. R. Carter
Deputy Superintendent
Cypress School Division No. 4
147 - 6 Street S.E.
Medicine Hat, Alberta

Dear Bob:

Re: Appleworks Workshop

After school, on April 29th and 30th, Cam Barbour presented an Appleworks Workshop which he developed for several of our staff members including our secretary. I found the workshop interesting and enlightening. There are definitely valuable uses for the Appleworks Program, particularly for the school office.

I should also add that Mr. Barbour did an admiral job in presenting this workshop to the Seven Persons staff.

I am sending you an outline of the workshop. Mr. Barbour would be willing to present this workshop to other interested Divisional staff members. The workshop takes 5 - 6 hours to complete.

Yours truly,

A handwritten signature in cursive script that reads 'K. Jones'.

K. Jones
Principal

Enclosure